

# Effective Venting Strategies

by John O'Connell

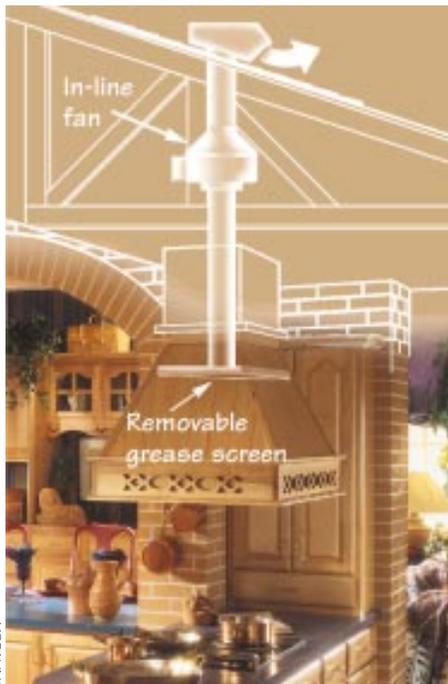
Most people in the building trades know that kitchens and baths are the main culprits when it comes to generating moisture and air pollution in the home. Both rooms require special attention to remove smells and water from the air.

## Kitchen Ventilation

Unless your customer is willing to constantly open and close windows to exhaust their kitchen or bath, there are only two effective ways to remove stale air from and introduce fresh air into a home.

Exhaust-only ventilation systems rely on both an exhaust fan to push air and moisture out and a good floor plan to circulate makeup air through the house.

Balanced systems, such as those manu-



**Figure 1.** An in-line fan located in the attic is quiet when running at high speed. With a variable-speed switch, the fan can be run at low speed during meals to keep food odors from permeating the rest of the house.

factured by Venmar (see source list at end of article), ventilate the whole house and bring the same amount of air into the home as they expel. In theory, balanced systems keep the entire house under neutral pressure. They cannot, however, be relied on for complete kitchen ventilation. If an exhaust port is located in the kitchen or nearby — such as in a half-bath — the kitchen will remain under negative pressure. Food and cleaning odors will be exhausted to the outside, but you still need higher speed ventilation while cooking, such as with a range hood and an exhaust fan.

Unfortunately, most range hood manufacturers focus on colors and styling, installing a loud blower motor seemingly as an afterthought. For example, manufacturers of island ranges supply down-draft systems that draw up to 1,200 cfm (cubic feet of air per minute); this is equivalent to a complete air change every 20 minutes in a 3,000-square-foot home. Since exhausted air must be replaced with makeup air, the potential for sucking noxious fumes into the living area through the furnace, fireplace, or even septic system — called backdrafting — is very real.

In contrast, a range hood fan that draws 300 to 600 cfm with the hood located directly above the cooking surface is adequate for most homes. At this rate of air exchange, the hood simply captures the heat, smoke, and grease that is already rising. Remember, the goal isn't to ventilate the entire house with this fan, but rather to use it for a specific task requiring less than an hour of running time.

A good option for range hood exhaust is a remote-mounted in-line fan, such as those made by Fantech (see Figure 1). While the filters and switches remain in



**Figure 2.** With a single remote in-line fan and a split duct (inset), you can ventilate back-to-back bathrooms or locate exhaust ports directly above more than one fixture.

the kitchen, the fan can be located in the attic, reducing in-room noise. With a variable-speed control, the fan can be run on high while cooking, then turned down to continue ventilating at a lower speed. This keeps the kitchen under negative pressure so food odors won't permeate the rest of the house.

Also, an in-line fan can be ducted down and out, avoiding roof penetration and sometimes requiring shorter duct runs. The fan will also be protected from temperature extremes and more accessible for maintenance.

## Bathroom Ventilation

Short of a whole house HRV or ERV, bathroom venting choices include surface-mounted ceiling fans, remote in-line fans, central ventilating systems ("fan-in-a-box"), or outside wall-mounted fans.

Surface-mounted ceiling fans are a good choice for small- to medium-sized bathrooms. Look for units rated 1.5 sones or less (one sone is equivalent to the noise of one refrigerator), such as Panasonic's VQ series or Broan's Solitaire line. A rule of thumb for sizing ceiling fans is to add 10% to the room size; for example, an 6x8-foot bathroom would call for a unit with 52.8 cfm, assuming the ceiling height is under 8 feet and the duct run is less than 15 feet. These units come in several fan/light configurations, and Broan's Sensaire line offers built-in humidity or occupancy sensors.

For large bathrooms, remote in-line fans can draw from multiple points (Figure 2, page 73). For example, in a bathroom with a hot tub, whirlpool or steam shower, exhaust ports can be located directly above the major moisture source, as well as over the vanity and/or commode. This is achieved by attaching a Y pipe to the in-line fan and running the ducts to each location. The same technique can be used to ventilate back-to-back bathrooms.

"Fan-in-a-box" units, such as those manufactured by Aldes and Fantech, are about the size of a microwave and have as many as four small ports, along with one larger port that is vented directly to the outside (Figure 3). These units can ventilate three or four rooms simultaneously and are sometimes used as whole house exhaust systems. When used for bathroom ventilation, however, the downside is that when the bathroom is exhausted, other rooms connected to the box are exhausted also since there are no individual room controls. This may cause drafts throughout the house.

Outdoor wall-mounted units are a good option if the house layout doesn't permit a surface- or remote-mounted fan, such as a bathroom with a cathedral ceiling. These fans come in a weathertight housing and are installed on the outside wall; a duct with a backdraft damper runs directly through the wall or into the floor system. Interior bathrooms can be vented with wall fans by running the duct through the ceiling parallel with the

joists; this works well when remodeling older homes with limited space for ducts.

Wall-mounted units should be located where they'll have the least visual impact. Also, avoid locations where the fan will blow exhaust toward areas where people may gather.

### Selecting a Ventilation Unit

Regardless of the kitchen or bath ventilation system you decide upon, it's important to properly select, size, install, and seal the fan and ductwork. Any ducts in unconditioned spaces (those not mechanically heated or cooled) should also be insulated.

Consider the length of the duct run, the number of right angles, and the type of duct material. Every turn slows down air flow, round ducting displays less resistance to air flow than rectangular, and flexible ducting resists air flow twice as much as smooth ducting. You may need to increase the cfm rating of the fan to compensate for impediments to air flow. Consult your local distributor or supplier when sizing a system.

Use sealing tape and a latex-based mastic to wrap all joints and cover the horizontal seams in rigid ducting. This will improve ventilation efficiency and keep noxious fumes from entering the house. Avoid the gray duct tape found in most hardware stores; it dries out quickly and loses its adhesive quality.

A variety of control units are available



**Figure 3.** Fans with multiple ports are a convenient way to ventilate up to four rooms simultaneously. A drawback, is that without individual room controls, all areas are exhausted whenever the fan runs.

from Broan, Leviton, Tamarack Technology, and several other manufacturers. These include programmable timers, speed controls, LED toggle switches (which indicate whether a remote fan is on or off), and time-delayed switches.

I strongly recommend that you purchase equipment that bears a label from the Home Ventilating Institute (847/394-0150), which indicates the fan meets HVI performance standards.

Also check the warranty. Look for fans that are rated for continuous use and carry at least a two-year warranty. Five years is even better and some HRV/ERV manufacturers offer lifetime warranties on certain components.



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### Makers of Vent Fans and Controls

**American Aldes**  
800/255-7749

**Leviton**  
800/323-8920

**Tamarack**  
800/222-5932

**Broan**  
800/558-1711

**NuTone**  
800/543-8687

**Venmar Ventilation**  
800/667-3717

**Fantech**  
800/747-1762

**Panasonic**  
201/348-7231