## Musings of an Energy Nerd

Contemplating residential energy use

# A Better Bath Fan Termination for Soffits

**A review of the EZSoffitVent**

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GBA PRIME

Most bathroom exhaust fans are installed poorly. Because of twisted ductwork, improper terminations, and (in some cases) inappropriate backdraft dampers, the actual air flow through the exhaust fan is much less than the fan rating.

In an article called "A Failure That Stalls the Certification of Many Energy Star Homes," Allison Bailes described an Energy Star builder who installed nine exhaust fans, each rated at 110 cfm. The builder was hoping that these fans would meet minimum program requirements — requirements which call for bathroom exhaust fans to have an air flow rate of at least 50 cfm. When tested, however, only five of the nine fans met the minimum 50 cfm threshold.

Image 1 of 3

**The EZSoffitVent is a plastic termination fitting for bathroom exhaust fans.** It includes an integral backdraft damper.

Some of the problems with current installation procedures involve old-fashioned sloppy workmanship:

- Leaky duct seams;
- Duct diameters that are too small;
- Convoluted ducts with unnecessary twists or too many elbows.

Other problems aren't necessarily the installer's fault:

- Most fans lack a good backdraft damper. Installing an inline backdraft damper severely restricts airflow, however.
- In many homes, there is no easy way to route the exhaust duct to an exterior termination. While soffit terminations are tempting — and in many cases closer than a gable-end termination — most existing soffit termination hardware has serious problems.

In my article on bathroom exhaust fans, I recommended against soffit terminations: "Soffit terminations grow icicles during the winter, and allow humid air to be sucked into the attic in all seasons." I may have to change that recommendation, however, in light of a new type of soffit termination that has been engineered to solve several bath fan installation problems.

The new soffit termination is called the EZSoffitVent (yes, with all the letters smushed together, without any spaces).

### Designed for job-site realities

The EZSoffitVent limits the problem of humid air entering soffit vents by including an adjustable ring that allows the installer to direct the airflow downward at a 45 degree angle, away from the building. Air leakage when the fan is not operating is effectively prevented by a well-designed backdraft damper. The rigid plastic damper is hinged at the top. When closed, it's fairly tight. Yet a breath of air from your mouth is sufficient to open

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the damper.

The termination disassembles into at least three pieces. This disassembly is designed for ease of installation. After the unit is installed, the termination fitting can be rotated to ensure that the duct connection is optimal. The manufacturer provides excellent installation instructions on the company's web site (see Image #2, below).

The design of the termination (and the fact that it disassembles into several pieces) addresses a job-site reality — namely, the fact that at least two different contractors need to work with this type of installation: the contractor who installs the exhaust duct, and a different contractor (usually the siding contractor) who installs the soffit.

With the EZSoffitVent, the duct can be routed to the termination before the soffit is installed. When the siding contractor shows up to install the soffit, the termination is properly positioned to make soffit installation easy.

**Developed by an energy nerd who understands air flow**

The EZSoffitVent was designed and developed by Joe Nagan, an energy consultant from Wisconsin and a long-time friend of GBA. (Many GBA readers probably recall that Joe Nagan has made an appearance in at least two of my blogs: How Balanced Ventilation Systems Become Exhaust-Only and Broken Ventilation Equipment Goes Unnoticed for Years.)

The plastic termination is manufactured in the U.S. and distributed by Panasonic.

Joe Nagan has tested his soffit termination in a lab (see Image #3, below). According to his tests, a fan that delivers 128 cfm without any ducts delivers 118 cfm when attached to the EZSoffitVent. In other words, the backdraft damper and grille only account for a 10 cfm reduction in airflow. When the same fan was tested with two other brands of inline backdraft dampers, the measured airflow was 74 cfm with damper #1 and 115 cfm with damper #2. So the EZSoffitVent was the best performer of the three tested dampers.

**Soffit thickness limitations**

According to the manufacturer's installation instructions, the termination "works with soffits 5/16 inch to ½ inch thick." I emailed Joe Nagan with this question: "What if a builder uses ¾-inch-thick tongue-and-groove boards? Is there any way to make this product work?"

Nagan responded, "Funny you should ask. The home where we installed the first ever vent units had a half bath off the front of the house. They decided to bring the exhaust duct out the porch ceiling that had ¾-inch tongue-and-groove wood just as you asked about. It did work fine in this case with ¾-inch ceiling boards. That's about the limit as to thickness. Much beyond that and the grille shoulder will not engage into the vent body as we designed. We don't want leakage at this intersection. The screw that comes with it is a #8 x 1 1/4 inch pan head screw. If it doesn't engage enough for you, get a slightly longer #8 pan head."

**You're not home free yet**

Installers who purchase the EZSoffitVent can still mess things up, of course, especially if they end up with convoluted ductwork. But the unit's flexibility and its well-design backdraft damper should go a long ways toward reducing installation problems.

The EZSoffitVent is available online at prices ranging from $24.95 to $34.50. For more information, visit the Bath Fan Solutions web site.

*Martin Holladay's previous blog:* ***"'Extended Plate and Beam' Walls."***

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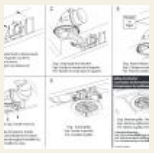


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