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The Dangers of Powered Attic Ventilators

In a fascinating presentation at the annual meeting of the Energy Efficient Building Association (EEBA), researchers Bruce Davis and John Tooley presented case studies of serious safety hazards and structural damage caused by powered attic ventilators.

The problem is that unless the ceiling of the home is airtight, the powered attic ventilator draws air from inside the home up into the attic through the ceiling (Figure 1). In an eight-home study in North Carolina, Tooley and Davis found that attic ventilators pulled up to 650 cubic feet per minute (cfm) of air from the living space. Using specific pressure calculations, they demonstrated that this air flow is very difficult to prevent.

The unintentional air flow creates two problems. First, the suction on the living space creates negative indoor pressure that can cause gas-fired water heaters and furnaces to backdraft. Davis described one example in which an attic ventilator caused a malfunctioning gas water heater to spew carbon monoxide into the living space. Within ten minutes after turning on the fan, the carbon monoxide concentration in the home rose to 75 parts per million.

The second problem is that the ventilator may suck warm humid outdoor air into the home. This not only increases the house cooling load, but may also lead to moisture problems.

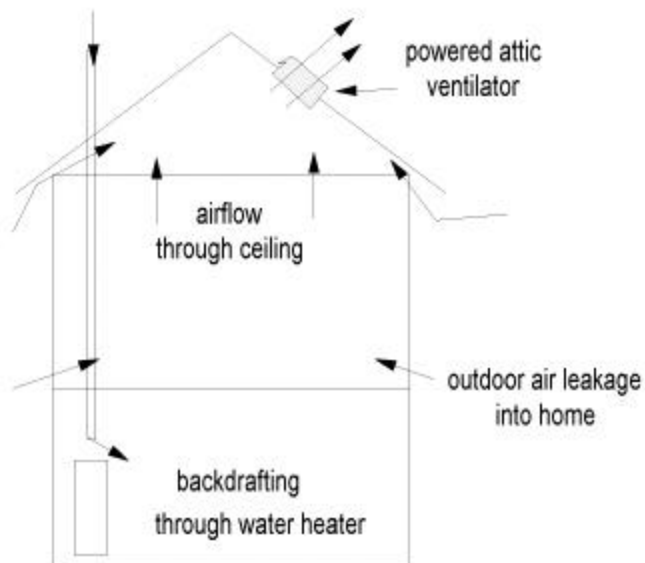


Figure 1 -- Unless the ceiling in a home is airtight, a powered attic ventilator will pull air from the living space up into the attic. Makeup air is then drawn into the home from outdoors, adding to the house cooling load and possibly causing backdrafting problems

In a classic illustration of the interaction of the systems in a house, Tooley described one extraordinary case study in which a powered attic ventilator caused the ceiling drywall in part of a house to become saturated with condensed moisture and fall to the floor. The home had a problem with leaky return ducts that were pulling in outdoor air. A heating contractor repaired the ducts and apparently did a good job. Since the ducts were no longer drawing in warm outdoor air, they became cooler.

But then another problem arose. A powered attic ventilator was pulling outdoor air into the ceiling cavity where the ducts were located. Prior to the repairs, this was not a serious problem. But once the ducts were fixed and began to run colder, moisture from the outdoor air began to condense on the cool duct surfaces. Eventually, enough condensation formed to saturate the ceiling drywall, which eventually dropped to the floor. The problem was permanently cured by sealing leakage pathways to the outdoors and disconnecting the attic ventilator.

Eliminate powered attic ventilators?

The Tooley/Davis report provides compelling evidence to stop using powered attic ventilators in homes with natural-draft gas appliances, especially since there is a question whether these devices serve any useful purpose for newly built homes.

For more information, contact John Tooley, Natural Florida Retrofit Inc., 1721 County Road 455, P.O. Box 560301, Montverde, FL 34756; (407) 469-2173, or Bruce Davis, North Carolina Alternative Energy Corporation, P.O. Box 12699, Research Triangle Park, NC 27709; (919) 361-8000. The Tooley/Davis paper is published in the proceedings of the 1995 *Excellence in Housing Conference*, available from the Energy Efficient Building Association, 1829 Portland Avenue, Minneapolis, MN 55404; (612) 871-0413, Fax: (612) 871-9441.