

VENTED VERSUS NON-VENTED ATTICS: THE ARGUMENT FOR ENERGY SAVINGS

**Which is better for energy savings, temperature and humidity control:
a vented or non-vented attic?**

BY BRUCE BOYERS

For homeowners, design of a new house must include many factors, including the best possible energy savings and comfort control. For architects and builders, recommendations must be made that take all homeowner desires into account and this includes educating homeowners on the best possible methods for achieving their aims. Which is more efficient: the traditional vented attic insulated with fiberglass or cellulose between the joists, or an unvented attic sealed with spray polyurethane foam (SPF)?

THE COMMON OR THE MOST EFFECTIVE?

In a traditional vented attic, insulation in the form of fiberglass batts or cellulose is placed on the attic floor, between joists, to insulate the ceiling from the seasonal heat and/or cold. The rest of the attic is left uninsulated and vented through gable, soffit and ridge vents in the roof structure. In theory, this would seem to make sense, as heat from the attic is vented outside, but an attic in the summer months can heat up to 135 to 140 degrees Fahrenheit – an apt demonstration that the attic is simply absorbing heat from the outside. This is especially true with black or dark-colored roofs which absorb heat and pass it through to the attic.

Many attics contain air conditioning units or, at the least, ducts which conduct cool air to the rest of the home. When the air conditioner is not running, the still air within the ducts is heated to the surrounding temperature of the attic. Once the air conditioning unit re-starts, the hot air within the ducts is forced back into the living space. To obtain the objective of a cooled living space, the air conditioning unit must work that much harder – a considerable waste of costly energy.

Additionally, because of the temperature differential between the inside of the ducts and the outside, condensation and moisture can form and collect in the attic, even leaking through the living space.

This type of engineered system is the most common throughout the U.S., but it is clear that there must be a more effective method.

A method rapidly gaining popularity, especially in areas that experience hot and humid climates in spring and summer months, is that of a closed, unvented attic space sealed with polyurethane foam.

In this method, the foam is sprayed directly to the underside of the roof between the joists, down around the rim and into the soffit areas, on the gable wall ends. The entire attic space is effectively sealed off and insulated from any air infiltration.

Doug Commette of Sprayfoam.com, a leading support site for spray foam contractors, says he has seen a recent sharp increase in inquiries about closed attic systems. "We've seen a marked increase in traffic to our Web site such as technical questions in our Q&A forums, building code-related questions and admission fire barrier-related questions, all dealing with vented versus unvented attics," Commette said.

The site offers many technical documents and extensive information on the subject.

THE SPF ADVANTAGE

The advantage to unvented attic is when you're spraying SPF on the underside of a roof deck, you basically make that a semi-conditioned space," said Mason Knowles, expert SPF consultant with over 40 years in the industry. "The spray foam separates the interior and the exterior environment, both in humidity and in temperature, so the attic space, instead of being whatever the outside temperature is, is a temperature within 7 or 8 degrees of the interior environment. That makes a big difference, particularly if you have ducts in the attic or even in some places they might have a furnace in the attic. So it becomes much easier to keep that building at the desired temperature.

A closed attic environment also makes it easier to control moisture which contributes to indoor air quality. If it is known that there will be a certain amount of humidity within a completely sealed home, it becomes possible to condition the air to occupant desire. This provides for more cost-effective energy usage while maintaining temperature and humidity levels.

Unvented attics, of course, work best in geographical areas that experience wide variations in temperature and humidity. "In the spring, summer and fall in such areas, your temperatures can range from 70 to over 100 degrees, and humidity runs from 50 to 80 percent," said Knowles. "With a vented attic, it goes into that attic space. There are all kinds of things in that attic space that have colder surfaces, and there's a great potential for condensation that you can't control in a vented space. In extreme cold conditions, you're trying to control all the cold air in the attic with just the insulation on the attic floor. Convective air currents within an unvented attic in either hot or cold conditions can reduce insulation efficiency by 50 percent. An unvented attic sealed with SPF greatly reduces these variables and makes for a much more energy-efficient home."

"An unvented attic provides several advantages with HVAC equipment is located in the attic space," said Rich Duncan, technical

director for the Spray Polyurethane Foam Alliance. “Air leakage from poorly-sealed ducts is contained within the building instead of being released into the vented attic, and conductive heat losses through the duct walls are also reduced. If the attic is sealed with SPF, the HVAC equipment is encapsulated completely within the building envelope, allowing the equipment and duct-work to operate more effectively at normal room temperature.”

REAL-WORLD RESULTS

“There are several studies summarized by a 2005 Florida Solar Energy Commission Center report that show an unvented attic provides measureable savings on cooling costs in hot climates,” Duncan said.

“These savings are realized because the ductwork and equipment are completely self-contained within the conditioned space of the building.”

“A test conducted in Oak Ridge National Laboratories showed only a 7- to 8- degree difference with an unvented attic between the attic space and the living space,” added Knowles. Oak Ridge National Laboratories is the US Department of Energy’s largest science and energy laboratory.

Knowles himself participated in the building of a home in South Texas in which pre-sealing temperatures were measured in the attic at over 135 degrees on a 90-degree day. After spraying three inches of foam under the roof deck, the attic temperature remained between 90 and 92 degrees. Another home he actually owns in Virginia is a three-story condo that, prior to the application of SPF, had an 8- to 10- degree temperature variation between the basement and the top floor. Once SPF was applied to the walls of the basement and in the attic, the differential dropped to 2 to 3 degrees with the same outside temperature. Over time since the installation, they have also used approximately 25 percent less energy. Two years later, Knowles was able to downsize the air conditioning unit from a 2 ½-ton unit to a 2-ton unit.

THE BEST POSSIBLE SOLUTION

Homeowners today are “going green” and are demanding that their homes are energy efficient. SPF technology enables them to save substantially and move their abodes into maximum energy efficiency.

For more information and education on the advantages and uses of spray polyurethane foam, please visit www.sprayfoam.com

Bruce Boyers is a freelance writer based in Glendale, California.