Always Separate the Attics from the Living Spaces by Air Sealing. WHY?

Q. Why does the Home Performance Industry and every program make it the top priority to fully separate attics from living spaces? Why is it so important to keep attic air out of the house and house air out of the attic? What can happen if the attic isn't fully air sealed from the living space?

A. Attic air can contain contaminants. These contaminants may include mouse droppings, fiberglass, asbestos, and mold. If this air gets sucked into the living space, it can cause health problems for the people living in the house. Also, air from the living space can easily get into the attic, carrying water vapor with it. If that water vapor hits a cold place in the attic, it can cause rot and mold growth.

With our Zonal Pressure Diagnostics (ZPD) House we demonstrate the critical issues around proper air sealing.

Q. How does air from the living space get into the attic?

A. In the winter, when the heat is on, the heated air rises and expands and pushes against the top ceiling of the building. If there is a way for the air to get out into the attic, it will. A common place for air to leak out is at places where the builder didn't seal, such as around the tops of walls at the ceiling (top plates), around attic hatches, over dropped soffits over cabinets, around recessed lights, and around chimneys. This is due to the stack effect, and is the biggest reason for heat loss in the winter.

This is an open wall top. Heated air from the living space gets into this wall and then gets into the attic and is wasted. It also delivers moisture to the attic which can cause roof rot and mold. And, it can suck on the combustion appliance zone and cause the appliances to backdraft. Also, cold attic air can drop into the living space through these openings.

Q. How does air from the attic get into the living space?

A. Beside the places mentioned above, if there are ducts in the attic, and the return ducts have holes in them, attic air can be sucked into the house through those duct leaks. Anything that causes unbalanced house or room air pressures can cause bad air to mix with good air.

This is an unsealed return plenum in an attic.

Q. Can an unsealed attic cause my combustion appliance to backdraft?

A. Yes! When a bypass, such as a chimney chase, isn't air sealed in the attic, the stack effect can suck air out of the basement. Since most of our heating and water heating systems are in basements, their flue pipes can be the source of the make-up air that is being sucked out of the basement. This is very dangerous! Watch our YouTube Video called Pure Energy Coach - Zonal Pressure Diagnostics House, http://www.youtube.com/watch?v=MI9Ro4IZ6kk&feature=plcp.

Test smoke isn't going up the chimney, indicating weak draft

Open by-pass in attic

Q. What does the Building Performance Institute (BPI) say about this?

A. BPI Standards are very clear about this issue and ***essentially*** state:

- Thou shall not add attic ventilation without first verifying that the attic is fully air sealed from the living space. And, Thou shall not add attic insulation without first verifying that the attic is fully air sealed from the living space. Adding ventilation without a solid air barrier between the attic and the living space will make the house air and heat leak out faster because the attic will be colder in the winter. If the house air is carrying moisture with it, the moisture will condense on the cold roof deck and cause wood rot and maybe mold. Also, unbalanced house pressures can cause natural draft heaters and water heaters to backdraft fumes. The fumes may contain carbon monoxide (CO). CO is very dangerous and can cause death. If the combustion appliance zone isn't fully separated from the attic, the combustion appliance zone can be under so much suction pressure that the combustion appliances can backdraft.

BPI expects technicians to verify an effective air barrier between the living spaces and the attic spaces by doing visual inspections, and by using a blower door, zone pressure testing with a manometer, and smoke. An infrared camera can also be a very effective way to find remaining air leaks.

The pressure boundary is re-established by capping this dropped soffit (bulkhead) hole with foam board at the same level as the rest of the attic and air sealing. Insulation will be blown over this whole area, and the old insulation, now.