



Effective Attic Ventilation

Increased attic ventilation has long been promoted by roofing material and attic ventilator manufacturers as a way to increase shingle life, decrease attic temperatures and lower cooling costs. Unfortunately, there is no scientific data to validate any of these points and mounting evidence and research to the contrary.

Attic ventilation was added to the nationwide building codes to prevent/eliminate roof damage caused by trapped, moisture-laden air migrating into the attic during winter. This code change followed the widespread introduction of indoor plumbing and central heating systems. As the use of attic insulation increased, ventilation proved valuable in controlling another problem, ice damming. Ice damming occurs when certain areas of the roof become warmer than others, causing a thaw-freeze cycle that allows accumulated snow to melt, then re-freeze on colder portions of the roof. This re-freezing creates an ice dam that works its way under shingles only to later melt and create roofing leaks. Ventilation ensures the roof deck temperature remains consistently cold so ice damming cannot start.

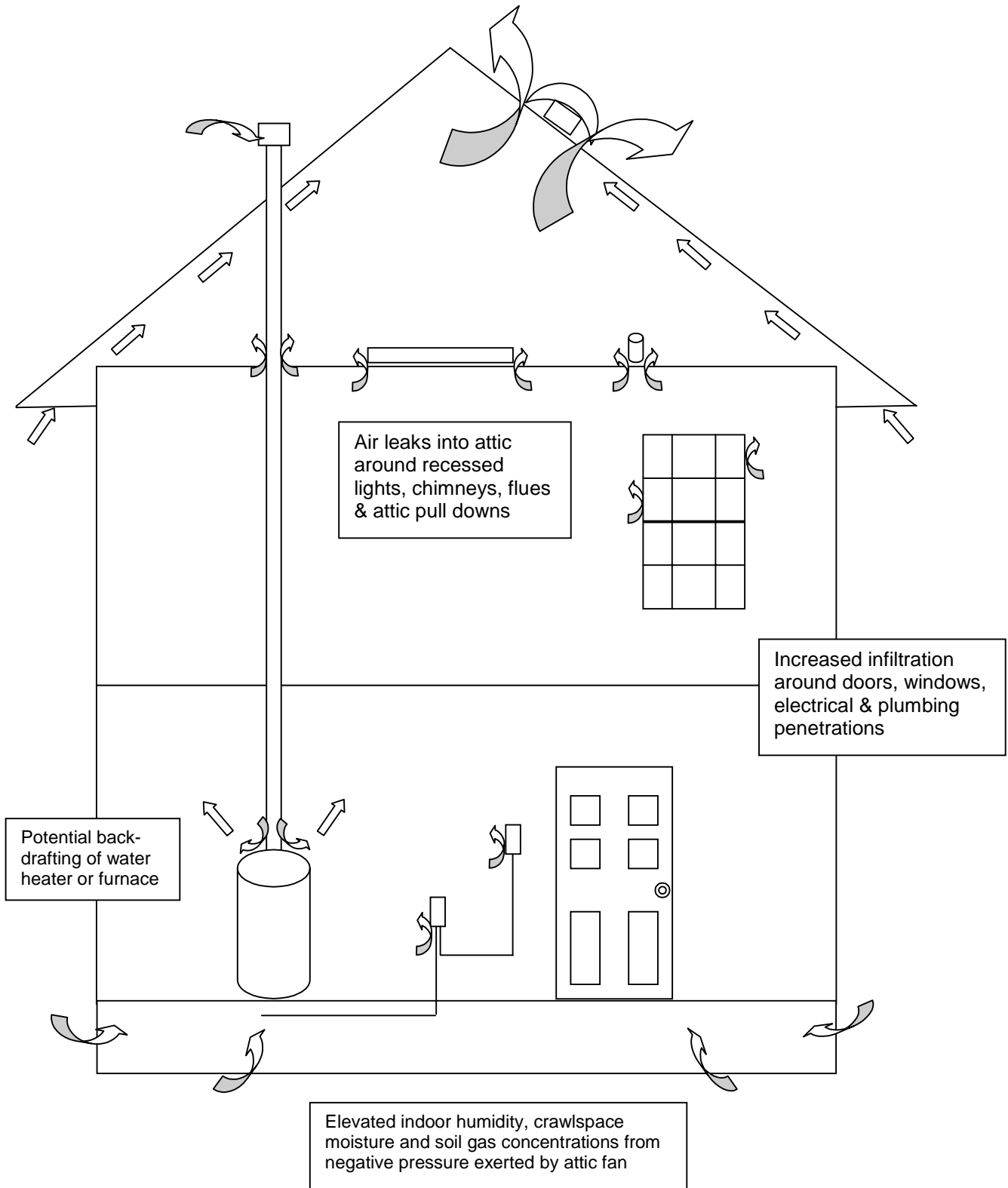
At some point, the original purpose for attic ventilation was forgotten and/or replaced, in cooling climates, with the belief that it was to reduce roof and attic temperatures, thus lowering cooling expenses and increasing shingle life. This was further compounded by the leap of faith that increased or powered ventilation would be even better. While sounding logical, there is simply no research to validate it. In fact, scientific testing has shown that attic ventilation has almost no effect on roof surface/ shingle temperatures and very little effect on attic temperatures.

There is however, a growing list of research, computer modeling and field data that indicates powered attic ventilation can be a detriment to health and safety and actually increase cooling costs. The latest and most compelling findings by Natural Florida Retrofit and the AEC Applied Building Science Center found that in all the homes they studied, powered attic ventilators (PAVs) offered no benefits and sometimes caused serious health and safety problems. The attached diagram shows just how PAVs unintentionally effect the house during operation. Their research found three reasons why PAVs are not a good energy investment:

1. PAVs can create negative pressures in combustion appliances causing the back-drafting of flue gases such as carbon monoxide in the living space. These same negative pressures can also draw increased levels of moisture and soil gases, such as radon, from the crawlspace.
2. PAVs can draw conditioned air out of the house and into the attic, causing the air conditioning to run more. Conditioned air is then replaced with moisture laden outside air, creating increased humidity levels inside the living space.
3. PAVs can increase utility costs substantially because of the increased energy necessary to run the fan and cool/dehumidify the outside air being drawn into the home.

Unintended Effects of Powered Attic Fans

Total Fan Capacity – Attic Ventilation Ability = House Air Drawn by Fan



Controlling Attic Temperatures

The most effective strategy for minimizing the effects of summer attic temperatures and eliminating the potential for winter ice damming is as follows:

1. Eliminate air leakage between the attic and living space. Common leakage points are penetrations made by plumbing and electrical fixtures, top plates of interior walls, attic pull downs/ doors and plumbing chases. Use expanding foam or caulk for plumbing and electrical penetrations and weatherstripping for doors or pull downs.
2. Seal ductwork located in the attic using a commercial grade duct sealer or mastic and insulate with a minimum 2" insulated duct-wrap with vapor barrier.
3. Insulate the attic floor to a minimum R-30.
4. Use light colored shingles to reduce roof surface temperatures.
5. Provide ridge and soffit or gable and soffit passive ventilation to building code specifications to remove moisture and prevent ice damming.