



TAKING THE VENTS OUT OF VENTED CRAWL SPACES

Crawl space foundations are a popular feature in building construction throughout the U.S. They are a go-to for most households because they are cheaper than full basements but more functional than slab foundations. These spaces offer convenient locations for plumbing, electrical lines, and ductwork for heat and air conditioning systems.

Unfortunately, crawl spaces pose a major problem—for several decades they have been built and maintained incorrectly. Building codes and conventional wisdom have insisted that crawl spaces be ventilated with outside air to control moisture and improve damage within the space.

However, wall-vented crawl spaces can actually be the cause of moisture buildup and other complications in households. Many unpleasant symptoms are associated with wall-vented crawl spaces. These are most often noticed in the humid spring or summer seasons, but can occur in the home anytime of the year. Common symptoms experienced with a conventional wall-vented crawl space are:

- Mold or moisture damage in the crawl space or living area
- Condensation on insulation, water pipes or truss plates in the crawl space
- Condensation (“sweating”) on air conditioning ductwork or equipment
- Musty odors in the living area
- Buckled hardwood floors
- High humidity in the living area
- Insect infestations
- Rot in wooden framing members

Before research studies found the failures of wall-vented crawl spaces, the most common treatment for dealing with these symptoms was to add even more ventilation, by either installing additional ventilation openings to the outside or installing fans to deliberately move more outside air through the crawl space. With high costs and time-consuming repairs to resolve the moisture concerns and other difficulties, homeowners, property managers, tenants, and the construction industry became more aware of the importance of finding ways to stop these symptoms from the start. This awareness led to research on closed crawl spaces. Research conducted by Advanced Energy found that closed crawl spaces, insulated spaces without vents to the outside, can significantly improve moisture control and have major energy savings with proper installation.

THE VENTILATION MYTH

Using outside air to ventilate a crawl space only adds more moisture to the area—it does not dry it out. Furthermore, wall-vented crawl spaces allow condensation, surface mold growth, high wood moisture content and rotting wood to increase.

THE OUTSTANDING BENEFITS

The most significant benefit of closing a crawl space is improving the quality of life of a household. Without moisture and mold building in the foundation of a home, air quality will easily improve in the home, which can greatly reduce health side effects caused by air pollution. Research has also found that by insulating the crawl space, heating and cooling costs can be reduced by up to 18 percent. Furthermore, closed crawl spaces create warmer floors during the winter seasons and minimize damage to hardwood.

A PROPER DESIGN

Now that a solution has been discovered, researchers and installers have been testing and improving closed crawl space designs. There are many components to consider when designing a proper crawl space that will meet and surpass the minimum requirements for residential codes. Moisture management is the primary goal for any closed crawl space system, therefore, it is the most important requirement.

Two basic strategies are used to manage both liquid water and water vapor: blocking sources and facilitating removal. Facilitating removal outlines the various ways to mitigate the moisture that will inevitably get into even a closed crawl space, whereas blocking sources describe the methods in handling factors such as roof runoff, exterior ground and surface water, humid air and evaporation from the ground and perimeter walls.

In addition, pest control is a priority throughout every step of installing and maintaining a closed crawl space. Perimeter walls are the most common path wood-destroying insects take to get from the ground to the structure so designers must pay extra attention to the materials applied to these walls.

Furthermore, combustion and fire safety, thermal insulation and radon control are additional requirements to keep a crawl space safe and running well without posing any danger to the home.

THE INSTALLATION

After a qualified installer has been contacted and the design has been defined, both the homeowner and the installer will need to work with the local code official to ensure that the closed crawl space design is acceptable and meets all code requirements for the state.

Quality installers of closed crawl spaces know the importance of managing moisture and other components during the construction process. Likewise, most experienced installers care about the long-term performance and typically offer quality assurance options, such as a monitoring system to inform the homeowner of relative humidity levels or a water alarm to inform the homeowner of a buildup of liquid water.

For those who currently have a wall-vented crawl space—don't lose hope! If you are unsatisfied with your existing crawl space, there are many methods offered to either improve it or convert it into a closed space. However, there is much more to converting a crawl space than just closing the existing vents. An experienced installer will know the appropriate steps to take in order to update a conventional wall-vented crawl space.

THE MAIN COMPONENTS OF A GOOD CRAWL SPACE DESIGN ARE:

- Moisture management
- Combustion safety
- Thermal insulation
- Pest control
- Fire safety
- Radon control

BASIC CRAWL SPACE MAINTENANCE

The crawl space may not be the most popular place in the house to explore, but a periodic inspection is imperative to ensuring that potential problems are caught early on. Even though basic maintenance inspections can be done by any homeowner, some may choose to hire a private home inspector or other contractor to do it for them.

Property owners should frequently replace batteries in sensors or alarms as needed, check to ensure that access doors are closed, especially in warmer weather, and ensure that there are no potentially hazardous materials in the crawl space. Most importantly, a homeowner needs to keep an eye on any water intrusion to make sure it is quickly drained or pumped out.

BRINGING CRAWL SPACES TO A CLOSE

With the help of Advanced Energy's research and investigations, closed crawl spaces are now the standard for LEED homes. This research also had a major impact on building code, making it easier to install closed crawl spaces. With the proper maintenance and installation, the benefits of having a closed crawl space certainly outweigh traditionally vented spaces.

This article was provided by Advanced Energy, a nonprofit energy consulting firm. For more information, visit www.advancedenergy.org.

**FOR MORE INFORMATION, VISIT
TOUCHSTONEENERGY.COM**