

INSULATION - ATTICS

ATTICS

1. Seal the Attic floor.
2. Bulk up the insulation above the top plate.
3. Vent the soffit continuously; as far to outside edge as possible.
4. Provide plenty of air space 1 to 2 inches are required between the back of the roof sheathing and the top of the insulation to ensure sufficient air flow through the to the roof venting.

Blown-In Cellulose or Fiberglass

1. Highly effective & environmentally friendly.
2. Small particles enter cavities filling gaps & air leaks.
3. Used with Soffit Vent Baffles; prevent air leaks & provide correct air circulation.



a. **Blown Cellulose** insulation is made from recycled newspaper and treated with borate for fire retardance.

b. **Blown Fiberglass** insulation is fire retardant with a R-value of 3+/- per inch.

c. **Fiberglass Batt** insulation is rolled in between and/or over the ceiling floor beams. **Faced** has a paper layer on one or both sides. **Unfaced** (pictured) has no paper layer and breathes better.

d. **Wool Batt** can be used for additional sound-proofing.

e. **Spray Closed Cell Foam** may also be used in a Conditioned or Closed Attic.



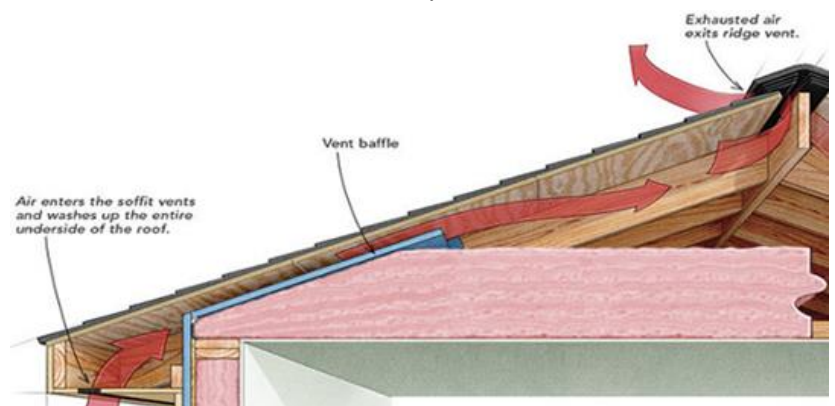
Attic Cap - Attic doors are a major culprit of air leaks; warm air in the attic in cold seasons or warm air from the attic during warm seasons.

Styrofoam & Foil Zipper caps are shown.



Soffit Vents – Styrofoam or Cardboard; styrofoam is more durable and moisture resistant. Soffit vents help your home achieve the right amount of airflow circulation while blocking moisture in the air from accumulating around the beams and interior elements of your home. This ventilation is achieved through mini-holes or vents in the soffit. These vents make your home breathable and

provide beneficial and proper attic air circulation.



INSULATION – WALLS, Batt & Foam

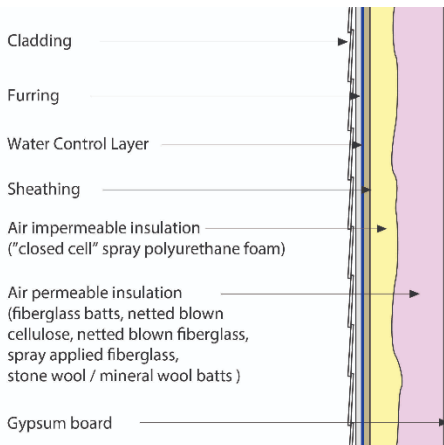
Fiberglass Batt Insulation - An effective & affordable new construction or retrofit option; when walls & ceilings are open. Proper installation ensures maximum thermal performance. Our installations are cut for precise fit around obstructions.



Spray Foam Insulation - Professionally applied, offers superior protection. Automatically seals seams, joints, cracks, & holes in attics, walls, crawlspaces & ceilings. It is the preferred choice for metal buildings.

Hybrid; Foam with Batt - The following information is from "Hybrid Insulation Systems" by Steve Easley;

<http://www.steveeasley.com/images/GreenBuilderMag-HybridInsulation10-09.pdf>.



Flash-and-Batt. In the continuing quest to get the most effective insulation for the dollar, contractors have discovered the foam/batt combo process referred to as **flash-and-batt**. This process provides a cost-effective way to get a high-performing building enclosure and perform quite well in walls and ceilings/attics. The beauty of the hybrid system is it marries the high-performance of spray foam with the economics of fiberglass. The process involves spraying a layer of closed cell foam (CCF), usually 1" thick on the inside of the exterior sheathing. Then fiberglass batt or blown insulation is installed over the CCF.

Airflow through insulation reduces its R-value. R-value is a term to describe how insulation performs in the real-world. These ratings do not consider heat scavenging by wind-washing through walls that reduce insulation performance.

On a windy winter day, the best sweater in the world doesn't help much without a wind breaker over it. That's because the wind blows right through the sweater and scavenges heat. The same phenomena occurs in walls.

Air sealing cracks and thermal bypasses reduce air infiltration at air leak points. Sealing these areas are important, but misses gaps at the perimeter of stud bays at plate lines. Infrared images illustrate heat loss at plate lines, studs and other openings. Some heat loss occurs by thermal bridging; points in a building where direct connections between the outside and inside through structural elements with a higher thermal conductivity than the rest of the building.



Foam to the Rescue. Spraying 1" of CCF in the stud cavity of a wall or ceiling seals the area fast and economically. The foam efficiently expands to fill cracks and gaps around framing as well as mechanicals much faster and better than caulk or foam joint sealant. The CCF layer also seals narrow framing cavities that are almost impossible to seal with caulk or fibrous insulation. CCF is durable and long-lasting. In addition, CCF has an R-value of 5.9 to 6.9 per inch allowing for a greater total wall R-value than with traditional fibrous or cellulose insulation

alone in the available space. The use of CCF does result in some compression of the fibrous insulation. The R-value of an R-15 batt compressed to 3" is about R-13. R-13 + 6.8 for the 1" foam gives you up to R-19.8 in a 2x4 cavity. Add the OSB sheathing and drywall and the entire wall assembly would be R-20+.



Cavity insulation alone allows thermal bridging.



Adding exterior continuous insulation prevents heat flow through framing.



INSULATION; WALLS – BLOWN-IN

Open Walls

While open walls are usually insulated with Batt or Spray Foam before being closed and finished, they can be covered with a plastic or polyurethane film and blown.



Closed Walls

Typically, blown insulation is used in finished walls of an existing home or building.

Holes are drilled from the exterior or interior between studs, where the cellulose or fiberglass insulation can be blown into the wall.

The holes are then plugged and repaired appropriate to the wall material. NOTE: Vance can pug the walls but does not do sheetrock or panel installation or repair.



FOAM

Occasionally walls can be insulated with spray foam instead of blown insulation. Such a decision would be based on equipment access, wall structure, wall strength and increased cost.



CRAWLSPACE

Basic Protection

- Tear Out & Haul Away deteriorated ground cover and/or insulation
- Install 6, 10 or 12 MIL Poly Vapor Barrier
- Install R-19 Insulation in Floor Joists

Closed

- Seal foundation vents
- Polyseal ground barrier to foundation; 10-20 mil poly floor taped at seams & caulked to walls & pillar footings
- Install R-19 Batt in floor joists
- Install Dehumidifier to control air moisture and temperature

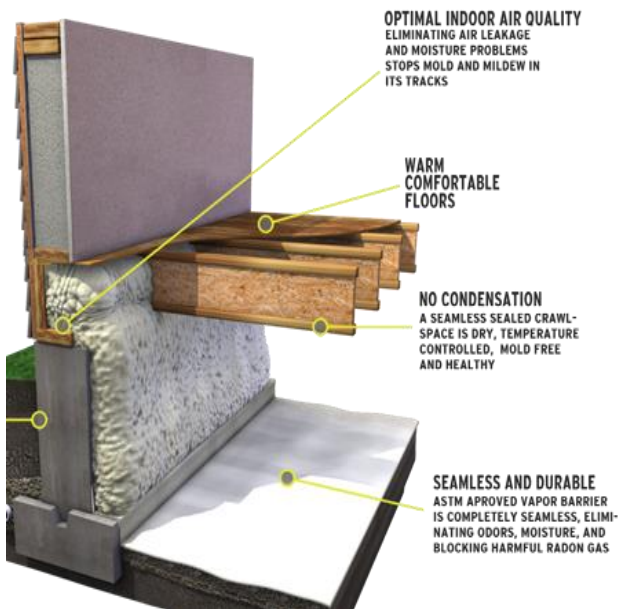
https://www.advancedenergy.org/portal/crawl_spaces/pdfs/Closed%20Crawl%20Spaces.pdf



Conditioned - Move insulation protection from floor to foam foundation wall, polyseal, install HVAC inducer for crawlspace heating/cooling. See **Building Science Corporation** article “**Info-512: Crawlspace Insulation**”, 6/18/15, <https://www.buildingscience.com/documents/information-sheets/crawlspace-insulation>

Crawlspaces should not be vented, should have floors joists uninsulated, sealed ground vapor barrier, walls insulated and air sealed, and conditioned air from HVAC or a dehumidifier.

Traditional Crawlspace: Traditional vented crawlspaces are often damp, moldy and inhabited. They allow air through many unintentional leaks in the floors, partitions, wiring, plumbing, and ducts. To ensure [durability](#), air quality and save [energy](#), a crawlspace must be kept [dry](#). The best way to do this is to create a conditioned environment that controls temperature and humidity by being sealed; free of moist/humid air and pests.



Ground Cover:

Crawlspaces should have continuous sealed vapor resistant groundcover materials such as taped polyethylene with control joints sealed. If crawlspace ground level is below ground level of the surrounding yard grade, it should have perimeter drainage.

Insulation: Crawlspaces should be insulated on the perimeters; not between floor joists. Perimeter insulation provides warmer and drier crawlspaces than insulation between the crawlspace and interior. Insulation should be moisture resistant to prevent interior air from contacting cold basement surfaces, creating condensation; such as concrete/block structural elements and rim joist framing. Structural element [below grade](#) walls are cold (concrete in direct contact with the ground). Below grade rim joists are cold both winter & summer.

Foam Insulation: The best insulation is [foam](#)-based and allows foundation walls to dry inwards. Foam insulation should be vapor semi-permeable or [vapor-permeable](#). The greater

the [permeance](#) the greater the inward drying and the lower risk of excessive moisture accumulation.

Circulation: To remove small incidental sources of moisture, it is important to have some air circulate from the living space in the crawlspace. It is for this reason the approach is called a “conditioned crawlspace”. This can be accomplished with a HVAC diffuser or a stand-alone dehumidifier.

MOISTURE CONTROL; MOLD

Tear Out & Haul Away

Remove existing mold infested insulation and ground barrier.

Spray & Scrub

Spray fungicidal to sanitize & deodorize affected areas; spray, scrub, then respray moderate to heavy areas. Must fungicide must DRY before encapsulating and/or installing insulation.



Wood Sealant Encapsulation

Encapsulate cleaned areas by painting antimicrobial fungicide sealant; killing embedded post-cleaned surfaces. Inhibits future growth on cured surfaces. Not for use on electrical wires, plumbing or HVAC and related ductwork.



Controlled Crawlspace

To minimize the potential for mold regrowth or new mold growth, moisture and humidity in the crawlspace must be managed. No known mold cleaning or prevention can guarantee reoccurrence or new mold if moisture or moist air is continually present. See the Vance Insulation Product Page **CRAWLSPACE** for Basic, Closed and Condition crawlspace options and details.

MOISTURE CONTROL; Drain Tile

Drain Tile

Corrugated pipe in a mesh debris filter irrigation ditch, gravel covered. Empties to a sump pump or outside gravity-driven drain.

Sump Pump

Removes water to dry area preparatory for polyseal. Used in periodically flooding areas. Includes small wells for below ground installs w/auto start & stop feature.



Dehumidifier

Long-term damp air solution. Circulates air & removes moisture w/o temperature change. Five-year Warranty & optional Service Agreement are available.

In-Home vs Crawlspace Dehumidifiers: Both perform the same function(s); removing moisture, damp musty odors and preventing mold and mildew from developing. The difference is the area and environment they are designed to perform. As the name implies, crawlspace dehumidifiers are designed to be placed in tight, shallow areas indoor dehumidifiers do not properly fit. Both are available in different sizes and capacities.



Generally, the cubic feet of crawlspaces are lower because of lower ceiling height. Therefore crawlspace dehumidifiers require more airflow because it is harder to dehumidify the area. Harder because the low ceiling makes the circulation of air throughout the crawlspace require more air pressure. When deciding on the correct size or capacity of crawlspace dehumidifier, it is suggested to double the airflow. It is recommended to prevent outside air from coming inside that increases air moisture; by closing the crawlspace vents. It is also recommended to provide a vapor barrier to lessen moisture evaporating from the ground if the crawlspace has a dirt floor.

These reasons explain why crawlspace dehumidifiers cost more than basement dehumidifiers. Another obvious difference is basement dehumidifiers are built in a horizontal design so they fit into tight indoor spaces; i.e., laundry room, bathroom etc.

Backfill

Below-grade crawlspace becomes a ground-water reservoir. Process fills crawlspace to yard grade or above. Usual material is sand or similar dirt products.



INSULATION; Spray Foam Metal Building

SURFACE PREPARATION; (see GUIDELINE FOR INSULATING METAL BUILDINGS WITH SPRAY APPLIED



POLYURETHANE FOAM, Spray Polyurethane Foam Alliance, 2000)

1. Building components must be secured prior to the application of the SPF system.
2. Surfaces must be dry, free dirt or contaminants prior to SPF application.
3. Contaminants may be removed by pressure washing, steam cleaning, vacuum, grit blasting, scraping, etc.

DETERMINING INSULATION THICKNESS

1. Building codes require certain buildings meet local, state & federal standards.
2. SPF is used to control condensation.
3. Greater insulation thickness decreases heat and cooling costs. There is diminishing return to excessive thicknesses versus installation costs; 1" to 3" is standard.
4. Thickness must be sufficient to achieve proper surface cure. Smooth surfaces require a minimum of 1". Corrugated configurations may require thicknesses of 3" for a suitable finished surface.



HOW DOES METAL BUILDING INSULATION WORK?

- Insulation controls heat flow, prevents condensation, controls noise and may increase lighting efficiency.
- Controlling heat transfer also reduces energy usage.
- Preventing condensation inhibits growth of mold, mildew, rust and/or corrosion.
- Soundproofing is provided because the foam absorbs vibrations.

Spray foam comes as a two-part liquid; a foaming agent and a polymer.

It can be sprayed on walls, floors, and ceilings where it expands to fit the space. It then hardens into a solid cellular plastic referred to as Closed Cell Foam (CCF).

It easily fills all nooks and crannies until they are airtight. CCF is ideal for unusual shapes or areas with a lot of obstructions. It is more expensive than batt or foamboard but is a superior air and sound barrier.

