

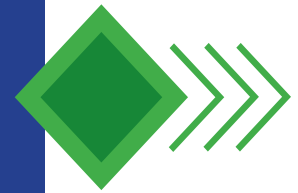


# ADDING HOME INSULATION

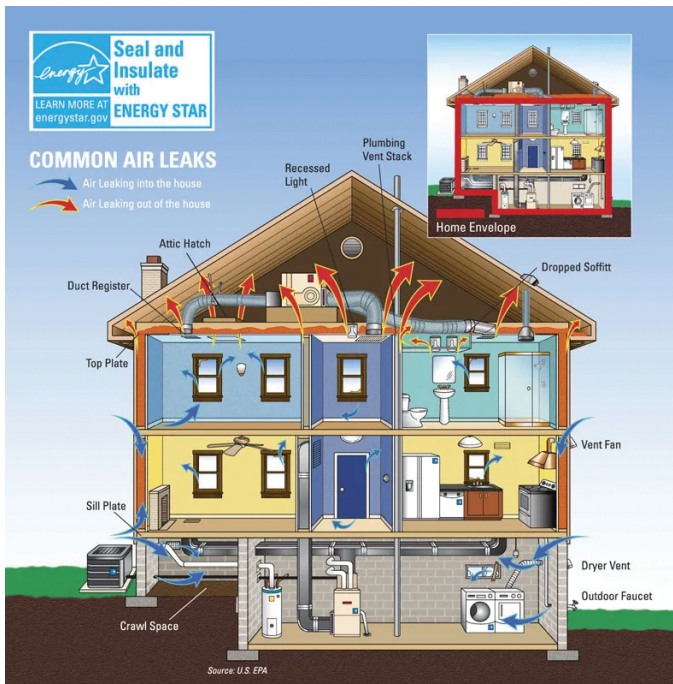
INSULATION HUGS THE AIR BARRIERS!

**Insulation can't do its job if air is flowing around or through it. That's why air sealing comes first in priority before insulation.**

Insulation should "hug" the interior of the outside air barrier that seals the outdoor air from the living space. The working goal is a continuous home insulation envelope with no voids or gaps, while the purpose of insulation is to slow the conduction of heat through building materials.



## STEP 1: AIR SEAL



(Also see the accompanying Air Sealing What to Know fact sheet from your electric cooperative.)

## STEP 2: INSULATE

### Where to Insulate

The home envelope between the outside air barrier and the inside conditioned air should contain insulation that is in full contact with the air barriers. This building envelope includes ceilings, walls, floors over unconditioned spaces, soffits over cabinets, attic access panels, knee-wall doors and exterior doors. The top and bottom of the home are usually the easiest, cheapest and most cost-effective locations to air seal and insulate.

When adding attic insulation, install cardboard or foam baffles between the roof trusses at the soffits. Baffles prevent insulation overflow into the soffit eave vents, protect insulation from wind and provide an airflow path for attic ventilation.

### How Much to Insulate

The effectiveness of insulation for resisting heat conduction is measured by R-value, with a higher R-value indicating greater effectiveness. As the applied thickness of an insulating material increases, so does the R-value. New homes built today require at least R-38 insulation in ceilings and R-19 under the floors.

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## Insulation Types

Your choice of insulation products for an existing home may depend on whether you plan to hire a contractor or do it yourself. Proper installation will ensure effectiveness. Read the manufacturer's material safety data sheet and installation instructions when selecting an insulation type.

### Cellulose

**(R-Value = 3.4 to 3.8 per inch)**

Cellulose, which is made from recycled newspaper, can be blown dry into existing wall cavities and attics, or blown damp into open wall cavities. Boric acid, an additive typically found in cellulose insulation, increases fire resistance, repels insects and helps prevent mold growth. For experienced do-it-yourself workers, installing dry cellulose in the attic may be manageable, but damp cellulose insulation in walls is generally a contracted professional job.

### Fiberglass

**(R-Value = 3.1 to 4.3 per inch subject to density and application)**

Blown-in fiberglass or batts can be installed by an experienced do-it-yourself worker. Manufacturer instructions must be followed because compression of the material will cause a reduction in R-value. For blown insulation, see the R-value charts on insulation bags. Measure the R-value of blown fiberglass by the number of bags installed per 1,000 square feet of attic floor or wall. Insulation depth can be misleading because blown insulation can fluff and settle. Fiberglass insulation should be applied only after extensive air sealing. Read the material safety data sheet and use protective gear for installation.



### Spray-in-Place Foam

**(R-Value = 3.4 to 7.0 per inch)**

Spray-in-place foam insulation is becoming more common in our state. Foam insulation can have high R-values for insulating and excellent air sealing properties. Except for canned foam used in small, targeted spaces, spray-in-place foam must be professionally installed and is usually higher in cost than other insulation types. Combustion characteristics of foam products vary according to the chemical formulation, combustion temperature and available air. Fire codes require a fire barrier between foam insulation and the living space, such as 1/2-inch gypsum wallboard or intumescent paint coating. Read the material safety data sheet of the foam product to be applied as well as local fire codes.

### Rigid Foam Board

**(R-Value = 3.5 to 6.0 per inch)**

Rigid foam board insulation typically comes in 8-foot sheets and functions as an air barrier over other wall insulation. Cut and seal foam board to surfaces using caulk or spray foam and fasten with plastic-washed fasteners. Seal seams with foam or with tape approved by the foam board manufacturer. Three types of rigid foam board are polyisocyanurate (polyiso) with an aged R-value of ~6 per inch of thickness, extruded polystyrene (XPS) with an R-value of around 5, and expanded polystyrene (EPS) with an R-value of approximately 3.8. Polyiso carries the higher price tag and will absorb water; XPS is the mid-range cost board, will not absorb water and is more durable; and EPS is the low-cost option and more prone to damage. To qualify as an air barrier, polyiso or XPS must be at least 1.5 inches thick, and most EPS products must be at least 5.5 inches thick.

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## Location Tips & Tricks

Blown-in wall insulation is a job best suited for a professional insulation installer, regardless of the material. The insulation should be blown into all the nooks and crannies of each wall section so that it doesn't settle and create a hole in the insulation layer. When comparing bids from insulation contractors, ask how many bags will be installed and about how many pounds of insulation are in each bag. Many consumers refer to the coverage chart on the bag label and count the number of bags as they are installed.

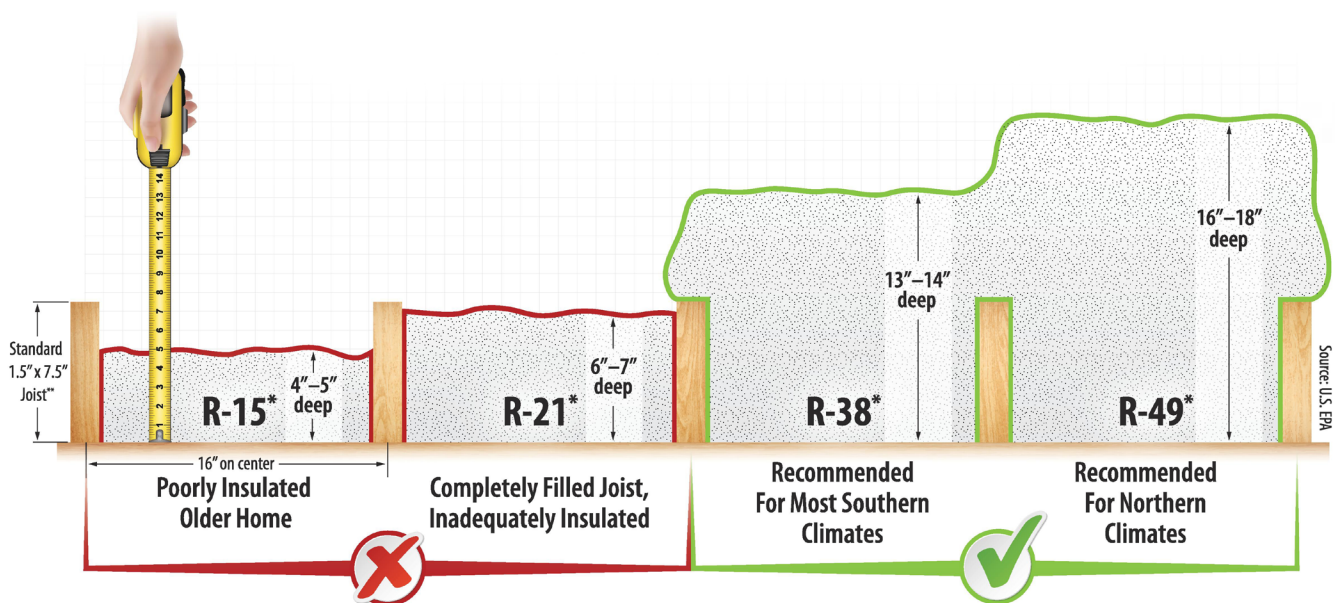
## Extreme Makeovers: Unvented Attics and Crawl Spaces

- Reduce or eliminate the need to seal heating and cooling ductwork
- Eliminate the need for attic ventilation
- Eliminate the need for air sealing the connections between the home and the attic or floor

- Provide semi-conditioned storage area (possible storage rental savings)
- Greatly reduce air and moisture infiltration into the home
- Eliminate most condensation on ducts
- Can reinforce structural strength (closed-cell foam)
- Can reduce heating and cooling bills

The attic can be professionally sealed with impermeable spray foam insulation, installed in direct contact with the underside of the roof sheathing. The same foam insulation is applied to the inside of attic gable-end walls. A continuous envelope of spray foam insulation closes the gap between the top of house walls and the lower attic perimeter. Applied correctly, this process brings the entire attic into the conditioned space. Insulation is removed from the floor of the attic, and small vented openings in the home ceiling are used to allow airflow from the house to the attic, if allowed by local codes.

## DOES YOUR ATTIC INSULATION MEASURE UP?



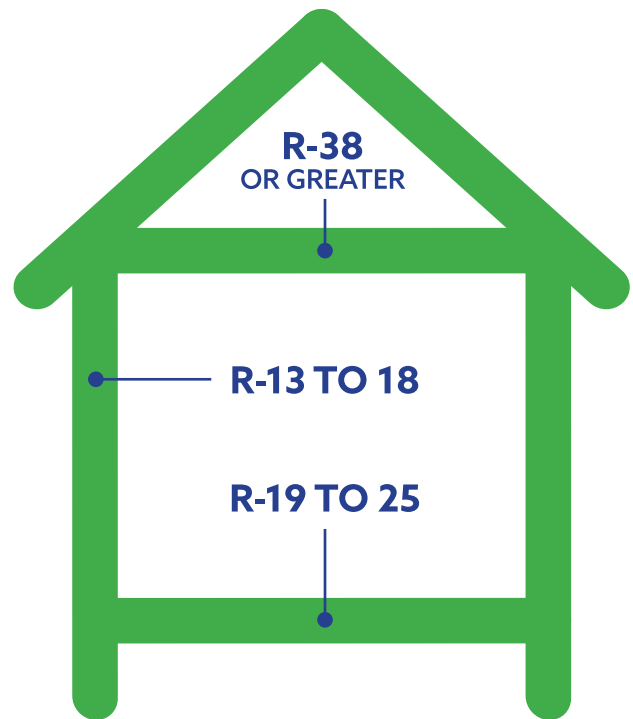
\*Recommended Dept. of Energy attic insulation levels for commonly used fiberglass, mineral wool, and cellulose insulation assuming about R-3 per inch.

\*\*Standard joists are sold as 2' x 8" but usually measure closer to 1.5' x 7.5".

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Similarly, the [crawl space can be professionally sealed](#), or closed, with foam insulation on the walls or with existing insulation kept in the floor. Regardless of the insulation material and location selected, the existing foundation vents must be closed and a vapor barrier installed on the ground and walls to minimize any moisture getting in from the outside, among other key details.

These processes are high-cost solutions that could solve a host of problems if done correctly. Professional installation is always required. For safety and application reasons, this is not a do-it-yourself project. Blower door pre- and post-testing by an energy efficiency professional is recommended. Testing will provide a before-and-after comparison of house leakage and help locate any missed gaps in the foamed attic or crawl space. The International Energy Conservation Code (IECC) specifies unvented attic assemblies according to IECC climate zones. Most counties in Mississippi are in IECC Climate Zone 3A. Jackson, Harrison, Hancock, Stone and Pearl River are in Climate Zone 2A.



**R-value indicates the effectiveness of insulation**

Spray foam products have a safety limit on application thickness per pass. This limit is due to a temporary heat reaction when chemicals are mixed. Two applications, or passes, may likely be necessary to reach a desired total R-value of 20 or more. Read the manufacturer's technical data sheet for the foam insulation product being considered. Note the aged thermal value or R-value, the thickness required for impermeability and the fire performance ratings. Read local fire codes prior to installing. Improperly mixed foam insulation products may exude a long-term odor and may not perform as intended. A fully adhered leak-free roof membrane is important.

All wood materials and framing should be dry and below 18% wood moisture content prior to installation.