

FROM THE OLD HOUSE JOURNAL ONLINE

EXPERT ADVICE: INSULATION

Questions—and answers—about insulation materials for old houses. By [Ernest A. Conrad](#)



Repairing interior walls or replacing exterior siding presents rare opportunities to make improvements in an old house "weather envelope." Be sure to carefully consider the building's composition before you add insulation.

(Photo: Bruce Martin)

Many folks want to do the right thing by adding insulation to an old house. The benefits of insulation and its related materials (air and vapor retarders) are lower heating bills in the winter, cheaper air conditioning in the summer, and greater comfort year-round. Unfortunately, these products are nearly as numerous as the contradictory advice and moisture horror stories that surround them.

Each of the following questions represents a common concern about insulating materials in old houses—many of them in the not-so-old category of early- and mid-20th-century construction. Once you understand the principles outlined in the answers, you'll have the basic tools for dealing with the specific insulating conditions in your old house.

Q: Will blown-in cellulose insulation damage my old wood-frame house?

A: The oil embargoes of the 1970s sparked a rush to insulate buildings of every kind. Blown-in cellulose became a very popular material for old houses: it was quick and cheap to add, and it even covered its costs through reduced heating energy bills. Where this insulation was improperly installed, however, many of us are now paying the price for the paint failures, rotted sills, and frozen pipes it caused.

Blown-in cellulose is simply a shredded paper product. Its light, puffy particles can fill hard-to-reach voids in the perimeter envelope of a building. This definitely can improve the building's thermal insulation value. The problem is, air moves easily through this low-density stuff. As warm room air passes through the wall cavity in winter it becomes cooler. If this air has a high moisture vapor content, the water vapor will condense into a liquid, or freeze into frost, and start a vicious cycle of destruction. The condensation will wet the cellulose—just like that wet newspaper in the driveway—rendering it useless as insulation. Pretty soon the wood siding gets saturated and won't hold paint. High moisture levels in the framing can even promote wood rot or attract wood-eating insects.

I recommend restricting the use of cellulose insulation to extra-dry locations, such as attics, where it can be readily removed if the need arises. Don't forget about any water pipes up there. They'll freeze if they wind up on the cold side of newly installed insulation. They must be moved to a heated environment.



Fiberglass insulation is often faced with kraft paper (the same material used for paper grocery bags); in some products, the kraft paper comes asphalt-impregnated and coated with foil, a facing that is intended to block the movement of moisture. (Photo: Rob Huntley/Lightstream)

Q: What about blown-in fiberglass or vermiculite?

A: Like cellulose, these materials are great insulators. Better yet, they are not combustible. (Blown-in cellulose of the past was not always treated with fire retardant!) Blown-in fiberglass is a very light and puffy matrix of glass fibers that uses its high percentage of air space to do the work of insulating. Vermiculite (sometimes mistaken for asbestos) is a flaky, natural rock expanded to a pebble-sized mix that insulates in a similar way. Both these materials will allow air to easily pass through them the same as cellulose. Thus, they too have the potential to become waterlogged in the event of condensation, but to a lesser extent.

Q: Which insulation is best for use in humid Southern climates?

A: Insulation was first introduced in houses in northern climates where the temperature outdoors drops to -10° F or lower. This extreme cold creates a large differential in temperature through a wall between indoors and outdoors. Down south, even when it is 100° F or so outdoors, the differential temperature at a wall is only about half as much as up north, when the room temperature is about 70° F.

With year-round air conditioning being the norm in a southern climate, my primary focus would be on controlling outdoor air infiltration and its resulting cold-surface condensation. Mold growth is a constant threat as hot, moist outdoor air cools on contact with these surfaces.

Old wood-frame houses down south can attribute their longevity to lots of ventilation, which helps dry out wet surfaces rapidly. Given this, in an old house I would lean towards not using any insulation. Instead, I would reduce infiltration to a minimum and use the air-conditioning primarily for its ability to dehumidify, thereby keeping the air as dry as possible.

On the other hand, in newer construction the use of rigid insulation and outer coatings of stucco or Dryvit work very well. These coatings are excellent barriers to both moisture vapor and infiltration, and the thermal performance of the rigid insulation is not reduced, if they should get wet.



The number of possible moisture sources reaching your siding is endless, from an errant sprinkler to rising damp.

(Photo: Ernest A. Conrad)

Q: My walls are not insulated, but the paint on my siding is peeling. Why?

A: It's not fair to always blame peeling paint on a poor insulation job. Moisture may indeed be the culprit, but something simpler could be the agent. Roofing, flashing, and gutter leaks often cause water to enter a wall cavity. Porous materials like plaster, low-fired brick, lime mortar, and wood will absorb this water and retain it for several days or weeks. Such moisture can make for poor adhesion at the time of paint application, or it can push what was a good paint job off the house soon after the leak begins.

All these situations have the same solution: a moisture inventory. This is a visual inspection of the house using logic to identify and quantify unwanted sources of water (see box). Although moisture generated from a dirt-floor basement has a long way to migrate, it can easily end up as condensation on the back of siding. Similarly, residential humidifiers can be very damaging to an improperly insulated old house.

Start your inventory with a ladder and inspect the whole house from a “rain’s eye” perspective. Going a step further, simulate rain with a garden hose and ask a friend to keep a lookout inside the house. Inspections during an actual downpour are the best! Be sure to check for major moisture makers like combustion exhaust, green firewood, ground moisture migration, humidifiers, plumbing leaks, and rain or snow-melt penetration. If no leaks show up, you may well be the victim of a condensation problem.



Housewrap can allow moisture vapor to pass through while resisting gross air flow—a benefit to houses with central air. (Photo: Rob Huntley/Lightstream)

Q: What’s the difference between “housewrap” and vapor retarder?

A: The various air retarder products that are generically called “housewrap” have become almost universal in new house construction over the last five years or so. Their sole purpose is to reduce air infiltration, thus making a house tighter. The housewrap itself is a unique balance of rugged synthetic fabric and microscopic voids. It allows moisture vapor to pass through the material, but resists gross air flow. This is especially beneficial for houses that are air-conditioned, since infiltration of unwanted outdoor air is a primary energy load on the cooling system. Housewrap is advertised to be an energy saver in heating climates too. In any event, the material is inexpensive and has yet to prove harmful anywhere. My choice would be to use it as a weather barrier on the building’s exterior, under the siding.

Deciding whether or not to use a vapor retarder is more difficult. We even have trouble figuring out what it is, why we need it, and where we should put it! Not long ago this stuff was referred to as vapor barrier. Now the manufacturers call it vapor retarder. It comes in many forms, with metal foil or poly sheeting being the most common. Its purpose is solely to block the passage of water in the vapor state.

Q: Should I use a vapor retarder in my clapboard siding replacement project?

A: First, I would conduct a moisture inventory and faithfully carry out a program of controlling unwanted water sources. If I am going through the agony of replacing siding, I sure hope to add insulation at the same time. Vapor retarders and insulation should always go together. Without insulation there would be no reason to have a vapor retarder. (The same is true if there were absolutely no moisture sources inside the house.) But with insulation, I would want its protection. My choice here would be to insert foil-backed fiberglass batts in between the studs. I only have to remove some of the exterior sheathing so I can slide the batts in place vertically up against the back of the plaster lath.

Ernest A. Conrad, P.E., is president of *Landmark Facilities Group, Inc.*, a consulting firm specializing in historic buildings.

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{ 18 comments }

John December 7, 2010 at 6:43 pm

Hey... you know there are old houses in the dry West too. Not just desert, arid areas from Mexico to East Washington. You folks act like there is no history west of the big muddy.

Paul F. Sanders December 8, 2010 at 1:27 am

I have been told by the previous owner that the 1639 John Sanders House(Salisbury, Mass.) walls have "clam shell" insulation. What is "clam shell" insulation?

bobthe builder March 23, 2011 at 5:47 pm

Vermiculite!

A Rayford April 14, 2011 at 11:51 am

Should you place insulation under a house on pilings?

Tom Bassett-Dilley June 8, 2011 at 11:20 am

Just want to clarify that there is dense-pack cellulose insulation, which air does not easily pass through—the article kind dismisses cellulose. Moisture management is a complex issue, and I recommend everyone to the source I go to, which is buildingscience.com, an incredible resource of building science, case studies, and carefully thought-out recommendations. They're funded by the DOE to help builders increase efficiency.

RICK GALLAGHER November 5, 2012 at 2:14 pm

I HAVE A 1924 LARGE BUNGALOW TYPE HOME. BRICK FIRST STORY, THEN CLAPBOARD ON BOTH THE ENDS AND THE FRONT/BACK DORMERS. IT HAD ALUMINUM SIDING INSTALLED IN THE '60S. SHOULD I STRIP IT ALL DOWN TO THE SHEATHING AND REPLACE WITH VINYL, OR TAKE OFF THE ALUMINUM AND REPAINT THE CLAPBOARD?

Sue February 4, 2013 at 1:42 pm

I have a 150 year old farm house in southeast Ohio farm country. The problem is , one side of the house has no basement under it, just dirt. I'm wondering how to insulate that floor to cut down or eliminate the moisture issues with the first and second floor of this side of the house. Currently, there is no heat in this part of the house, but we will be adding a propane free-standing heater in the first floor room. Any suggestions?

Viki Hymer August 13, 2013 at 10:22 pm

We had new insulation blown in over old insulation in a house built in early 1930's. House is now contaminated with fiberglass!! We don't know where or how to begin cleaning up, but, most of all, how can we prevent this happening again after cleanup? HELP!!

Iris November 24, 2013 at 9:05 am

How to insulate a brick house with interior plaster walls? Ceilings are also tall, could I install drywall to lower the plaster ceilings and what to do for the walls in the very small rooms?

Thanks

Kim May 30, 2014 at 9:01 am

We bought a 1930's home in the Northeast. We discovered this winter that the kitchen (a new addition to the house) has no insulation. Inside the cabinets is freezing and with one zone heating the rest of the house is very hot just to get the kitchen to a bearable temperature.

Someone suggested we "blow" insulation into the walls. This poses a lot of questions:

- 1 – What insulation is best for this purpose (pro's and con's)
- 2 – How is this administered? Will it cause damage to interior or exterior walls/siding?
- 3 – What time of year is best to undertake this project?
- 4 – What do we look for in contractors that do such work?
- 5 – What price range are we looking at for approximately 200-275 sq. ft area?

Is radiant heat in the floors a practical or preferable option?

New home owners – apologize for all the questions.

knj

Andy August 21, 2014 at 12:45 pm

One side of my 1948 "American Small" house (had to look that up) got pounded with rain while the roof was exposed (wood planks) for some needed repairs. Now I have some ceilings to repair as well. Is there any good ways of drying it out?

guy alix September 18, 2014 at 11:45 am

hello,

I am DIY a veranda 10 by 12 on existing patio which is built with 2 by 10 every 16 inches and supported by piles 10 feet in the air having a garage underneath.

Now, what will be the step by step CORRECT INSULATION regarding flooring and what will

become the new ceiling?

diagrams would be appreciated.....

thank you very much guy alix

Marc January 29, 2015 at 6:13 pm

I have old plaster walls and my attic is already insulated and dry walled My walls have no insulation from basement to the attic floor and I know this bc I can see straight up the house at some points. Can I blow insulation from my attic down my walls until it comes up to attic floor?

Mark November 26, 2015 at 10:24 am

I would like to insulate the wall cavities in my old balloon framed brick century old home. I was planning on blowing insulation down the walls from the attic until I read this article. Since my house is brick I have a air gap between the brick and framed wall, will this prevent the insulation from getting wet from condensation? There is no vapour barrier installed , but there is old craft type paper wrapped around the interior of the exterior walls. Your input would be appreciated

Lauren McCarthy January 30, 2016 at 11:54 am

I recently had my home insulated with blown in insulation. We have plaster walls and the areas where they drilled holes and blew in the insulation the paint is cracking and bubbling. The few walls that are drywall and wood paneling are not affected. The hole areas are also leaking a yellow stick substance. We had the company who insulated come out to look at these bubbles and crack and they stated that it was a paint issue from putting water based paint over latex paint, but the 3 outside walls that were not drilled into that have the same paint on them that is bubbling in other outside wall areas have no bubbling or cracking. Could it be from the drilling in the wall since that is the only different element? Looking for advice.

Sherry March 2, 2016 at 2:16 am

We are restoring/preserving an 1860 brick farmhouse. After lots of research we decided on using 100% sheep's wool insulation. It is wonderful! Soft, safe, easily slips into each corner of the attic. If it gets wet, it dries out naturally (even creating a little heat in the process). You can walk on it and it springs back. Treated with borate it does not invite insects. And it is relatively non-flammable – it can be set on fire, but the fire soon dies out. And it provides

excellent sound deadening. I don't understand why more people don't know about it, except that for now it is hard to find and is expensive. It is ideal for all houses, but particularly historic ones.

Justin Mello June 27, 2016 at 3:01 pm

If you already have blown cellulose insulation in a couple of rooms in an old house, can you minimize the damage by drilling a peep hole in between the studs to let the moisture out, or check to see if the insulation is wet or damaged.. Also, is it different with an old house with brick siding, seeing that there is no paint to worry about.. Just wondering if there is a way to minimize this without tearing down the walls, and physically removing the insulation, and about how long does it take for cellulose insulation to cause major damage in an old house?

Justin Mello June 27, 2016 at 3:44 pm

"I know I have some blown insulation in a couple of my walls from my old father's house.. My question is, how will I know if the insulation is causing damage seeing that the house has brick siding, and there is no paint to see falling? Can I drill a small hole between the studs, and sample the insulation to see if it is damp or wet? And about how long does it take for blown insulation to cause damage? And can I minimize damage by having a dehumidifier in the room to get rid of the moisture.
