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Foam Home

All other factors being equal, traditional fiberglass batts remain the most economical choice to meet energy code standards. Unfortunately, the other factors aren't always equal. Over the past decade, in response to concerns over moisture and mold, walls have become one of the most complex parts of residential construction. Builders have re-examined many long-standing details and adopted new ones where necessary, including drainage planes, vented rain screens, flashing, housewrap, vapor retarders, and various sealants, tapes and caulks.

Insulation, too, is under scrutiny, and it's no longer just a matter of R-value per dollar. Spray foam insulation is gaining attention for what else it can offer—notably, help with air infiltration and condensation inside walls, which are major sources of callbacks and litigation.

"If you build a wall to code, with R-19 fiberglass in 2x6 framing or R-13 fiberglass in 2x4 framing and OSB sheathing, the dew point will fall inside the wall cavity—period," says Marvin Moore of the Association for Better Insulation.

Foam is hardly a new concept in insulation, but a different system deserves a closer look from builders. One that offers advantages that go beyond mere R-value and reduces the cost per square foot for insulation and sealing while providing a true value add of air sealing, sound proofing, structural integrity and higher R-value in the cavities.

Overview

Spray polyurethane foams (SPF) are liquid-applied systems consisting of two parts, isocyanate and polyol resins, that react to form polyurethane foam as they are sprayed into wall cavities. In its high-density, closed-cell form (typically 1.5 or more pounds per cubic foot), SPF has an R-value up to 6-7 per inch, and is used for roofing insulation and commercial applications, including refrigerated buildings.

Foam remains flexible and won't pull away from expanding and contracting framing members. This plays to its strongest suit: the ability to provide a superior air seal while remaining vapor-permeable. Tiger Foam-brand SPF, for instance, has an air leakage rate a bit tighter than plywood; vapor permeance for a 3.5-inch wall is 0.2 perms, which is lower and better than many housewraps.

The bottom line is that warm, moisture-laden air won't condense inside the cavity.

"The dew point temperature falls within the wall, but there's nothing for moisture to condense on," says Moore, "since the SPF will not support thermal bridging that would bring the temperature of the surface to the dew point. SPF foams also don't support organic growth if they do get wet and tend to dry quicker than other insulations like fiberglass or cellulose.

The air barrier is far more important for reducing condensation than vapor barriers, which reduce vapor drive. "A typical vapor differential across a 4x8 sheet of drywall can bring one-third quart of water into a wall over the course of a heating season and a 3/4-square inch hole in that wall can bring 30 quarts. That's where you really get mold," says Moore.

Spray foam alone isn't enough to achieve a low air change rate. Sill plates need to be gasketed or, if foam is used, sealed with a continuous monolithic barrier; and annular seams, such as lengthwise stud joints, should be caulked, if not foamed over the whole area to provide that all-important monolithic barrier. But two-component spray foam expands to fill most voids, and so eliminates the need for a lot of the tricky sealing details around fixtures and openings that are required by caulks and cans of one component 'beading' foams.

A Sprayed Polyurethane foam can cut heating and cooling bills by 35% to 50% over Fiberglass, which depends on perfect installation for its effectiveness since a 5% void in insulation can reduce R-value by 15%.

Unlike the urea-formaldehyde foam insulations from two decades ago, SPFs don't off-gas dangerous substances. While most manufacturers of high-density foams are struggling to reduce ozone-depleting chemicals CFCs from their processes, Commercial Thermal Solutions foams use water as a blowing agent and have no CFCs or VOCs released.

Spray foam's consumer recognition is also working in its favor. "Homeowners are becoming increasingly inclined to request SPF insulation," says Steve Loftis supplier for North Carolina Foam Industries. He credits the product's exposure on TV shows such as This Old House and the Internet for generating consumer interest.



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