How Do EIF Systems Fare in the Energy War?

oil prices are up, natural gas prices are up, and electricity prices won’t be far behind. Can it be long before building owners start asking about energy performance, again? The EIFS Industry Members Association thinks not, and the energy efficiency of EIFS will be the association’s main talking point for the next year or two, says EIMA spokesman Bernie Allmayer.

Citing a report prepared for EIMA, Allmayer says that “the type of insulation used in most EIFS gives an R-value of the insulation alone of up to 15, when added to R-value of stud cap insulation, the overall R-value can be as high as 25.” Those are some very impressive numbers, but “the R-25 in the EIMA report must be for the whole wall,” says Jeannie Sikora, research engineer with the National Association of Home Builders. Most EIF systems use 1-inch polystyrene, which has an R-value of about 4, she says. An R-value of 15 implies EIFS with 4 inches of insulation, which is unrealistic for residences, she explains.

“I don’t know where that thinking comes,” says Tom Remmele, manager of technical services for STO Corp. “Most folks have opted to use 1 inch as the base thickness, and 2 inches around windows and doors to create trim, because most people buy EIFS for its appearance, but it is just as easy to use 2-, 3-, or 4-inch EPS as the base thickness. In the Northeast in the 1970s it was common to use 2-inch EPS. Only in the South did the common denominator become 1 inch.”

The R-value of commonly used 1-inch expanded polystyrene board is 3.8, says

By

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USG corporate spokesman Marty Duffy says USG also has an EIFS product with a 1.5-inch EPS base with an R-value of 5.3.

**How Efficient Is Sufficient?**

EIFS is cited for its energy efficiency by some energy efficiency and construction organizations, including the Partnership for Advanced Technology in Housing, which is affiliated with the U.S. Department of Housing and Urban Development; and the Green Building Information Centre in Canada, but it is not alone. PATH also gives its energy efficiency rating to insulative vinyl siding, which is a vinyl siding system with built-in insulation, and to exterior finish panels made from straw. The fused vinyl siding-polystyrene product creates a "solid insulated wall system" with an R-value of 4, according to PATH. Straw-based building panels have an R-value of 1.25 per inch, but they can be made several inches thick and used as structural panels, not just as a cladding.

The common feature of all of those systems is that the insulation is exterior to the sheathing, says Remmele. The advantage is they provide a layer of insulation over potential thermal bridges, such as wall studs and columns and floor-wall junctions. According to Jeffrey Christian, director of the Buildings Thermal Envelope Systems & Materials Program at the Oak Ridge National Laboratory in Tennessee, "thermal shorts" from framing can reduce the total R-value of a wall by as much as 40 percent from the value you would expect from insulating between the studs.

Rick Duncan, technical director at the Fiber Cement Division of CertainTeed Corp., admits EIFS is more energy efficient than his company's fiber-cement siding alone. However, fiber-cement siding can be installed over exterior insulative foam board, he adds: "Whatever cladding you use, as long as you have foam board, that is what will make a difference," he says.

Sikora agrees that insulating foam board is the key. "I don't see any benefit of EIFS over any other siding installed with exterior insulation board, except possibly some installation benefits," she says. Nor can she think of anything that can't be installed over insulation board. Even brick can go up over exterior insulation board, as long as the bricklayers keep an air space between the brick and the board.

**But Wait, There's More**

"I respectfully disagree with Sikora," says Stephan Klamke, executive director of EIMA. "At least a portion of energy loss is created through air infiltration. EIFS significantly reduces that over any other system, and hence makes the wall more effective."

Robert Thomas, president of CMD Associates, made that point in the report he prepared for EIMA on the energy saving benefits of EIFS. According to Thomas, the circulation of outdoor air within the wall cavity is a major source of energy loss. "In many other forms of cladding, such as metal or plastic siding, wood shakes or brick, there are hundreds of feet of seams or joints through which outdoor air can pass. ... In a typical, old-

er wood-frame house, for example, air infiltration through the opaque cladding portion of the walls accounts for about 35 percent of the energy loss by air leakage from the wall. With EIFS, losses due to air infiltration is essentially zero because EIFS has no seams through which the outdoor air can travel."

Wouldn't the exterior insulation board itself reduce infiltration, blocking many of the seams and joints so that outside air cannot pass through the wall? Yes, says Remmele, but there still would be some, so "I think it would not be quite as efficient as an EIFS system."

But, no one appears to have actually tested the thermal efficiency of different cladding systems, however, with or without exterior insulation. Ryan Dalgleish, at the National Energy Conservation Association, in Winnipeg, Manitoba, says that "typically when someone does testing, it is the whole wall assembly. I've never heard of a report that details one cladding system against another."

Allmayer says that is why it is so hard to translate the savings a homeowner could realize with EIFS: "We don't have a comparison. You would almost have to have two homes, identical in every way, except the exterior systems. And if you don't insulate the roof or attic, it doesn't matter how much EIFS you use."

Higher energy prices, then, don't really affect the owners' options in cladding systems. The smart owner will insist on external insulation, but the choice of the cladding will still be guided by such things as esthetics and the installed cost.

**About the Author**

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