

EPS Radiant Floor Heat Panels

Increasing interest in energy-efficient products and ways to minimize a home's carbon footprint are on the minds of many home owners. With this growing trend, radiant floor heating continues to emerge from Europe into the U.S. housing market.

A recent survey by the National Association of Home Builders Research Center shows that almost a quarter (23 percent) of 302 home builders surveyed intend to "increase" or "greatly increase" their use of radiant floor systems. They cited

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INSULATED VINYL SIDING COMBINES TWO HIGH-PERFORMANCE MATERIALS FOR DURABILITY AND ENERGY EFFICIENCY.

Double Duty EPS

Insulated Vinyl Siding Offers Strength, High R-Values & Curb Appeal

One of the newest hybrid products to hit the market, insulated vinyl siding is catching the eye of contractors and home owners. By combining two high-performance materials to make an even better product, insulated vinyl systems inherit the durability and energy efficiency of the foam backing material and the easy care of a vinyl exterior. Mostly used in remodeling applications, the product is more impact-resistant than traditional vinyl siding and is virtually maintenance free. Plus, it offers better insulating properties than any other type of cladding.

The thermal and mechanical properties of expandable polystyrene (EPS) make it ideal for residential, commercial and industrial applications where R-value and moisture resistance are critical. EPS insulated siding marries an exterior siding panel (skin), whether metal, vinyl, composite, or other cladding material, with a shaped foam backer (core) precisely contoured to fit the siding profile at all points of contact. Insulated siding is just one of many highly engineered building products capitalizing on the inherent design flexibility, energy-efficiency and structural integrity of EPS material science.

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EPS Molders Association (EPSMA) past President and inventor of Progressive Foam's Fullback® Thermal Support System, Pat Culpepper is quick to give EPS the credit. "The excellent characteristics of EPS deliver a host of benefits not available with any other product we know. As innovators, we're vigilant about sourcing alternative insulation products. None come close to matching the cost-effectiveness and energy-efficiency of EPS," claims Culpepper.

Performance Benefits with EPS Foam

When siding or exterior cladding with EPS is applied to the exterior wall it helps to create an envelope around the structure covering all the wall cavities and studs to increase resistance to heat transfer either out of or into the building. Without a continuous insulation barrier, energy transfer through the studs (referred to as thermal bridging) is more prevalent especially in wood and metal frame construction. Insulated siding prevents thermal bridging and enhances the overall system R-value.

The backing increases the siding's R-value by as much as five times that of regular vinyl helping to reduce annual heating and cooling energy costs by up to 20%. EPS manufacturers can achieve varying R-values depending on density and thickness to provide the exact level of insulation required. One leader in this innovative application, Progressive Foam Technologies, has also achieved Energy Star® qualification as part of the Home Sealing effort sponsored by the Department of Energy (DOE). This makes insulated vinyl siding a great way to improve on any construction method that only insulates in between wall studs.

Impact Resistance

The most important mechanical property of EPS in insulation and building products is compressive resistance – its ability to resist compressive stresses. This ability increases as EPS density becomes higher. Most products are made at 1.0 pcf (pound per cubic foot). Tests performed by an independent laboratory concluded that siding panels insulated with EPS foam absorbed impacts from 160 PSI to 340 PSI, depending upon the siding material. It is conservative to conclude that the rigid EPS foam structural support used in today's premium engineered siding products increases the impact resistance of ordinary vinyl siding by more than 400%.

Vapor Permeability

The average family of four can generate up to six gallons of water vapor a day through normal household activities. If this is not released, it can condense on and between wall studs and result

in both structural and health-related problems. Building scientists measure a structure's ability to breathe in terms of permeability. A perm rating for a material is the number of grains of water vapor (7,000 grains = 1 lb.) that will pass through one cubic foot in one hour when the vapor pressure differential between the two sides of the material equals 1 inch of mercury (0.49 psi).

EPS enjoys a naturally high permeability rating. For example, some systems are rated at 5.0 perm per inch, five times what is required to prevent pockets of moisture from building up behind panels. Independent lab tests of three EPS products conducted in accordance with ASTM E96-05, Standard Test Methods for Water Vapor Transmission of Materials (Desiccant Method), calculated the average moisture vapor transmission rate (MVTR) to be 0.804 g/h-m²— three times that of ¼" extruded polystyrene fanfold.

EPS is an ideal choice because it does not rot, is resistant to mold and mildew—and is proven to be a safe, highly effective compound with excellent thermal properties and added sturdiness when used as a part of a hybrid insulating system. And, it is highly compatible with a variety of traditional building materials, such as metal, wood, masonry and other plastics. Insulated vinyl siding is not as brittle in the winter and won't buckle in the summer, it won't dent or cup, which improves the home's appearance and prevents callbacks.

Installers often prefer insulated products over hollow vinyl siding because they're more rigid allowing them to lay flat even on irregular walls. And, attached versions save installation time when compared with drop-in foam-backed products. While EPS backing can add \$30 to \$40 per square (10'x10') to a vinyl siding job, premium vinyl, wood, and fiber-cement claddings don't offer near the R-value and can require special tools making it more difficult to install.

Traditional vinyl siding sales total about 35 million squares annually, compared with 1 million squares for insulated vinyl siding, but because of its unique benefits, significant growth is forecasted. Business consulting firm Hadley Associates predicts insulated vinyl siding sales will double to quadruple during the next five years. This remarkable success evolved from EPS manufacturers working in close relationship with major vinyl siding manufacturers and the Vinyl Siding Institute (www.vinylsiding.org) to offer state-of-the-art energy efficiency to remodelers and new construction projects.

Current vinyl siding manufacturers supporting the EPS Insulated Siding Category:

- Alcoa Building Products
- Alside Vinyl Siding
- CertainTeed
- Exterior Portfolio by Crane
- Heartland
- Infinite Building Products
- Kaycan
- Mitten Vinyl
- Napco
- Norandex Inc.
- Reynolds Building Products
- Resource Materials Corporation
- Variform, Inc.
- Wolverine Vinyl Siding