

Department of Energy Study Finds EIFS Outperforms Brick, Stucco and Other Wall Claddings

Exterior insulation finish systems (EIFS) outperformed brick, stucco, and cementitious fiberboard siding in US Department of Energy (DOE) tests measuring energy efficiency, moisture intrusion, and temperature control in identical, side-by-side field installations. (See link to full report at <http://www.ornl.gov/sci/roofs+walls/research/envelope/eifs>).

Based on the study, EIFS (including EIFS with drainage) is the exterior cladding of choice for achieving the key building performance goals of energy efficiency, temperature and moisture control in mixed, coastal Zone 3 climates. The study further states that EIFS does not absorb moisture nor retain heat as does brick and stucco. EIFS also controls heat flow more efficiently.

The DOE, through the Office of Energy Efficiency and Renewable Energy's Building Technologies Program, and the EIFS Industry Members Association (EIMA), sponsored the study conducted by researchers at the Oak Ridge National Laboratory (ORNL).

Real World Data Demonstrates EIFS Effectiveness

The results provide the first real world data demonstrating that EIFS outperforms other typical exterior claddings during most of the year. It is an excellent choice for achieving key building performance goals in a mixed, coastal, Zone 3 climate.

In a summary of the research findings, Achilles Karagiozis, Ph.D., of the Building Envelope Group at ORNL, asserted that the research is “useful ... in demonstrating the superior moisture and temperature control performance of EIFS as compared with other types of exterior claddings.”

The testing was done on a building constructed near Charleston, S.C., that features exterior wall panels made from the various claddings and assemblies. Each panel is fitted with an array of sensors that provide a full profile of temperature, heat flux, relative humidity, and moisture content values. The data was collected 24 hours a day and transmitted back to the ORNL research facility located in Oak Ridge, Tenn., where the data was extensively analyzed.

Key Findings Illustrate EIFS Advantages

Key findings of the study gathered by ORNL researchers between January 2005 and June 2007 include:

- EIFS with four inches of foam outside the stud cavity, a liquid applied water-resistive barrier coating and no insulation in the stud cavity was the best performing wall configuration.
- EIFS absorb little moisture and maintain a consistent, acceptable moisture level within the cladding despite varying outdoor conditions.
- EIFS with drainage and a liquid applied water-resistive barrier coating readily disperse liquid water and moisture introduced by flaws in the building envelope.
- Liquid applied water-resistive barrier coatings outperform sheet goods. In addition, EIFS with water-resistive barrier coatings performed significantly better than other claddings that used building paper or spun-bonded polyolefin membranes.

Simulated building envelope defects were introduced into some of the wall panels during the moisture study. The goal was to assess (1) the performance of cladding assemblies to water penetration, (2) impact on the performance of wall systems from wall orientation on moisture infiltration and (3) type of water-resistive barriers used (e.g., sheet barriers versus liquid applied) and different exterior cladding systems (e.g., EIFS, brick).

In the testing, EIFS drainage layers comprised of vertical ribbons of adhesive and a liquid applied water-resistive barrier provided the most effective method for managing bulk water intrusion into the cladding cavity.

Manufacturers Respond to Changes in Building Codes with Enhanced Substrate Protection Technology to Mitigate Moisture Concerns in EIFS Applications

Quality EIFS manufacturers now offer moisture drainage systems that feature code compliant substrate protection and a positive means of drainage. From the studs out, these systems perform at least as well as any other cavity wall cladding system in protecting against the elements.

Recognized EIFS manufacturers also go one-step further in protecting the building substrate by offering technologically advanced, water-resistive barrier coatings that offer enhanced performance superior to traditional sheet barrier products.

Liquid-applied Barriers Perform Better than Standard Sheet Goods

These polymer-based, liquid applied, water-resistive barriers literally coat the substrate in a seamless layer of water protection that significantly improves upon standard sheet goods in keeping the substrate dry. Since the liquid applied products do not require fasteners that penetrate the barrier – which compromises the effectiveness of the sheet barrier itself – they simply perform better. In addition, since they are seamless, there are no concerns about improper lapping of the sheet products in field application.

The International Residential Code (IRC) was changed in 2000 to require a water-resistive barrier to protect the substrate and a positive means of drainage for incidental moisture. The so-called “conventional” exterior insulation and finish system – one in which the expanded polystyrene (EPS) was adhesively attached directly to the substrate (typically plywood or OSB) – did not feature either a water-resistive barrier or a positive means of drainage. As a result, conventional EIFS are acceptable on all types of construction with the exception of wood frame construction (Type V, Group R1, R2, R3, and R4).

Liquid applied barrier technology has addressed this problem. It provides substantially better protection for the building substrate than traditional sheet barrier products.

Learn More About EIFS and EIMA

Founded in 1981, the EIFS Industry Members Association (EIMA) is a national non-profit technical trade association comprised of leading manufacturers, suppliers, distributors and applicators involved in the exterior insulation and finish systems (EIFS) industry. For information, contact EIMA at 800-294-3462 or eifsinfo@eima.com, or see www.eima.com.