

# EIFS Performance and Modeling Study Summary

## Summary

A three-phase study of the thermal and moisture control characteristics of exterior insulation and finish systems (EIFS) was initiated and funded through the U.S. Department of Energy (DOE) and in part by the nonprofit trade group EIFS Industry Members Association (EIMA). The study was conducted independently by the Oak Ridge National Laboratory (ORNL). In short, **the results confirm that EIFS performs better than brick wall cladding in terms of energy efficiency and moisture control.** This is provided that a vapor barrier, if used, is properly located within the wall, for the construction climate zone, and water intrusion is prevented by proper construction and maintenance.

## Phase I

Phase I consisted of construction, instrumentation, and data collection of eight wall cladding assemblies. The work was performed in Hollywood, South Carolina, near Charleston. Temperature and moisture sensors were installed in each of the assemblies. The wall assemblies were installed as discrete sections within the perimeter walls of a climate-conditioned “test hut”. The data were collected over the course of a year and document the performance of the wall assemblies in Climate Zone 3.

## Phase II

Phase II consisted of a computer modeled simulation of the performance of the wall assemblies which had been constructed and monitored in Phase I. The results of the simulations were compared to the actual data obtained in Phase I. The data closely compared to the simulation results. This validated that the computer model, WUFI—ORNL Version 5.0, could be used to predict the performance of the tested wall assemblies in other climate zones.

## Phase III

Phase III used the computer modeling validated in Phase II to predict performance of four wall assemblies. A representative city was selected from each of the U.S. climate zones and historical weather data for the cities was used as input.

Zone	City	Zone	City	Zone	City	Zone	City
1	Miami, FL	3	Atlanta, GA	5	Chicago, IL	7	Fargo, ND
2	Austin, TX	4	Baltimore, MD	6	Minneapolis, MN	8	Fairbanks, AK

Three EIFS assemblies were compared to a brick masonry assembly. The assemblies are summarized below:

Description	Panel No.	Exterior Insulation	Stud-Cavity Insulation	Exterior Sheathing	Framing
Generic EIFS with Drainage	2	1.5-inch EPS	R-11 Fiberglass Batt	Plywood	Nominal, 2 x 4 wood
Generic EIFS with Drainage	5	4.0-inch EPS	None	Plywood	Nominal, 2 x 4 wood
Generic EIFS with Drainage	11	1.5-inch EPS	R-11 Fiberglass Batt	Gypsum	1.5” x 3.6”, 18-ga. steel
Brick Masonry	14	None	R-11 Fiberglass Batt	OSB	Nominal 2 x 4 wood

Notes:

- 1) All sheathing materials were exterior-grade.
- 2) Stud spacing was 16-in. on-center for all panels.
- 3) All EIFS panels included a fluid-applied water-resistive barrier coating applied to the exterior face of the sheathing, and exterior insulation was adhesively attached using a notched trowel to provide vertical paths for drainage.
- 4) EIFS panels included glass-fiber mesh reinforced base coat and acrylic-based finish.
- 5) The interior face of all panels was covered with ½-inch interior gypsum wallboard and a 10 perm interior paint.