

Moisture Absorption & Permeability of Complete Wall Assembly with Fullback

In order to determine whether the Fullback® Thermal Support System is likely to absorb or retain undesirable moisture, Progressive Foam Technologies, Inc. contracted with Architectural Testing, Inc. (ATI) of York, Pa., to compare the moisture absorption of a composite wall system clad with foam-backed vinyl siding with that of an identical system clad with hollow backed vinyl siding. ATI subjected the wall systems to specified and accurately controlled environmental conditions.

Executive Summary

An insulated siding product, consisting of Progressive Foam Technologies' Fullback® Thermal Support System laminated to vinyl siding, was exposed to various simulated weather conditions representing a range of seasons. These simulated weather conditions subjected composite wall panels to water vapor at levels greater than those typically found in the United States. After collecting and comparing data, and based on the information obtained, Architectural Testing, Inc. concluded:

1. Progressive Foam Technologies' Fullback Thermal Support System did not appear to absorb or retain moisture.
2. The insulated siding product, as a composite system, did not appear to act as a vapor barrier.
3. The siding product itself did not act as a vapor barrier. Water vapor did not appear to be trapped between the Fullback Thermal Support System and the vinyl.
4. The use of Fullback Thermal Support System combined with the vinyl did not appear to have a negative effect on the performance of the wall panels relative to moisture absorption and retention.

Test Procedure

Four wall panels were fabricated for this test. Prior to fabrication, each individual component (studs, OSB, insulation, gypsum and vapor barrier) was weighed and the weight recorded. The four wall panels were erected and mounted between two environmentally controlled chambers. The specified conditions were set and the wall panels were subjected to environmental conditioning. At the conclusion of the test, the wall panels were dismantled and each individual component (studs, OSB, insulation, gypsum and vapor barrier) was weighted and recorded. Weight comparisons were completed and water absorption, by weight, was determined. The wall panels were subjected to 3 weeks (approximately 500 hours) at the following conditions:

Condition #1 (Summer)

Interior conditions: 70°F, 30% relative humidity
Exterior conditions: 100°F, 85% relative humidity

Condition #2 (Winter)

Interior conditions: 76°F, 30% relative humidity
Exterior conditions: -5°F

Preparation of Specimens

Test Frames: Four test wall panels measuring 44-3/4" wide by 96" high were constructed of nominal 2" x 4" lumber and one sheet of 1/2' thick OSB sheathing. Four vertical studs, evenly spaced, were secured to top and bottom plates. R-13 fiberglass insulation was installed between the studs. A 2-mil plastic vapor barrier was adhered to the studs with spray adhesive on two of the wall panels, as described later in this report. Finally, 1/2" thick gypsum, painted with generic interior wall paint, was fastened to the studs on the interior side of the wall (See attached sketch of test wall panels).

Mountings: A vinyl starter strip was nailed to the bottom of the wall panels and nine full courses of siding were locked into the receiving flange of the course below. The siding was fastened to the OSB through the nail tab with two fasteners, evenly spaced, per course.

- Test Wall Panel #1: D-5 Dutchlap siding with laminated Fullback® Thermal Support System, with vapor barrier installed between gypsum and studs.
- Test Wall Panel #2: D-5 Dutchlap siding with laminated Fullback® Thermal Support System, without vapor barrier installed between gypsum and studs.
- Test Wall Panel #3: D-5 Dutchlap siding without Thermal Support System, with vapor barrier installed between gypsum and studs.
- Test Wall Panel #4: D-5 Dutchlap siding without Thermal Support System or vapor barrier.

Test Results

General Note: Exclusion of recorded weights of individual components indicates no change in moisture absorption.

Summer Conditions

Condition #1

Interior conditions: 70°F, 30% relative humidity
Exterior conditions: 100°F, 85% relative humidity

Test Wall Panel #1: D-5 Dutchlap siding with laminated Fullback® Thermal Support System and with vapor barrier installed between gypsum and studs/insulation.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
Siding product	17.2	17.2	0.0
OSB	45.7	60.5	14.8
Insulation	8.7	8.7	0.0
Gypsum	46.8	46.7	0.1

Comments: No visual evidence of moisture/condensation was observed.

Test Wall Panel #2: D-5 Dutchlap siding with laminated Fullback® Thermal Support System and without vapor barrier.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
Siding product	17.2	17.2	0.0
OSB	46.9	60.2	15.5
Insulation	8.3	8.3	0.1
Gypsum	45.6	46.7	0.1

Comments: No visual evidence of moisture/condensation was observed.

Test Wall Panel #3: D-5 Dutchlap siding without support system and with vapor barrier installed between gypsum and studs/insulation.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
Siding product	13.1	13.1	0.0
OSB	48.1	60.3	12.2
Insulation	8.6	9.6	1.0
Gypsum	47.3	47.3	0.0

Comments: During the dismantling of the wall panel, condensation was observed on the vapor barrier and bottom plate of the stud wall. However, weight measurement revealed no significant difference in weight

Test Wall Panel #4: D-5 Dutchlap siding without Thermal Support System and without vapor barrier.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
Siding product	13.1	13.1	0.0
OSB	45.1	60.6	15.5
Insulation	8.5	8.6	0.1
Gypsum	48.2	48.3	0.1

Comments: No visual evidence of moisture/condensation was observed.

Summary of Observations: After collecting the data and reviewing the results, it is our opinion that the use of Progressive Foam Technologies' Fullback® Thermal System has no negative effect on the performance of the wall panels in relationship to moisture absorption.

Test Wall Panel #2: D-5 Dutchlap siding with laminated Fullback® Thermal Support System and without vapor barrier.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
Siding product	17.2	17.2	0.0
OSB	46.9	60.2	15.5
Insulation	8.3	8.3	0.1
Gypsum	45.6	46.7	0.1

Comments: No visual evidence of moisture/condensation was observed.

Test Wall Panel #3: D-5 Dutchlap siding without support system and with vapor barrier installed between gypsum and studs/insulation.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
Siding product	13.1	13.1	0.0
OSB	48.1	60.3	12.2
Insulation	8.6	9.6	1.0
Gypsum	47.3	47.3	0.0

Comments: During the dismantling of the wall panel, condensation was observed on the vapor barrier and bottom plate of the stud wall. However, weight measurement revealed no significant difference in weight

Test Wall Panel #4: D-5 Dutchlap siding without Thermal Support System and without vapor barrier.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
Siding product	13.1	13.1	0.0
OSB	45.1	60.6	15.5
Insulation	8.5	8.6	0.1
Gypsum	48.2	48.3	0.1

Comments: No visual evidence of moisture/condensation was observed.

Summary of Observations: After collecting the data and reviewing the results, it is our opinion that the use of Progressive Foam Technologies' Fullback® Thermal System has no negative effect on the performance of the wall panels in relationship to moisture absorption.

Test Wall Panel #4: D-5 Dutchlap siding without Thermal Support System and without vapor barrier.

Component	Initial Weight (lbs.)	After Conditioning (lbs.)	Moisture Absorption by Weight (lbs.)
OSB	56.8	59.4	2.6
Insulation	8.4	15.7	7.3
Gypsum	45.3	45.5	0.2

Comments: During the dismantling of the wall panel, the fiberglass insulation was found to be frozen to the OSB.

Summary of Observations: After collecting the data and reviewing the results, it the opinion of ATI that the use of Progressive Foam Technologies' Fullback® Thermal System has no negative effect on the performance of the wall panels in relationship to moisture absorption.