

## A PROVEN TRACK RECORD... 20 YEARS, ZERO MOISTURE CLAIMS!

Fullback®V Siding Insulation is an industry leading building product. Its moisture performance is only one of its many industry leading features. From the product's introduction nearly 20 years ago, it was obvious that no siding system would be successful unless it allowed moisture to escape from the wall assembly, either as water vapor or bulk moisture. Progressive Foam completed moisture testing leading-up to the launch of Fullback®V Siding Insulation, and has continued to test products as the Fullback® line has evolved.

Fullback®V Siding Insulation is manufactured from expanded polystyrene (EPS), ensuring that you get a high quality product that conforms to all of the physical properties of ASTM C578. The closed cell structure of EPS provides the insulation your home needs, and features a permeability rating of up to 5.0 to allow water vapor from inside your house to escape.

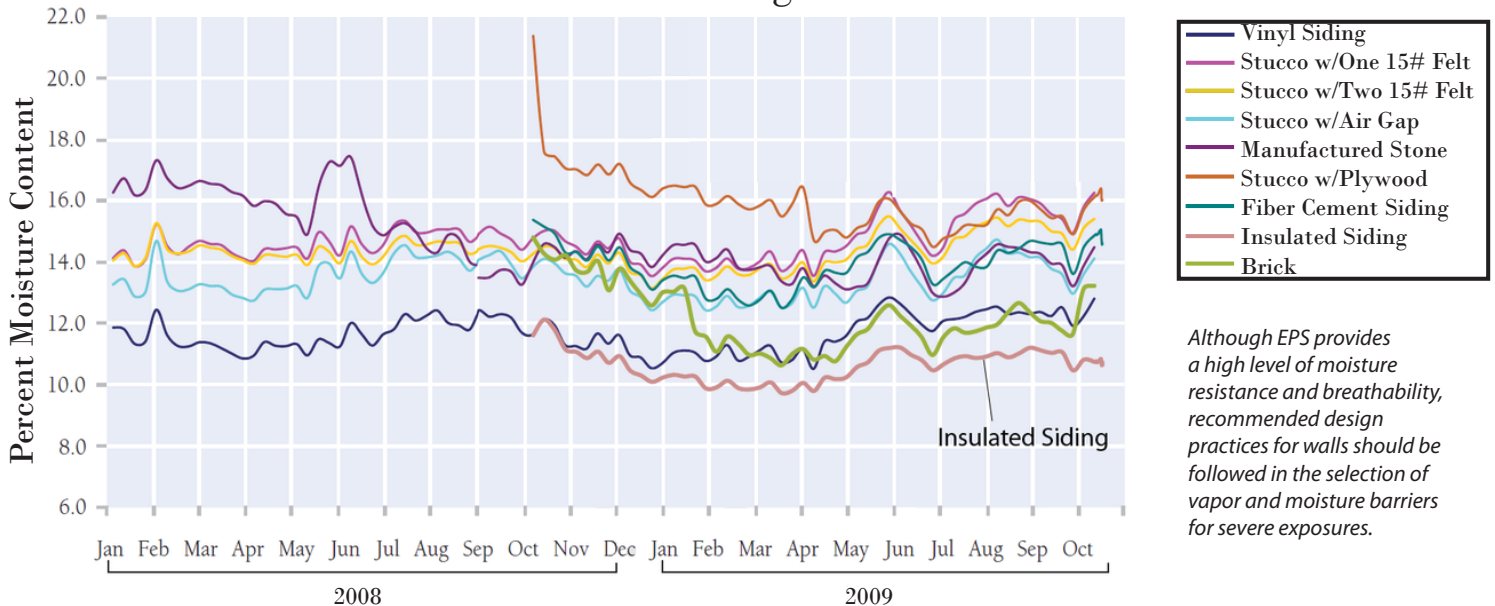


### Proof #1: Driest Wall System

Craig Drumheller, Senior Energy Engineer with the National Association of Home Builders (NAHB) Research Center, recently completed a one year field study<sup>4</sup> on the effects different cladding systems have on the moisture performance of wood-framed walls. In this study, he compared insulated siding with eight other wall assemblies (including traditional vinyl siding and fiber cement siding) and concluded that:

- "Insulated Siding provides both thermal and hygrothermal benefits in light framed wall construction. The thermal resistance of insulated siding provides a double benefit: reduced heat flow in the wall assembly, thereby saving energy, and a higher wall cavity temperature, resulting in increased drying capacity."
- "The wall pair with insulated vinyl siding had the lowest all-around sheathing moisture content values."

### Moisture Content Sheathing- North



Although EPS provides a high level of moisture resistance and breathability, recommended design practices for walls should be followed in the selection of vapor and moisture barriers for severe exposures.

<sup>4</sup>Drumheller, S. Craig, and Charles G. Carll. *Effect of Cladding Systems on Moisture Performance of Wood-Framed Walls in a Mixed-Humid Climate*. National Association of Home Builders (NAHB) Research Center.

## Proof #2: Wind-Driven Rain

Further testing of the Fullback® system revealed that it does not trap or retain moisture in wind driven rain testing (ATI Report 43722.03-120-40). A wall assembly with Fullback® was subjected to one hour of wind driven rain at a velocity of 25 mph with a water application rate of 5 gal/sq foot/ hour (8" rainfall per hour). Thirty minutes after the application of the water, the 8' by 8' wall assembly showed that it only retained 4.3 ounces of water. One hour after testing the wall assembly retained only 1 ounce of water, and after 24 hours all of the moisture had evaporated from the wall.

<sup>1</sup>ASTM C272-01 (2007) Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions: <http://www.astm.org/Standards/C272.htm>.

<sup>2</sup>EPS Molders Association. *15-Year In-Situ Research Shows EPS Outperforms XPS in R-Value Retention*. 2008. Print. EPS Below Grade Series 103.

## Proof #4: Freeze-Thaw Cycles

The EPS Molders Association commissioned a similar study by Intertek EL SEMKO, an independent test laboratory. Intertek conducted environmental cycling tests on 1" thick specimens of EPS product Types I, II, and IX, using ASTM C1512, the Standard Test Method for Characterizing the Effects of Exposure to Environmental Cycling on Thermal Performance of Insulation Products. ASTM C1512 was developed specifically to evaluate building foam insulation under exposure to moisture and freeze-thaw cycles.

*It is important to note that the use of other ASTM procedures (such as those designed for concrete) to evaluate the effects of freeze-thaw conditioning on foam insulation has led to confusion. Reporting the results of tests designed for other materials and applications is inaccurate and unsuitable.*<sup>3</sup>

<sup>3</sup>National Advertising Division (NAD) of the Council of Better Business Bureaus, Inc. *Dow Chemical Company & EPS Molders Association Take Part in NAD Self-Regulatory Forum; NAD Recommends Dow Chemical Discontinue or Modify Some Claims*. 14 Oct. 2005.

## Proof #5: R-value Retention

In August 2008, independent testing evaluated the field performance of EPS and XPS insulation in a side by side, below grade application following a continuous 15 year installation period. Samples of both materials were excavated from the exterior of a commercial building in St. Paul, MN at a depth of approximately 6 feet below grade. Results of that testing are shown in the graphs to the right.

These results demonstrate that EPS Type I outperforms XPS Type X in both R value retention and decreased water absorption. Further, whereas the in service R value of the XPS insulation is reduced by half, expanded polystyrene still delivers 94% of its specified R-value of 3.6 per inch after 15 years. These long term performance advantages make EPS insulation a preferred choice when compared to its competition.

*Specimens were tested for thermal resistance using ASTM C518 "Standard Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Apparatus" immediately after excavation. Moisture content was determined by measuring the sample weight at the time of removal and again after being oven dried.*

## Proof #3: No Mold or Mildew

A 2007 Architectural Testing Institute(ATI) research study (Report No. 74575.01-201-27) of an eight hundred square job in Minneapolis, MN revealed that there was no cracking, breaking, or crumbling of the foam. After seven years on these apartments, the average moisture content was determine to be 1.4% (well below the ASTM C578 4% maximum). Upon removal of the product there was no evidence of staining, mold or mildew - supporting the claims that Fullback®V won't trap moisture in your walls.

| ASTM C578 Minimum Performance Properties |                          |                                   |                            |
|--|--------------------------|-----------------------------------|----------------------------|
| EPS Type                                 | Compressive Strength psi | R-value, F-Ft <sup>2</sup> -b/BTU | Moisture Content, Volume % |
| I  | 10.0                     | 3.6                               | 4.0                        |
| II                                       | 15.0                     | 4.0                               | 3.0                        |
| IX                                       | 25.0                     | 4.2                               | 2.0                        |

| After ASTM C1512 Environmental Cycling |                          |                                   |                            |
|--|--------------------------|-----------------------------------|----------------------------|
| EPS Type                               | Compressive Strength psi | R-value, F-Ft <sup>2</sup> -b/BTU | Moisture Content, Volume % |
| I                                      | 13.7                     | 3.7                               | 2.7                        |
| II                                     | 21.6                     | 4.0                               | 1.7                        |
| IX                                     | 32.0                     | 4.4                               | 1.6                        |

