



## ENERGY EFFICIENCY ENHANCED WITH

# Air Barriers

**A**lthough energy efficiency and green buildings are buzz phrases in today's society, some people may not realize how air barriers can help with energy conservation, indoor air quality, reduced mechanical load and related issues of mold and material degradation. They simply desire a comfortable and energy efficient living and working environment.

A recent study, conducted by the National Institute of Standards and Technology, determined that air barriers are a cost effective measure to be installed in buildings. Most notably, the study showed that the energy savings ranged from 30 to 40 percent for heating climates and 10 to 15 percent for cooling climates.

In today's building culture, green is the key color.

**By Lisa Petsko**

Air leakage has proven to be a significant potential source of condensation and moisture accumulation in building envelope assemblies, according to several studies completed in the last decade. One such study compared potential moisture contributed by air leakage vs. vapor diffusion over a period of one year. The results: Infiltration/exfiltration proved to be a significant potential source of moisture accumulation in walls and/or high relative humidity levels in interior spaces.

Water vapor diffusion, on the other hand, was shown to be a much less significant potential source of moisture than once thought. In this study, air leakage was 228 gallons, which equals 45.6 five gallon buckets vs. less than 6 ounces of vapor diffusion.\*

Designing and constructing an airtight building envelope reduces the risk of moisture problems—mold growth, decay, corrosion, loss of insulation value and IAQ problems—that can occur because air leakage and condensation

are minimized. Controlling moisture helps to control mold growth in wall assemblies and makes the building or home more energy efficient.

### AIRTIGHT CONSTRUCTION

At the same time, airtight construction is likely to be less capable of drying than “air-porous” construction in the event of water leakage or other unforeseen circumstances that cause water to enter a wall assembly. The designer then must strive to prevent rainwater penetration into the wall assembly, to construct an airtight building envelope assembly of compatible air barrier materials, and to enhance the drying potential of the wall assembly in the overall design strategy. Luckily, a number of connecting air barrier materials are on the market to make transitions from one material to the next.

Construction detailing is a critical component for the success of any wall assembly. Aside from minimizing and controlling the condensation that may occur via air leakage or water vapor diffusion, the designer must also create construction details that prevent rainwater penetration.

An important advantage of a breathable spray-on waterproofing/air barrier in the wall assembly is that it can mitigate or eliminate one of the major forces that causes water infiltration into walls—pressure difference. A waterproofing/air barrier, in combination with venting and compartmenting, enables the pressure behind the cladding material to equalize with the pressure outside and prevent rainwater penetration caused by pressure differentials.

Sto Guard, a spray-on waterproofing/air barrier, effectively resists water penetration for up to 75 minutes when subjected to water spray equivalent to 8 inches of rainfall per hour driven by an approximate 50-mile-per-hour wind. The air and water barrier, tested in accordance with ASTM E-331, also has the ability to allow water vapor to pass through, yet keeps damaging moisture from penetrating the sheathing. The product has been proven to resist mold growth when tested in accordance with ASTM D 3273. With a spray-on structural moisture barrier, a builder has minimized risk

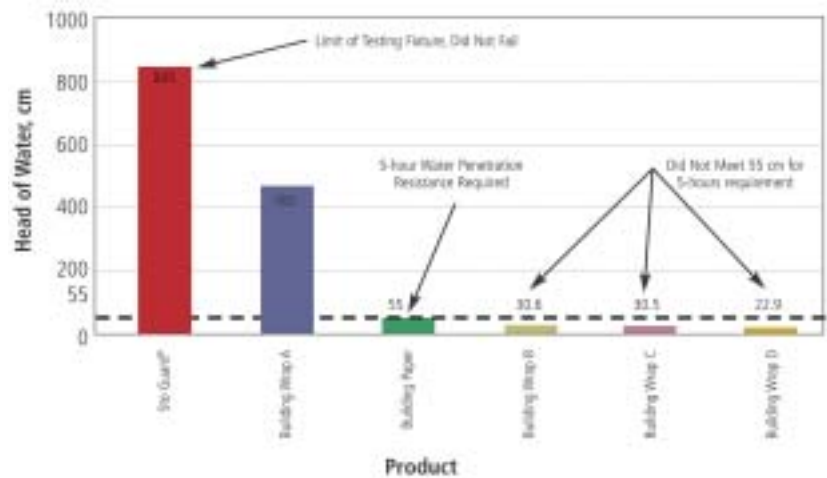


Chart: Water penetration resistance of Sto Guard Spray-On Waterproofing/Moisture Barrier Material compared to building wraps and building paper.



of damage from water intrusion during or after construction.

When thinking about choices in air barriers, it’s also important to think about what type of cladding will be used. By using a stucco or EIFS cladding, combined with a waterproofing/air barrier, a more energy efficient cladding can be created.

When making these choices, we need to think what’s best in the long-term and what’s best for our environment, including IAQ. There are organizations that help us to think green. The U.S. Green Building Council is working to promote buildings that are environmentally responsible, profitable and healthy places to live and work. Council members work together to develop LEED products and resources, the Greenbuild Annual International Conference and Expo, policy guidance, and educational and marketing tools that support sustainable building. LEED certification recognizes projects that have demonstrated a commitment to sustainability. The LEED standard has been adopted nationwide as the guideline for sustainable building.

### NOTES:

#### Independent testing by Cerny & Ivey Engineers

Sto Guard spray-on waterproofing/moisture barrier material did not leak but met limit of testing fixture.

Materials tested in accordance with AATCC-127 (American Association of Textile Chemists and Colorists Test Method 127—Water Resistance: Hydrostatic Pressure Test [modified]). A column of water 21.6 inches tall is placed over the moisture barrier material and sealed to the surface. The moisture barrier material spans a 1/8-inch-wide joint in supporting sheathing. Building wraps and building paper are not penetrated with fasteners. Time to water penetration is then measured. For the materials that met the 5-hour criteria, the height of the water column was increased to determine the limits of the material.

\*Extrapolation of data from “Preventing Indoor Air Quality Problems in Educational Facilities: Guidelines for Hot, Humid Climates,” by CH2MHill in cooperation with Disney Development Co.

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