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Managing Moisture in Building Envelopes

Vapor Retarders Are a Valuable Tool

Condensation from water vapor diffusion can cause a great deal of damage when trapped inside the wall assembly. Extended moisture exposure can cause wood-based building components to decay and steel structural members to corrode, and wet insulation loses R-Value, making the building less energy efficient. Certain building materials, such as wood and paper, can also support mold growth when moisture meets with dormant mold spores present in the materials. Using the cellulose in these building materials as a food source, mold can cause structural deterioration, poor indoor air quality and maintenance headaches.

Fortunately, by incorporating a vapor retarder into the building envelope and implementing other key moisture management strategies, building professionals can ward off these potential moisture problems.

VAPOR RETARDERS

A vapor retarder is a thin sheet that can be made from a variety of materials and is designed to impede the diffusion of water vapor through the wall assembly and protect the building envelope from condensation damage. A properly installed vapor retarder can also act as an interior air barrier, minimizing the flow of moisture-heavy air into insulated cavities during cold weather.

> The lower the perm rating, the more successful a vapor retarder is at impeding moisture transmission.

Vapor retarder materials are rated by "perms," the measurement of their water vapor permeance. The lower the perm rating, the more successful they are at impeding moisture transmission.

Throughout the building community, vapor retarders are often interchangeably referred to as vapor barriers, which are defined as any material used to completely bar the transmission of water vapor through walls, ceilings and floors. Most of the materials referred to as vapor barriers, however, do actually permit some vapor transmission, making this label misleading.

The most recent edition of the International Residential Code (IRC) divides vapor retarders into the following three categories:

Class I

Class I covers materials most frequently referred to as vapor barriers. These vapor retarders have a permeance level of 0.1 perm or less and are considered impermeable. Examples include polyethylene film, glass, sheet metal, foil-faced insulated sheathing and nonperforated aluminum foil.

Class II

Class II vapor retarders have a permeance level between 0.1 and 1 perm and are considered semi-impermeable. Examples include unfaced expanded polystyrene, fiber-faced polyisocyanurate, asphalt-backed kraft paper facing on fiber glass batt insulation and smart vapor retarders. Smart vapor retarders provide the best moisture management, as their permeance changes with the

FEATURED PRODUCTS

MemBrain™ Smart Vapor Retarder & Air Barrier Film

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MemBrain™ Smart Vapor Retarder & Air Barrier Film

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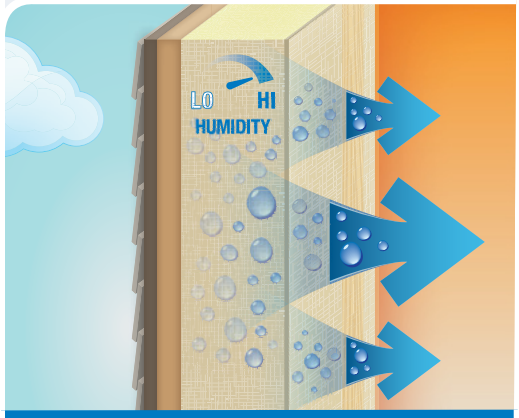
BLOCKS MOISTURE

When humidity levels in the wall are low, MemBrain™ helps keep indoor moisture from entering.



RELEASES MOISTURE

When humidity levels in the wall increase, MemBrain™ becomes more porous to let excess moisture escape.

seasons. This allows them to serve as a vapor retarder during the dry winter season and become vapor-open during other seasons when conditions are more humid, keeping the building envelope dry in both seasons.

Class III

Class III vapor retarders have a permeance rating between 1 and 10 perms and are considered semi-permeable. This class includes most latex paints over gypsum board, #30 building paper and plywood. Per the International Energy Conservation Code (IECC), Class III vapor retarders are allowed only when design conditions exist that promote drying through the use of ventilated claddings or reduce closed-cavity condensation potential through the use of exterior insulating sheathings.

These classifications help building and design professionals select the best vapor retarder for their project. After selecting the vapor retarder, however, it is important to consult the IECC and ASHRAE Standard 90.1, Energy Standard for Buildings Except Low-Rise Residential Buildings, for climate-based guidance on the proper positioning of the vapor retarder in the wall assembly.

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