Vapor Barriers
A Key Component in Moisture Management Strategies

A building without an effective moisture management strategy is a recipe for trouble, as inadequate moisture control can create several devastating problems. Moisture can cause a great deal of damage when trapped inside a wall cavity. Over time, many building materials deteriorate and fail from being repeatedly saturated. Hidden within building cavities, wet insulation loses R-Value and makes the building less energy efficient. One of the most serious problems, however, is mold and mildew growth, as airborne mold spores can lead to serious respiratory ailments. By incorporating a vapor barrier and other key moisture management strategies into the building envelope, building professionals can ward off these potential moisture problems.

Usually a thin, film-like material, such as polyethylene, vapor barriers are used to retard or prevent water vapor diffusion into a wall, ceiling or floor during the cold winter. Unfortunately, many traditional barriers can cause trouble, as they can also prevent the evacuation of moisture that may have accumulated in an insulated cavity, preventing the wall assembly from drying.

A material's water vapor transmission rate, or permeance, is the rate at which a measured amount of water vapor transfers through a known surface area under standard atmospheric pressure conditions. Water vapor permeance is defined in nanograms (ng) of water vapor, per second, per square meter, per Pascal. Type 1 vapor barriers are very restrictive to moisture transmission, having a permeance less than or equal to 15 ng/(Pa·s·m²) of moisture passage. These barriers are required where there is cladding on the house that doesn't allow enough drying to the outside. Type 2 vapor barriers, the basic vapor barrier for ordinary conditions, are defined as having a permeance less than or equal to 60 ng/(Pa·s·m²) of moisture passage.

Prevalent vapor barrier materials used over the years have been polyethylene (Type 1), asphalt-impregnated or asphalt-coated kraft paper (Type 2) and foil scrim kraft (FSK) (Type 1) — paper-backed aluminum.

Moisture management cannot depend on a vapor barrier alone. The most successful moisture management strategies combine high-performance fiber glass cavity insulation with a vapor barrier, a water resistive barrier, an interior air barrier and an exterior wind barrier to reduce the potential for seasonal surface condensation and rainwater penetration. An innovative new product from CertainTeed Corporation simplifies such systems by acting simultaneously as a vapor barrier and air barrier — it can prevent the entrance of moisture, but also allow cavity moisture to escape.

The Canadian Construction Materials Centre (CCMC) recently conducted a study and published an evaluation report on CertainTeed MemBrain® Smart Vapor Retarder & Air Barrier Film. Collaborating with researchers from the National Research Council of Canada (NRC) Institute for Research in Construction (IRC), the CCMC developed a testing protocol for MemBrain’s evaluation based on laboratory testing requirements for vapor diffusion, air leakage control and durability. In addition, the CCMC required computer modeling to verify the product’s
compliance with the National Building Code. The researchers were able to
demonstrate that the product performed well in the varied climates of four
separate Canadian locations, both coastal and non-coastal, and in interiors
with both high and low relative humidity.

The resulting CCMC report from the research (CCMC 13278-R) stipulates that
MemBrain can be used in place of polyethylene, both as a vapor barrier and as
an air barrier system within a building's exterior walls, except in buildings with high
indoor relative humidity, such as saunas and swimming pools. MemBrain retards
moisture under dry conditions, with a permeance of about 44 ng/(Pa·s·m²);
but, as relative humidity increases above 60 percent, it dramatically opens up
to a permeance of up to 2,050 ng/(Pa·s·m²).

For more detailed information, visit the Building Science section of the
CertainTeed website at www.certainteed.com/buildingscience. For information
on using MemBrain in Canada, consult CCMC 13278-R, CCMC's evaluation
report on the product.

MemBrain™ is a smart vapor retarder that changes its permeability to water vapor as ambient humidity changes.