TECHNOTE

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STYROFOAM Reduces Moisture Drive Through Brick Walls

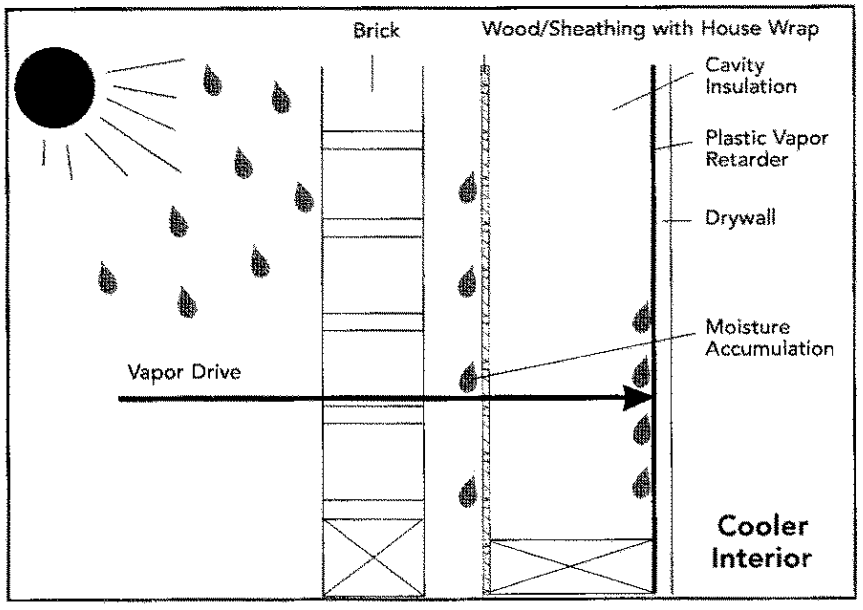
STYROFOAM* brand insulation in frame wall sheathing applications

Problem: Water vapor can be driven into walls from the outside when rain-soaked exterior finishes like brick are heated by direct sunlight. This vapor drive can be many times greater than the vapor drive from inside to outside in cold climates. As water vapor moves through a wall, it can condense into liquid water when it comes in contact with cool surfaces. Condensation inside walls can cause rot, mold, and odors.

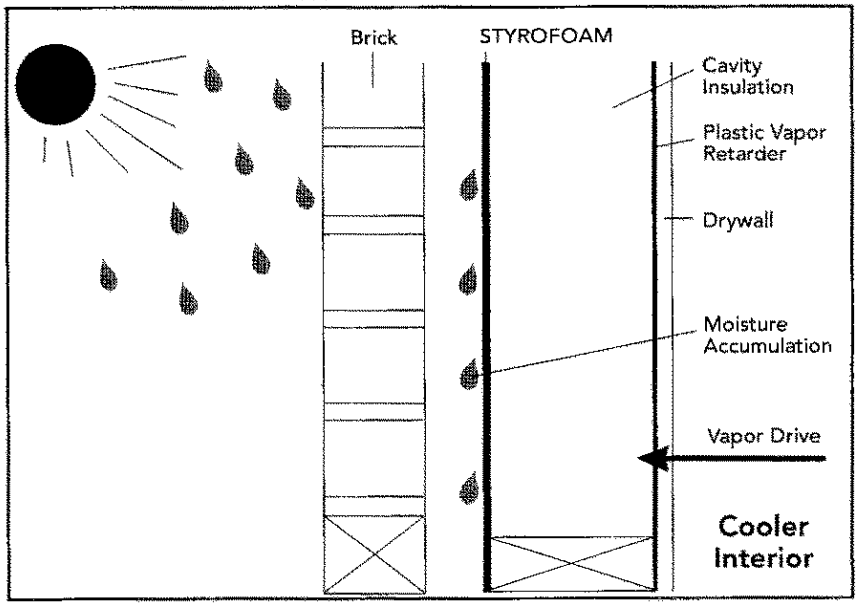
Application: Some exterior finishes, particularly brick, are porous and can absorb a significant amount of water. Brick veneer walls typically consist of an outer brick and mortar facing attached with metal ties to the frame wall

A comparison of vapor drive in a cold climate to vapor drive behind solar heated brick is illustrated to the right.

Solar Heated Wall with Permeable Exterior



Solar Heated Wall with STYROFOAM



Styrofoam Brand Insulation

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and separated by an air space. The air space, which is sometimes referred to as the drainage space, can become a very moist environment when it rains. Rainwater can make its way through the exterior brick/mortar facing into the drainage space where it flows downward along the back side of the brick facing and the outside surface of the wall sheathing. The drainage space is designed and built to handle this wet environment by incorporating water resistant materials, flashings and weep holes.

Direct sun exposure can heat the wet brick and the wet drainage space above 100°F. Very hot, very humid air in the drainage space has a very strong driving force toward the cooler, drier conditions inside the house. While hotter climates subject walls to these conditions for much of the year, walls in cold climates are also exposed to these solar heated conditions for at least a few months per year.

In cold climates, vapor drive during most of the year is from the warm, moist inside toward the cold, dry outside. In order to reduce movement of water vapor into walls in cold climates, vapor retarders such as poly or faced batts are installed on the inside of the framing, under the drywall. It is recognized that vapor drive into walls in cold climates can cause problems. However, it is not generally recognized that the vapor drive due to solar heated wet brick can be 10 times greater than the vapor drive in cold climates. As a result, drainage spaces behind brick veneer are not always designed to handle vapor drive toward the inside of the house and moisture problems can occur in the wall.

Like air pressure or water pressure, vapor pressure flows from high to low. The greater the difference in vapor pressure from one area to another, the stronger the driving force to move from high vapor pressure to lower vapor pressure. For example:

A **cold climate wall** may be subjected to outside conditions of 0°F and 80% relative humidity and inside conditions of 70°F with 50% relative humidity. In this scenario there is a vapor pressure difference of 1.25 kPa forcing water vapor through the wall from inside to outside. To counter this vapor drive, a vapor retarder is usually installed near the inside of the wall.

A **solar heated wall** may experience 120°F and 100% relative humidity in the drainage space and inside conditions of 75°F with 60% relative humidity. In this scenario there is a vapor pressure difference of 9.92 kPa forcing water vapor through the wall from outside to inside. This vapor drive is 9 times greater than the cold climate example! And yet, there is often no vapor retarder near the outside of the brick veneer wall to counter this very strong vapor drive.

Solution: STYROFOAM* brand insulating sheathings provide the ideal combination of water vapor resistance, low water absorption and insulation needed in brick veneer drainage spaces and behind other water absorptive exterior finishes. STYROFOAM brand Tongue & Groove installation works well in brick veneer wall applications.

STYROFOAM brand residential sheathing and STYROFOAM DURAMATE* brand insulation sheathing provide additional water vapor resistance, which makes them particularly well suited to the harsh conditions found in brick veneer drainage spaces. Their long- term performance has been proven on hundreds of thousands of homes. This proven, long-term performance may be further enhanced by taping the joints between boards. Housewraps, 15-lb felt, fiberboard sheathing, fiber-faced isocyanurate foam and wood structural panels do not have the performance characteristics required to handle the wet conditions and strong vapor drive that can exist in solar heated brick walls.

STYROFOAM brand insulating sheathings keep brick veneer walls drier and reduce the risk of rot, mold, and odors.

Another product that works... for houses that work.

For technical information, call 1-800-441-4369

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