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# The Role of Vapor Retarders on Building Performance

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**E**xterior building assemblies are not water-tight, and moisture will enter the building. It doesn't have to be ice, a leak, or a flood that causes significant damage to your building and operations. Vapor can have devastating results in its smallest moisture form if not properly controlled. In addition to property and structural damage, moisture is a breeding ground for mold, mildew, and insects, bringing exposure to health-related issues.

Vapor is water suspended as particles in the air in a gaseous form, and it's this vapor that is ever-present and the most challenging to control in our buildings. Understanding how vapor moves through the exterior walls and how the building envelopes interact with HVAC systems allows architects and engineers to specify suitable mechanical systems and building envelope components to manage the vapor movement through the building envelope.

So how does water vapor move? Generally, vapor travels from warm to cold and from high to low pressure. Therefore, installing or not installing a vapor retarder in the correct location is the first defense in building a durable and healthy wall system. In cold climates, such as Chicago, the goal is to keep the interior warm, moist air from getting to a cold exterior surface. A vapor retarder is designed to stop the travel of vapor. So, vapor retarders in the wrong location could prevent assemblies from drying out and damage the wall system.

All building materials and systems that impact or are impacted by moisture content should be considered, and a custom plan should be developed. For example, air-conditioned enclosures, below-grade spaces, excessive moisture spaces, and an exterior vapor retarder can change the building conditions.

For specialty buildings, such as a natatorium, sauna, and refrigeration warehouse, the vapor retarder along with an air barrier should be located based on computer analysis of the exterior and interior wall assembly. Why? Depending on its location in the wall, a vapor retarder could trap the moisture or allow the moisture to move freely throughout the facility, which would cause extensive moisture damage to the facility.

Double vapor retarders, or vapor retarders on both sides of an assembly, should not be considered lightly, and it is recommended not to be installed in most situations. Vapor retarders have a permanence rating, which allows



*Vapor barrier installation with self-adhered sheets*



*Vapor barrier installation with spray or roll-on*






*Parapet Detail Challenges*

vapor to pass through the material at a significantly reduced rate, which is why they are not vapor “barriers.” Designers must be careful when potentially installing a double vapor retarder in the wall system, such as a wall covering, latex paint, plastic behind the drywall, and an air/vapor retarder on the exterior surface of the exterior wall. The key concept is that vapor should be able to exit in at least one direction to facilitate assembly drying.

By understanding the role of protective materials and systems and how they function separately and together

within a wall system, you can make smart choices that optimize the function of your building and ensure its durability over a more extended period of time. Why is this important? First, it’s healthier for the building and its occupants. Second, it’s cheaper to maintain and prevent costly repairs.

At Pepper, we implement quality assurance measures during planning and implementation to advise you on the best solutions for your building’s performance. If you have a question about your existing facility or upcoming project, please contact us. We can help. 

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