

## Water Intrusion: The Contractor's Most Expensive Enemy



**Proper installation techniques and product selection are critical to preventing building damage from water intrusion.**

**When corners are cut, resulting repairs can be expensive.**

Construction techniques and products are always evolving to meet new building owners' demands. One of these most important trends contractors should watch is the design and installation of weather-resistant barriers (WRBs).

A 2018 research report, prepared by Principia Consulting, a Malvern, PA consulting firm, indicated that WRBs are evolving faster than traditional building materials. Principia researchers suggested two main market-driving forces for the rapid change: building codes that are mandating designs that include a 40% energy consumption reduction and the elimination of water intrusion into buildings.

To meet these requirements, weather-resistant barriers have evolved from single products into multi-component systems designed for multiple-performance capabilities. These design details include rain screens and cavity wall continuous insulation, siding underlayment, barrier walls, air & moisture barrier systems, and thermal, moisture and air barriers.



*Fortfiber Weather Smart – Weather Resistant Barrier (WRB)*

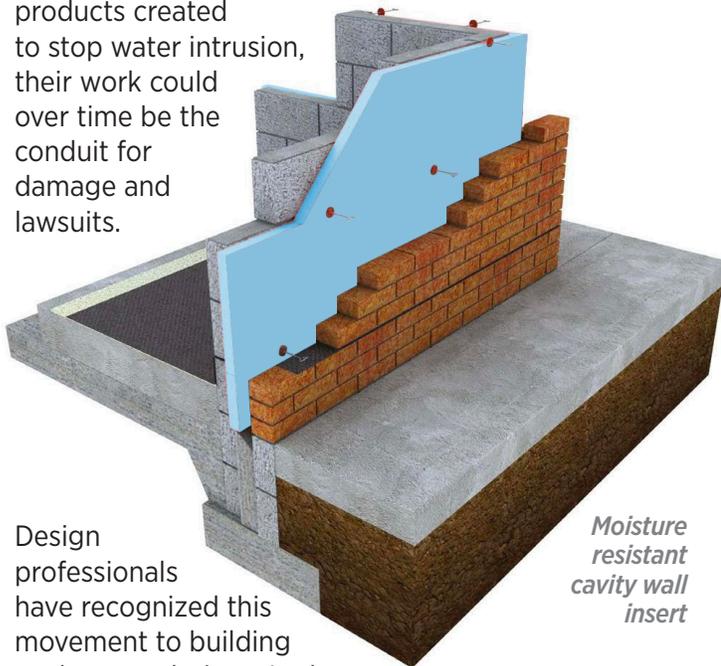
### **Why should contractors pay attention to WRBs as water intrusion solutions?**

According to a report by Zurich American Insurance Company, water intrusion is one of the leading property damage risks associated with new construction and renovation projects. By researching their claims experience from 2007 through 2016, Zurich found “nearly 50% of all Builders Risk claims resulted from some form of weather or escape-of-water event”. A water damage event can range from rainstorms and snow-melt, to flooding and hurricanes, as well as damage from internal water-carrying systems, such as plumbing and sprinkler systems.

But contractors need to note that events also include water intrusion issues. Claims from moisture damage, mold, and other “sick building” experiences extend beyond their Builders Risk policy. Zurich's data from this same period found that the majority of Construction Defect claims are water-related. Claims of this sort can greatly affect the prices of a contractor's General Liability, Professional Liability and Environmental Liability policies. And in many states, building owners may have up to ten years to file claims related to water intrusion causes. ([Ohio Supreme Court: All Claims for Defective Construction or Design Must Be Brought Within 10 Years of Substantial Completion](#))

## More than a good roof

For years, building designers focused on water intrusion approaches that directed rain, wind-blown moisture and snow melt away from the building's exterior. But now most plans include details with greater emphasis on moisture source control beyond flashings and gutters. These new approaches often affect specialty contractors that weren't previously involved. Underslab vapor barriers, cavity wall inserts, and waterproofing concerns can affect every trade's work on a project. Unless contractors become aware of the new standards, construction practices, and array of products created to stop water intrusion, their work could over time be the conduit for damage and lawsuits.



Design professionals have recognized this movement to building enclosure solutions. In the spring of 2019, members rebranded the Roof Consulting Institute (RCI) to the International Institute of Building Enclosure Consultants. This strategic move aligns the institute's resources and activities with their members' interest. IIBEC members have branched out from focusing strictly on roof designs to the entire building enclosure, including waterproofing and exterior wall specifications.

Uncontrolled rainwater penetration and moisture ingress are two of the most common enemies of the building envelope, threatening structural integrity and performance.

## Water-tight is built right

One of the effects of current climate change is the increase of both intensity and quantity of wind-blown events. Researchers in Great Britain and the United States are creating new predictive models that estimate the increase to aid in adapting the ICC Building Code. More than ever, weather-resistant

barriers play an integral part in preventing water penetration and moisture ingress. WRBs are installed to create an envelope of protection that will repel water elements in all types of climates. But their protection also takes into consideration how to mitigate water condensation by creating an airtight exterior. Air sealing enclosures allow HVACs to manage indoor-outdoor air pressure relationships between interior areas and exterior climate conditions.

A weather-resistant barrier provides protection to the wall assembly from intrusion by bulk water (e.g., wind-driven rain) that breaches the cladding system. WRBs also minimize water intrusion into the exterior wall substrates with drainage.

## How to avoid turning a good project into one with major problems

**Contractors from all trades on a project play an important role in avoiding practices that can lead to water intrusion problems. Contractors should:**

### 1) Review The Spec's

Carefully review all contract details to identify potentially improper specifications. There are major differences in regional climate conditions that can affect the selection and installation of WRB systems. Contractors should trust their training and experiences and question details and specifications that may be troublesome for the project's location. And before ordering materials, check with your supplier to ensure they have been successfully used in your region.

### 2) Check Joints And Connections

Thoroughly inspect all joints, connections, and transitions. These areas are more subject to thermal expansion and movement that can leave cracks and unseen openings once covered up. Double-check that these interfaces are made with materials that share expansion and adhesion physical properties that will allow simultaneous movement.

### 3) Verify All Points Of Drainage

Check that all drainage zones are free flowing from floor to floor. All Waterproofing Design Specialists rely on an efficient path of drainage. Inspections should focus on the removal of any material that may have fallen in the open cavity. A final check includes the examination of the system's outfall elevation ensuring there is adequate drop even after establishment of the landscaping's finished grade.

#### 4) Double Check All Repairs

Examine any field repairs or adjustments made during construction. Special attention should be given to situations due to concerns involving tolerances, tear-outs and repairs. Many contractors have established procedures to document how repairs should be conducted, inspected, and documented for incorporation into the as-built drawings.

#### 5) Check All Material Compatibility

Ensure that all materials used on the project are compatible with regards to performance characteristics. This is also the case when matching caulks and sealants. One useful source of information is the SWR Institute. Their members participate in the SWRI Product Validation Program. The program was established to validate certain performance data that is found on manufacturer's datasheets. Manufacturer participation is voluntary, but all product tests are conducted by approved independent laboratories. Contractors and building owners can receive assurance that the listed products meet or exceed the performance data reported on their datasheet. Many of these products are not stocked at consumer-focused stores. Thus, using non-validated products may be incompatible with the existing building specified systems. This creates the potential for unwarrantable conditions, and can also cause gaps in the building envelope.

### How do Weather Resistant Barriers work?

**Building scientists have recognized that to prevent moisture intrusion, weather resistant barriers (WRBs) must withstand the four main causes of moisture transmission.**

WRBs withstand forces both weather-related and HVAC induced, by which moisture enters the structure.

#### Bulk moisture movement

WRBs present an impervious barrier designed to repel bulk moisture movement. This intrusion comes from liquid sources such as rain, snow, and thermal-based condensation. WRBs eliminate openings and cracks in the building envelope.

#### Capillary action

WRBs have components which are affixed or applied to the building exterior to prevent water intrusion from capillary action. Some materials such as concrete masonry block and clay brick are porous. Their matrix draws water away from an exterior source into the structure's wall cavity or even interior. Capillary forces are both destructive and secretive, since they often work and accumulate in commonly unobserved areas.

#### Air-transported moisture

Many WRBs focus on transferring air-transported moisture into, or out of buildings. These systems upgrade flashings and seals at all openings in a building envelope system. This approach is especially effective in mitigating both wind-driven moisture as well as air-handler related issues.

#### Diffused air flow

WRBs can be upgraded to mitigate diffused air flow, which is small amounts of water vapor that passes directly through the material that forms a building's envelope.

**To learn more about the products and techniques you can use to help avoid these problems, download our FREE**

**“Building Envelope Installation Checklist/Guide”**

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