

Window Leakage Claims Frustrate Builders



Builders who pay a high cost to install flexible flashing systems around windows and other building penetrations are discovering these products are not always the miracle cure they had hoped for, cites forensic expert Stan Luhr.

Window leakage claims continue to plague homeowners and frustrate builders, despite wide adoption of more expensive self-adhered flashing (SAF) products specifically designed to prevent such leakage, says a leading forensic investigator and building expert.

The problem isn't with the new products flexibility or adhesive qualities, according to Stan Luhr, CEO of Utah-based AxisPointe, a risk management services provider. Luhr is a forensic construction expert who has investigated thousands of window failures across the country, and claims that installers place too much faith on the products. "It's all in how the products are being installed," says Luhr.

Dozens of SAF products are on the market, including brands from Grace, DuPont, Fortifiber, Protecto Wrap and others. Luhr says the products work well when installed properly, but other factors must be considered when trying to make a building weatherproof, particularly in recessed window designs common in the west.

“A recessed window should be treated like a roof with a window opening very close to the deck surface, and that is why it is problematic for some builders,” Luhr said. Luhr’s forensic business includes testing windows and solving problems for builders and insurers before they get out of hand. When problems go unresolved, litigation often follows, leading to frustrated homeowners and expensive lawyer battles.

Luhr claims that most leaks occur due to the following reasons, which can be easily corrected during installation:

Improper clearance to window. Recessed windows, particularly in stucco designs, often lack sufficient room to allow the SAF products to terminate vertically, above the finished stucco or brick sill. This results in a ‘bathtub effect’, trapping water in the system where it finds its way through the slightest hole and into the building. Luhr recommends elevating the rough window sill at least 4-inches above the rough opening to provide for proper slope of the membrane and clearance to the window sill product. Window offsets less than 6-inches should require the window to be installed after the sill is waterproofed.

Leakage at Flashing Product Lap Joints. SAF products stick together very well, giving a false impression that a seam is entirely waterproof when it isn’t. Luhr says that the primary leakage is at the recessed window sill, where multiple pieces are joined together or when wrinkles occur at splices. When products are installed at inside corners and 90-degree joints, small openings can occur which allow water to travel through.

Complex Inside Corners. Many popular SAF products do not flex and stretch around three-dimensional corners, requiring the SAF to be cut and spliced. At inside recessed corners, Luhr insists that a folded corner—not a spliced corner—should be installed. Folded corners are created by folding the product into the dimensional shape which results in a completely waterproof joint.



Inside the wall cavity, a flexible flashing membrane joint leaks into the building cavity. Inside 90-degree corners often leak here when the top membrane is not firmly pressed into the corner.

Outside Corners. SAF products must be cut and spliced to lay flat, creating a pinhole where no protection exists. Luhr says that despite manufacturers suggesting use of a corner piece (often called a “bowtie”), leakage still occurs. Luhr prefers products that can completely cover the outside corner, such as DuPont’s FlexWrap™ which stretches and can be installed around corners without cutting.



Splices lead to failure. Inside corners should be folded, not cut and spliced, to provide a leak-free joint. See sequence below.



Outside corners need additional waterproofing to eliminate a pinhole leak, installed prior to the SAF membrane. This non-reinforced SAF product contours to the complex corner, which will be covered with a reinforced SAF membrane.



Inside corners can be folded instead of cut to eliminate leaks, as shown here. The next SAF membrane will cover the jamb and extend over this fold, creating a waterproof joint.

Inadequate Slope at Sills. SAF products are considered waterproof when perfectly installed, but few installations are perfect. Luhr recommends providing positive slope under the flashings to promote rapid drying and movement of water. The minimum recommended slope is ½-inch per foot to keep water from ponding within the system. For level sills, perfection is required.



This multi-million dollar window failure affected a seniors' care facility. Recessed window openings had reversed slope towards the interior, and missing waterproof components led to this failure.

The Self-Sealing Myth. In Luhr's investigations of thousands of windows, he concludes that SAF products cannot be trusted to self-seal around fasteners used to secure lath and other components. "We would never allow hundreds of nails to penetrate a built-up roof system, which is 10 times thicker than these SAF products," Luhr said. "Why do we allow lath fasteners on the flat portions of recessed sills?" He recommends prohibiting all fasteners on the horizontal portion, securing the lath at least 2-inches above the rough sill on the vertical sides. Luhr argues that stucco routinely spans studs up to 24-inches apart, and there is no need to fasten lath that is only spanning a few inches horizontally.

Missing Backing. "SAF products do not seal around penetrations unless the fastener is secured into solid backing where it cannot move," says Luhr, who adds that he often proves this simply by pushing fasteners into the SAF products and filling with water to watch them leak.



Waterproof membranes require solid backing to provide support for the membrane.

“Recessed windows should be treated like they are mini-roof systems, since water doesn’t know the difference between a horizontal stucco shelf and a flat roof,” Luhr said. “Yet we think because they are on a wall, we don’t have to take the same care of providing backing, slope and waterproofing as we do on a roof—and that is where we are going wrong.”

Luhr admits that installing SAF products is complicated. He has provided architects with a sequence of details to illustrate his installation method that has proven successful with his clients. “An even better solution is to transition to liquid membranes that incorporate a reinforcing scrim,” but Luhr says, “These are just coming into the market place and few builders seem comfortable smearing a sour cream consistency product on their recessed framing.” Liquid membranes will eliminate splicing and seam leaks, and can be more easily inspected than multiple flashing pieces for integrity.

Luhr prompted manufacturers to develop liquid membranes and tested several formulations to help create a product that builders can rely on that is easily applied and cheaper to install. Recently ProtectoWrap and DuPont have announced liquid membrane products and Luhr believes the market will transition to liquid membrane flashing once builders recognize the benefits, cost savings and risk reduction.



New membrane prototypes being tested in 2007 in our test facility.

What can builders do to prevent leakage? Consider the following if recessed window openings are planned on your project:

- ✓ Be sure to detail the installation, product and sequence so that everyone is on board with the installation method
- ✓ Build a full scale mock-up and water test the window, particularly for new trade partners or if new products are considered
- ✓ Use only one manufacturer's brand—don't intermix flashing systems and components
- ✓ Verify that the products are compatible with the window manufacturer's guidelines
- ✓ Provide sufficient room between the window fin and framing
- ✓ Prohibit lath fasteners on any non-vertical surfaces, even when good slope exists
- ✓ Consider the use of reinforced mesh and liquid membrane systems to reduce defects caused by miss-laps, wrinkles and complex corner breaches.

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Stan Luhr is a forensic construction expert with over 30 years of experience in the construction industry. As a forensic expert Mr. Luhr has completed over 4,000 litigation claims ranging up to multi-billion dollar product defect cases. In 1994 he developed the industry's first computerized field QA systems, which eventually became the benchmark for the construction industry. Since then, Mr. Luhr's Quality and risk management processes have been successfully used on over 430,000 homes and commercial buildings, reducing construction defects by over \$9 billion. A nationally recognized trainer, Mr. Luhr has lectured at hundreds of educational conferences including NAHB, PCBC, IRMI, ASQ, Benchmark, & EEBA regarding construction quality, litigation and risk management. He joined AxisPointe in 2011 and serves as the company's CEO.