Figure 1: When stucco changes planes without a plan for drainage you get a stucco bucket. Buckets hold water - stucco wrapped soffits will too.

Avoiding the Stucco Bucket at Overhangs and Insets

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Detailing an exterior sure would be easy if all houses were simple boxes with only four corners. It would be a lot easier if they didn't have all of those windows, too. Of course, those are not realistic options. In the real world, we always need to rely on deflection, drainage, drying, and durable materials to prevent moisture problems.

In this article, we're going to zero in on basic drainage requirements for stucco and stucco-type exteriors and examine one all-important question we need to focus on when detailing any exterior cladding system: "Where does the water drain?"

The rainscreen principle uses an air gap over a water-resistive barrier (WRB) to create a capillary break. That break allows gravity to drain liquid water; when detailed properly, it also provides ventilation to dry out materials. We need to rely on the rainscreen principle more than ever in high-performance buildings to help out the drying side of the equation. As increased levels of insulation and air-sealing have reduced energy flow through walls, they have reduced the drying potential of building assemblies as well. But the rainscreen principle involves a system, not a single component, and as we detail the numerous components of that system, we need an exit strategy for the water.

These days, providing an exit for water behind stucco is often straightforward and installers are familiar with what to do. While we still see some cases where weeps and weep screeds are left out at the base of the wall, the most common problem areas for moisture intrusion are windows and what have been termed "stucco buckets" by Jeff Bowlsby of Simpson Gumperts & Heger and stuccometrics.com.

A stucco bucket is an overhang where the stucco wraps from the vertical wall to the horizontal surface underneath, without anywhere for liquid water to drain out.

Like a bucket, stucco-wrapped soffits hold water and let your wall components marinate until the lawyers say you need to do something. These problems aren't limited to stucco, which has been dragged through the mud more than its fair share for poor detailing and execution. Thin-brick, adhered-stone, and even fiber-cement-siding walls suffer the same fate from the wrapped detail. Any time the drainage plane is interrupted, we need a plan for the moisture to exit.

Figure 2: A "stucco bucket" on this stuccoed cantilever resulted in the wall kicking the bucket, so to speak. Water had nowhere to drain and eventually overwhelmed the WRB, rotting the framing beneath.

Standard Solutions

To misquote an old children's song, "Put a hole in the bucket, dear Henry, dear Henry." The most straightforward approach to avoiding stucco buckets is to include a reveal that drains and ventilates the rainscreen air gap (see figure 3). Just let the water out. Where do we need these reveals? Wherever the water control layer changes plane, whether it's a full 90-degree corner or a smaller angle.

To identify those changes of plane, use the pen test, which is a simple and important process for verifying control-layer continuity on building plans. Use different color pens to trace the water, air, and thermal (insulation) control layers on the wall section details. If you need to pick up the pen at any point, there is a discontinuity with the control layer.

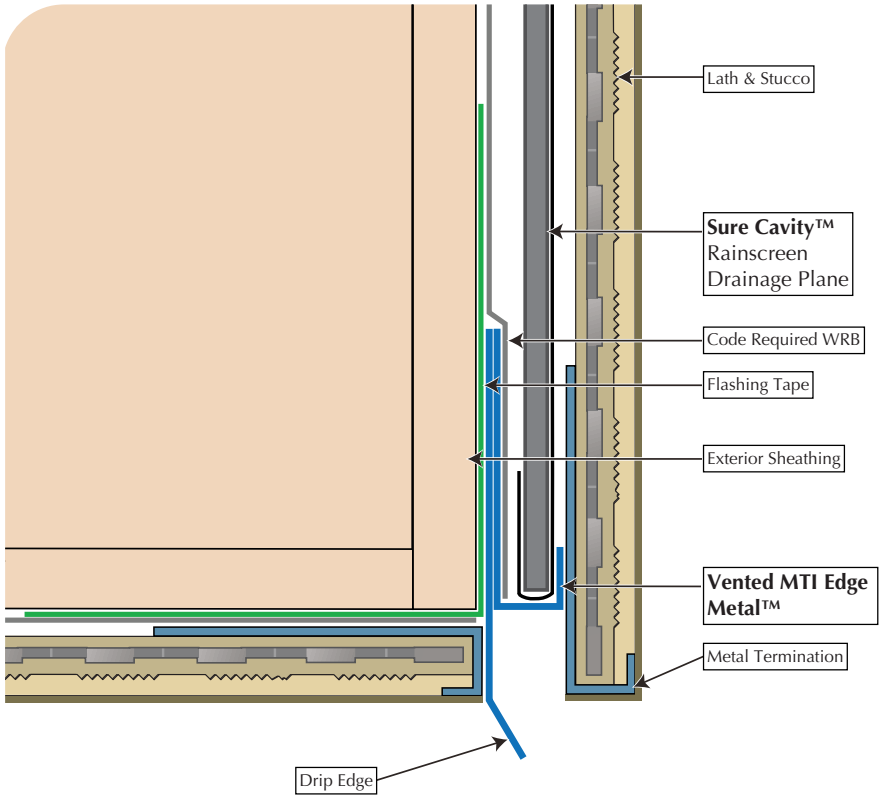

Figure 3: Drainable Reveal
We give the moisture "somewhere to go" by providing a reveal and vented termination at the change of planes.

In terms of drainage, any time your pen turns while tracing the water control layer, you need to flash or drain. Flash and slope when the pen turns outward; let the wall drain to the exterior when the pen turns inward.

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Thin-Brick And Stone

The extremely practical reveals shown in the "Drainable Reveal" illustration might not always offer the desired aesthetic, but gravity doesn't care about aesthetics, and we may need to alter our approach. We do always have to play by gravity's rules, but in some cases, it is possible to divert the drainage to a concealed outlet.

One common place this is often required is with "innie," or recessed, windows. These are currently popular with many designers, but creating a drainage reveal over every opening is not compatible with thin stone and thin brick. This cladding uses corner pieces at the header to deceive the eye into believing the wall has a full-wythe veneer. Using a drainage reveal, in this case, would preclude the use of the corner pieces and reveal the thin veneer's secrets.

One solution is to borrow an idea from the EIFS folks: Use rigid foam to create the inset aesthetic with the drainage plane between the foam and the sheathing (see Figure 4). This resembles an inset window in an EIFS wall—just limit the air gap to 1/8-inch drainage gap to maintain 95% of the insulation's R-value.

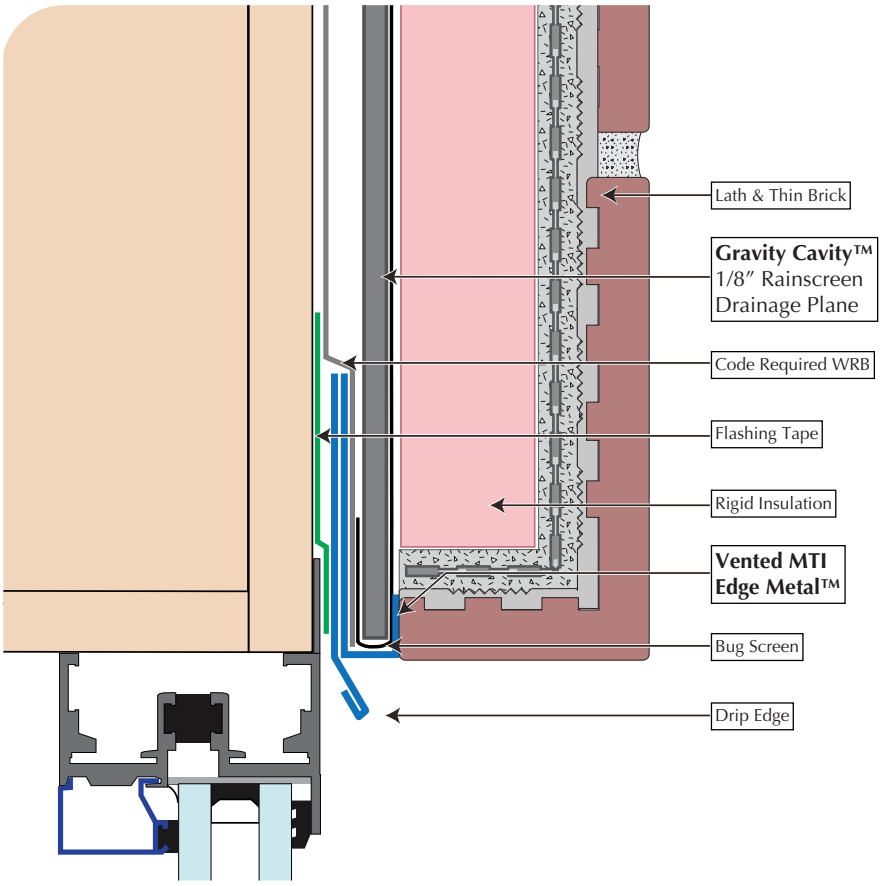


Figure 4: Continuous Insulation Solution
Use rigid exterior insulation to create the inset aesthetic, with the water control layer between the sheathing and rigid insulation. Detailing the water control layer behind the rigid insulation is typically more straightforward, but use an air gap to avoid repeating the painful past.

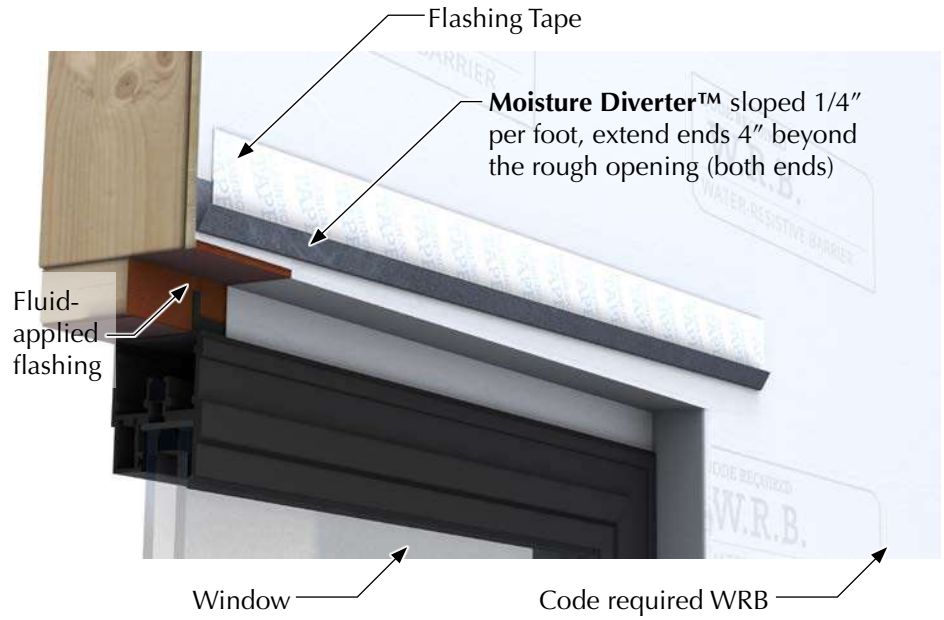
Not using exterior rigid foam? Then we'll have to create a diversion. No, we are not trying to confuse the water—let's just hope we don't confuse the designers or installers too much. The illustrations at left show how it's done.

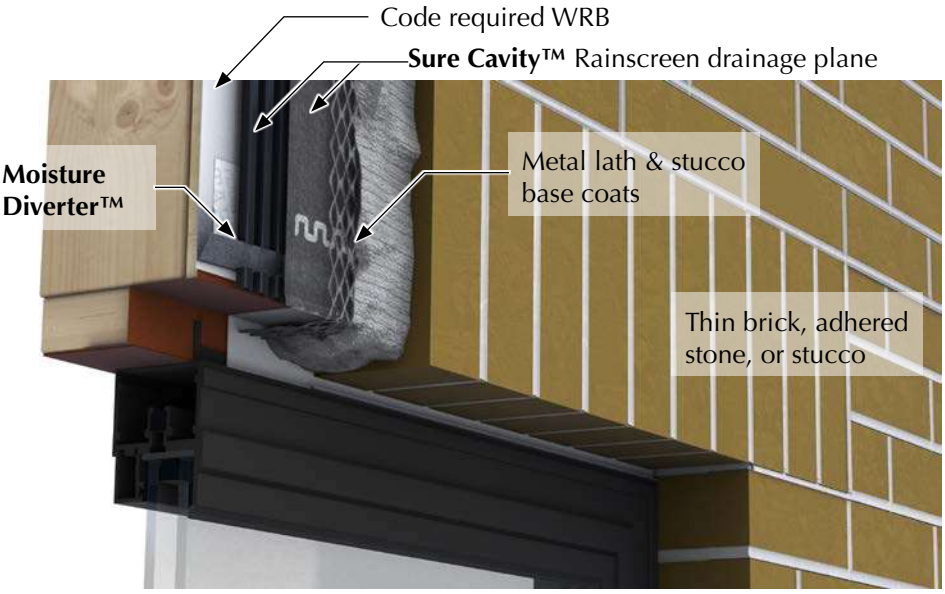
This diversion strategy still relies on gravity. Over a rough opening, we flash the water-control layer to a small moisture-diverter channel that is installed at a 1/4-inch-per-foot slope and extends 4 inches past the opening on both sides. This moisture diverter must be integrated with the WRB and the rainscreen air gap. Any liquid water draining through the air gap is safely diverted away from the rough opening and put back on course to drain to the bottom of the wall. Remember, at the bottom of that wall, there must be weeps, or a rainscreen-compatible weep screed, to let the water out.

This moisture-diverter approach is entirely concealed when the exterior is completed. Even when dealing with "outie" and "tweenie" windows that drain above the rough opening, diverting moisture away from this high-risk zone is a good example of belt-and-suspenders moisture management. We need this redundancy at windows.

Consider fluid-applied flashing for the recessed windows to simplify the origami that is otherwise required with peel-and-stick. Fluid-applied reduces the cumulative thicknesses of flashing with tapes. Also, put some slope on those sills when framing the openings. Sealants around the window will not last forever, so sloping the sill to drain prevents moisture from accumulating and causing problems.

Also, keep in mind that the window frame and any masonry will expand and contract at different rates. If you run stucco or masonry right up to the window frame, you will get accelerated cracking and exposure to moisture. Keep a more flexible seal around the windows, using backer rod and sealant between the window frame and the cladding. The goal is to build a predictable system. Use sealant to reduce cracking and rely on the rainscreen drainage plane behind the veneer to drain the water.





Figures 6 & 7: The Moisture Diverter
With the window already flashed the moisture diverter channel is installed at a 1/4” per foot slope to drain and flashed to the water control layer. The moisture diverter extends 4” past the window rough opening to reduce moisture at these high risk areas.