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Rainscreen Wall Assemblies

Introduction

All exterior wall assemblies are designed to control water infiltration and provide insulation. A conventional envelope system involves installing an outer weather-resistant barrier directly on an inner insulated layer, creating a dual-purpose outer skin. This type of system can be effective but is highly dependent on the integrity of the outer barrier. Failures can occur if components of the barrier are damaged or degrade and pressure-driven water becomes trapped behind the barrier, which can lead to mold, reduced insulation values, and other issues.

Rainscreen wall assemblies solve this problem by separating the weather-resistant barrier from the insulated wall with a ventilated air space. The air space equalizes the pressure on the weather-resistant barrier, greatly reducing pressure-driven water and minimizing infiltration. Any water that passes through the barrier is captured in the air space, where it can drain and evaporate.

Rainscreen Function

A rainscreen must be designed to resist numerous forces which naturally drive water to the interior of a wall assembly, including:

- **Kinetic Energy,** in the form of wind, which creates differential pressure that can drive water into a wall. The wall must be detailed so that the exterior surface is pressure equalized in order to negate this effect.
- **Gravity,** which pulls water down the face of a wall. The wall must be detailed so that water traveling down the exterior face remains on the exterior and is continually directed outward.
- **Capillary Action,** which allows a liquid to flow in narrow spaces in opposition to gravity. The wall must be detailed so that joints are either large enough or provided with gaps or breaks so that water does not flow into the interior.
- **Surface Tension,** which allows water to cling to the underside of a horizontal surface. The wall must be detailed so that horizontal surfaces have drip edges to interrupt the migration of water to the interior.

A functional rainscreen assembly requires the following components, from exterior to interior (see Figure 1):

1. **Rainscreen cladding** composed of a weather-resistant material and detailed to minimize water infiltration through gravity, capillary action, and surface tension. The cladding must also be detailed with openings to promote ventilation, which can be at the top and bottom or in gaps between the cladding members.

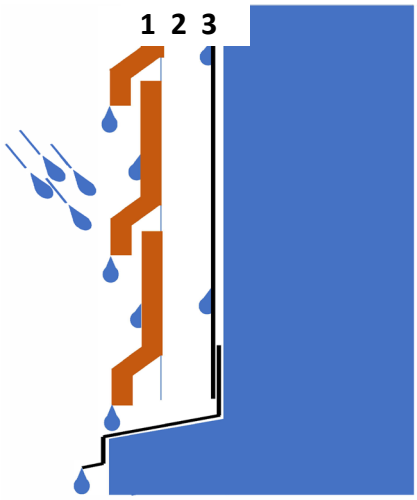

Figure 1:
Rainscreen Components

2. **Air space** between the cladding and the insulated wall that is large enough to promote air circulation for ventilation, equalize air pressure, and allows water in the air space to drain and evaporate.

3. **Water-resistant barrier** on the interior of the air space that provides a second line of defense against water as well as a drainage plane and allows the wall to breathe. Characteristics of the barrier are determined by the climate and the dynamics of the wall performance. The barrier must be flashed and sealed at the top, bottom, and at all penetrations.

Conclusion

Properly detailed rainscreen assemblies solve many issues common in conventional envelope systems. By equalizing the pressure on the weather-resistant cladding, the rainscreen reduces water infiltration and eliminates trapped water in a wall system.