

Information About EIFS



What are Exterior Insulation and Finish Systems?

Exterior Insulation and Finish Systems (EIFS), sometimes referred to as synthetic stucco, typically consist of five components: adhesive, insulation board (attached to substrate with adhesive), a base coat into which a fiberglass mesh is embedded, and a decorative finish coat in the desired color. This type of system is called a *face sealed barrier EIFS* and resists water penetration at its outer surface. It is not intended to drain water that gets behind it. It differs from other types of cladding that have a weather resistive barrier behind the cladding (tar paper or house wrap) and/or may have air spaces between the cladding and substrate.

There are many types of cladding materials that look like stucco. Traditional stucco is made of cement and is different than EIFS cladding, which uses the five components listed above. Other types of "hybrid" stucco include polymer/cement base coat directly applied to a substrate, or traditional stucco with an acrylic finish coat.

How is water entering behind EIFS?

Interfaces between EIFS and dissimilar materials are a common source of water intrusion, not the EIFS lamina (base coat and finish coat). The most frequent source of water intrusion is windows. Water frequently enters the EIFS at window locations in two ways: either through the joint around the perimeter of the window or through seams and joints in the window construction itself. Large quantities of water resulting in some of the most severe damage have frequently been discovered entering behind where a roof meets and terminates at the lower edge of a wall. Other potential sources of water intrusion are chimneys, decks and any other penetration of the EIFS lamina.

Architectural design, severity of weather (rainfall), exposure, and the performance and integration of other building components usually determine whether water infiltration behind the EIFS will occur. Although the likelihood of penetration through the lamina is remote, water can enter the system through cracks in the lamina.

Why does water intrusion occur behind EIFS, and why is it important to discover it?

Water intrusion occurs through and/or around building components such as windows, doors, gable vents, penetrations, and a variety of flashing and construction details. Water intrusion also occurs when maintenance is ignored for these components and other critical areas, such as caulk joints. It is important to discover the occurrence of water intrusion, because water can enter behind the cladding and wet unprotected sheathing, and in some cases, the wood structural members. Depending upon climate and the overall make-up of the wall assembly, the wall may not readily dry out. As water intrusion continues to occur undetected in a particular area, it can accrue to levels substantial enough to cause damage. Early detection of water intrusion is the key to minimizing and preventing such damage.

Is the location of water entry visible, and is the damage visible?

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The location of water entry is often difficult to see, and the damage to the substrate and structural members behind the exterior wall cladding frequently cannot be detected by a visual inspection.

Are the water intrusion problems unique to any part of the country?

No. While the problems were discovered in Wilmington, North Carolina, this in no way means that you could not have similar moisture intrusion problems where you live. Field investigations of non-drainable EIFS in other areas of the country have identified entrapped excessive moisture resulting from water intrusion. The degree to which the problem may exist in your area could be influenced by local climatic conditions. The more rain, the greater the likelihood of having water intrusion problems. In arid climates, the opportunity for water intrusion is smaller, and there is more opportunity for drying out of any incidental water intrusion.

Should I have my EIFS home periodically checked for elevated moisture levels?

Yes. Testing should be done at least annually. A combination of two moisture meters should be used: (1) a non-invasive meter that scans through the wall without penetrating the EIFS lamina, and (2) a probe-type meter that penetrates the EIFS lamina and gives moisture readings of materials in contact with the probes. Only a professional experienced in EIFS water intrusion inspections should perform these tests. Testing is recommended to be conducted in accordance with the latest edition of *Moisture Testing Guide for Wood Frame Construction Clad with Exterior Insulation and Finish Systems*, that is published by the New Hanover County Inspections Department in Wilmington, NC. (The telephone number is 910-341-7456.)

How serious are the problems if water intrusion occurs in EIFS-clad houses?

Damage can be significant if moisture intrusion goes undetected. Damage can become more serious if allowed to continue over time.

Can damaged homes be repaired, and does the EIFS cladding have to be removed?

Any repair method undertaken should render the house into a serviceable condition. The performance criterion used to determine if a serviceable condition is being sustained is a moisture assessment. A serviceable condition exists when damage or excessive moisture is not detected behind the EIFS cladding. This may be true even if the EIFS manufacturer's standard specifications and construction details were not originally followed. Localized removal of EIFS may be necessary to facilitate repairs where damage is discovered. Total removal of the cladding may not be necessary.

Home owners who are deciding whether to re-clad should consider the following questions:

- Does the substrate have prolonged excessive moisture that causes decay?
- If water intrusion has occurred, what is the extent of damage?
- Do the areas requiring repair represent the majority of the cladding area, or are they localized?
- Is the cost to repair the house in excess of the cost to re-clad?

What are the repair objectives?

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The primary objective of repair is to eliminate water intrusion. Repairs should be made where elevated moisture is detected or structural integrity of the material is impaired. Where structural damage has occurred, those areas require replacement of decayed wood products in addition to eliminating the source of water intrusion. Areas of elevated moisture in the absence of damage or decay may require no more than eliminating the source of water intrusion. It has been discovered that wet but undamaged substrate can dry out over time once the source of the water intrusion has been eliminated. Repair methods should address leaks associated with but not limited to:

Roofs - Install effective kick-out flashing at roof-to-wall intersections, diverter flashing around trapped valleys, and rake flashing.

Caulk Joints - Install effective caulk joints.

Windows and Doors - Caulk window jamb to sill joint and joints in any molding surrounding the window or door. Specially designed sill flashing is needed below most types of windows and most windows that are mulled together.

Decks - Install effective flashing.

Chimneys - Install effective cap flashing, cricket flashing at trapped valley, and effective kick-out flashing for roof-rake wall intersections.

Other Penetrations - Install effective caulk joint and/or flashing.

Cracks and Damaged EIFS Lamina - Repair according to manufacturer's specifications.

Effective implies that flashing and caulking prevents water intrusion. Special care, craftsperson skill and design consideration are required to make repairs and install flashing.

Repairs for every component, penetration, architectural detail and flashing detail have not been submitted to or reviewed by the EIFS Review Committee. Some repair methods have been developed in laboratory conditions and are currently being tested and monitored in the field for effectiveness. Preliminary test data indicate that effective repairs to some limited components frequently used in EIFS can be achieved. The repairs do not restore windows, flashing or EIFS to match the EIFS manufacturer's original specifications or details, but focus on eliminating leaks by modifying the as-built conditions. The effectiveness of any repair is dependent upon accurate diagnosis of the source of water intrusion and the skill of the contractor making the repair. The repair is performing successfully when elevated moisture diminishes to an acceptable level over time and does not recur in sustained elevated levels in the long term.

Should the repair be monitored?

Yes. You should hire a professional experienced in EIFS water intrusion inspection to perform follow-up inspections within six months after the repair. Then once every year, the effectiveness of the repair should be monitored as part of the whole house moisture survey. If the repair is not successful, elevated moisture levels will be detected, and the repair method should be evaluated for the reason for failure. After making additional repairs, follow up with another inspection until such time that the moisture level becomes acceptable.

How should the home be maintained?

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Frequent visual inspections should include thorough checking of windows, flashing and sealant/caulk. Damaged flashing should be repaired or replaced immediately. Cracks or deteriorated sealants should be repaired or removed and replaced. Periodic moisture testing would be prudent, especially for houses that were diagnosed with elevated moisture levels. Homeowners should refer to the manufacturer's maintenance and repair instructions. Information is also available from the National Association of Home Builders (NAHB) Research Center's HomeBase Hotline at 800-898-2842, and the Research Center's Website at www.nahbrc.org.

If you have additional technical questions about EIFS, please contact the Home Base Hotline at the NAHB Research Center. The toll-free number is 1-800-898-2842.



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