

EIFS Review Committee

The EIFS Review Committee is a multi-disciplinary group with expertise in the investigation of water intrusion in EIFS-clad structures and is reviewing field trials of EIFS repair methods. This document is intended for public service to assist with understanding the performance of EIFS cladding. Although the information in this document is believed to be accurate, the authors make no warranty, guarantee, or representation, expressed or implied, nor assume any liability for the use of information disclosed herein, or for damage arising from such use.

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Water Intrusion and Remediation For Wood Frame Homes with Exterior Insulation and Finish Systems (EIFS)

A Question-and-Answer Information Sheet for
Home Owners

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Water infiltration into homes sided with traditional barrier nondrainable (barrier) exterior insulation and finish systems (EIFS) also known as "synthetic stucco," can cause degradation to underlying materials. Non-drainable EIFS differ from most other sidings because they do not have a drainage cavity, do not have a weather resistive barrier (tarpaper/tarpaper) behind them, and they have limited drying potential. Geographic location, age of home, quality of construction do not necessarily preclude you from this potential problem. Professional EIFS moisture inspection must become part of homeowner's maintenance program to properly evaluate, correct, and monitor non-drainable EIFS; including repair of the drainable EIFS and related components. This information sheet has been prepared to help educate homeowners about this potential problem so they can make informed decisions regarding the assessment, maintenance and repair of their EIFS clad house.

■ **What are Exterior Insulation and Finish Systems?**

The most common type of Exterior Insulation and Finish Systems (EIFS), sometimes referred to as synthetic stucco, typically consist of five components: adhesive, insulation board (attached to substrate with the adhesive), a base coat into which a fiberglass mesh is imbedded, 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 some other types of cladding that have a weather resistive barrier behind the cladding (tarpaper 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 exterior insulation finish systems (EIFS) cladding which use a foam plastic insulation board, a polymer/cement base coat, glass fiber mesh and a polymer modified finish coat. Other types of "hybrid" stucco include direct applied polymer/cement base coat to a substrate, or traditional stucco with an acrylic finish coat.

■ **How is water entering behind the 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 via two ways, either the joint around the perimeter of the window or through seams and joints in the window construction itself. Large quantities of water that can result in some of the most severe damage have frequently been discovered entering behind where a roof meets and terminates at the lower edge in a wall. Other potential sources of water intrusion are chimneys, decks and any other penetration of the EIFS lamina.

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

Water intrusion occurs in a number of ways, through and/or around building components such as windows, doors, gable vents, penetrations, variety of flashing and construction details. Water intrusion also occurs when maintenance of these components and other critical areas like caulk joints, is ignored. It is important to discover the occurrence of water intrusion as water can enter behind the cladding and wet unprotected substrate (building sheathing), and in some cases the wood structural members. Depending upon climate and the overall makeup 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 or preventing such damage.

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

No. The location of water entry is often difficult to see, and the damage to substrate and structural members behind the exterior wall cladding frequently cannot be detected by visual inspection.

■ **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, non-invasive meter that scans through the wall for the presence of moisture without penetrating the EIFS lamina, and a probe type meter that penetrates the EIFS lamina and gives moisture readings of materials in contact with the probes should be used. Only a professional experienced in EIFS water intrusion inspections should perform this test. 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 Inspection Department in Wilmington, NC, 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 in a serviceable condition. 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.

■ **What are the repair objectives?**

The primary objective of repair methods is to eliminate water intrusion. Repairs should be made where elevated moisture or structural integrity of the material is impaired. Where structural damage has occurred, those areas require replacement of decayed lumber 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 undamaged but wet 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, rake flashing.
- Caulk joints - install effective caulk joints.
- Windows and doors - caulk window jam 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, 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, craftsmen 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 or reviewed by the EIFS Review Committee. Some repair methods were developed in laboratory conditions and are currently being tested and monitored in the field for effectiveness. Preliminary test data indicates that effective repairs to some limited components frequently used in EIFS can be achieved. The repairs do not restore the 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 inspections 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 effectiveness and 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?**

Frequent visual inspection 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 NAHB Research Center's ToolBase Hotline, 800-898-2842, and website www.toolbase.org.

MYTHS

■ **All houses clad with EIFS must be reclad if it was not installed precisely to the manufacturer's specifications.**

False. With proper maintenance, EIFS cladding can provide satisfactory service even if its installation deviated from the published manufacturer's specifications and details. Homeowners should consider the following to make an informed decision:

- 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 areas?
- Is the cost to repair the house in excess of the cost to reclad?

■ **All EIFS clad houses that were built precisely to the EIFS manufacturer's specifications are not susceptible to the water intrusion problem.**

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

■ **A proper caulk joint with backer rod and caulking will eliminate water intrusion at windows.**

False. Window leakage may circumvent the caulk joint. One area known for its high potential to deposit water behind the backer rod and sealant is the muller joint between adjoining windows. Water tightness of the muller window joint is independent of the windows' perimeter seal and therefore requires special sealing and/or flashing to discharge leakage to the exterior.

■ **The water intrusion problems associated with EIFS are unique to Wilmington, North Carolina.**

False. While the problems were discovered in Wilmington, North Carolina, this in no way means you could not have similar moisture intrusion problems where you live. Field investigations of nondrainable EIFS in other areas of the county 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 a water intrusion problem. In arid climates the opportunity for water intrusion is smaller and there is more opportunity for drying of any incidental water intrusion. It is recommended that all homeowners of EIFS clad houses have their houses tested for water intrusion at least once.