

EIFS Inspection Report

PREPARED FOR: Hampton Court Townhome Association 220 Hampton Avenue Highwood, IL 60050

EVALUATION INFORMATION:

Date of Inspections:	September 28, 2007
Weather/Temp:	Sunny/68°F/Humidity/48%
Age of EIF System:	Approximately 5 years old
Applicator:	Not Provided
Windows:	Aluminum Clad – Casement & Fixed
Product:	Dryvit Outsulation System comprised of 1" Expanded Polystyrene (EPS) foam board w/EPS Trim, Blue Mesh, and Brownish- Green Base Coat applied over Plywood sheathing substrate.
Moisture Meters:	Delmhorst BD2100, with 4 & 6 inch probes & Tramex Wet Wall Detector (WWD)

OVERVIEW:

The primary purpose of this inspection is to *evaluate the current performance of the EIF system* on this structure. The secondary purpose is to offer the best remedial options available to the Association based on the findings of this inspection.

Since there are many different options for remedial action, any implementation of any recommendations originating from this inspection report are the sole responsibility of Hampton Court Townhome Association.

The entire EIF system was inspected visually, as well as with the use of an electronic impedance meter (Tramex Wet Wall Detector). The Electronic impedance meter was used in a grid fashion to identify areas necessary for testing with deep wall probes. Probing was only performed in the areas of the structure that the Wet Wall Detector indicated a potential problem. Test probe readings may also have been taken in selected areas to assure the accuracy of the WWD.

Attached is a series of graphs and key to the graph abbreviations. These graphs detail all critical penetrations through the EIF system such as doors and windows, as well as missing and/or deficient kickout flashing. Moisture readings are indicated on the graph and should be interpreted as outlined in the attached document titled "Understanding Moisture Readings".

The following is a detail of the observations and recommended solutions for the areas of the system that our inspection indicated are in need of remedial action. <u>Since the original application is relatively consistent throughout the property, these recommendations are atypical for all reported defects, with the primary variations being related to the specific conditions reported on the graphs, such as locations of missing or improper flashing, impact damage, cracking, etc. Upon completion of the appropriate remedial action, and with proper maintenance including annual inspections, the system should perform as intended.</u>

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Typical Courtyard Elevation



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Cliff Kapson Consulting, Ltd		Photo Log	EIFS Moisture Survey
Photos			Remarks
		Cantilevered Balc Evaluation and/or Description of Pro intrusion on the source related to the impro- flashing at all of the Numerous location behind the system balcony, and are de- in the attached pho	conies on South Elevation: blem: A major source of water uth elevation appears to be oper installation and absence of e cantilevered balconies. as of high moisture were detected at the front edge and beneath the epicted on the attached graph and tos.
Bulge in System & Brown Staining Du	e to		
Deterioration of Substrate		Solution: The EIF : areas beneath the s moisture readings a substrate was soft inspection and repa affected structural Additionally, upon thorough evaluatio integrate flashing y be conducted by a	System must be removed at all outh elevation balconies where are in excess of 29% and/or the upon probing. This will allow the air of the damaged substrate and members. removal of the EIF system, a n of the possible options to with the existing balconies should qualified water-proofing
		contractor before re	emedial action can be completed.
Plant Growth in EIFS Due to Excessive M	oisture		
		Bulge in Syste	em & Brown Staining Due to
Fungus Growth Under Balcony – 220-	-D	Deter	ioration of Substrate

Cliff Kapson Consulting, Ltd		Photo Log	EIFS Moisture Survey
Photos			Remarks
<image/>	- Note d EPS	Absence of Kickout Roof/Wall Intersect Evaluation and/or Description of Prob not installed (NK depicted in the atta graph. However, moisture wall areas beneath r reveal any elevated inspection. Additionally, syste numerous roof loca photos. Expanded properly back wrapp Solution: Repair com flashing at all necess recommended instal	t Flashing & Exposed EPS @ tions: elem: Flashing is improper (IKO) or O) at roof/wall intersections as ached photos and on the attached scanning and probing of vertical missing or improper flashing did not moisture readings at the time of this em is improperly terminated at ations as depicted in the attached Polystyrene (EPS) foam is not bed and base coated. tractor should install kickout sary locations per manufacturers lation and repair details.

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Cliff Kapson Consulting, Ltd	Photo Log EIFS Moisture Survey
Photos	Remarks
Cliff Kapson Consulting, Ltd Photos	Photo Log EIFS Moisture Survey Remarks Flat Decorative Details: Evaluation and/or Description of problem: Decorative details are not properly sloped as depicted in the attached photos. Manufacturers of water-managed EIF systems required all decorative details to be sloped at a minimum 3:12 pitch. When EIFS details are improperly sloped, the system is susceptible to shelving of water, especially snow and ice in winter months, which can cause moisture intrusion and finish coat delamination. 20-F & 20-F & Solution: Repair contractor should apply a polymer-based, waterproof base coat such as Dryvit Dryflex over existing finish, and then apply the new finish to seal system and prevent finish coat delamination and/or caulk along tops of decorative details where detail meets EIFS wall to prevent moisture intrusion. Staining on Surface of EIFS: Evaluation and/or Description of Problem: Staining present on EIFS as depicted in the attached photos. Optional Solution: Staining on the surface of an EIF System is in most cases not indicative of a problem behind the system. EIFS can be cleaned according to manufacturer's recommendations as follows: Protect all adjacent plants and materials with drop cloths. Spray the affected area with water and scrub with a <u>soft bristle brush</u> using a solution of 1-gallon warm water, 1- quart of bleach and 1-cup trisodium phosphate or liquid soap. The area to be cleaned should be pre-wetted. Use gentle application techniques and rinsing. Multiple applications may be necessary to remove deep-s
Staining on Flat Decorative Detail Between 22 220-D	 may be necessary to remove deep-seated rust stains. Do not use abrasive hard-bristle brushes. Alternatively, power washing is also an option, but should only be performed by a qualified EIFS repair contractor or someone who specializes in power washing and has specific experience with cleaning EIF systems. 20-C &

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Photo Log	EIFS Moisture Survey
	Remarks
Compression Crack	king:
Evaluation and/or Description of probl depicted in the attack	<i>lem(s)</i> : Cracking was noted as hed photo.
Compression crackin various reasons, usua expansion or isolatic omission of reinforce manufacturers instal	ng can occur in EIF systems for ally related to the absence of proper on joints or the misapplication or ing mesh as required in the lation details.
<i>Solution</i> : Repair crac installation and repair	cks per manufacturers recommended ir details.
EIFS Termination	n @ Soffit:
Evaluation and/or Description of Pr soffit is not seale terminated at sof column). At some other loca soffit (see adjacent	<i>roblem</i> : EIFS intersection with ed at locations where system is ffit (see bottom photo in left ations system is terminated <u>above</u> t photo).
Solution(s): At all 1 terminated <u>at</u> soffit intersections to pre due to wind-driven	locations where system is t, caulk along all EIFS/Soffit event possible moisture intrusion n rain.
At all locations wh soffit, no sealant is	ere system is terminated <u>above</u> s necessary.
	Photo Log Compression Crack Evaluation and/or Description of probled depicted in the attack Compression cracking various reasons, usue expansion or isolation omission of reinforce manufacturers install Solution: Repair cracking EIFS Termination Evaluation and/or Description of P soffit is not sealed terminated at some column). At some other local soffit (see adjacent) Solution(s): At all terminated <u>at</u> soffit intersections to preduce to wind-driver At all locations while soffit, no sealant is

Inspection Checklist

Sealants & System Terminations	Good	Not Adequate	N/A	Comments
System Termination @ Window Frames		X		Adhesive failure of sealant at numerous locations. (see page 12 for details)
Window Miter Joints	Χ			Original miter joint gaskets in place and in sound condition
Window Mullions	Х			Original window mullions are sealed and do not appear to be a source of moisture intrusion
System Termination @ Door Frames			Х	
Door Jamb/Sill Intersections			Х	
Attachments & Penetrations			Χ	
System Termination @ Soffit		X		No Sealant at EIFS termination with soffit (see page 13 of report for details)
System Termination @ Concrete Porch			Х	
Floor Line Expansion Joints		X		Sealant failure at several locations. (see page 11 of report for details)
System Termination @ Siding	Χ			
System Termination @ Brick	Χ			
System Termination @ Stone	Χ			
System Termination @ Grade			Х	
System Termination @ Roof Line	Х			
Flashing	Good	Not Adequate	N/A	Comments
Kickout Flashing (Primary)		X		Kickout flashing not installed at roof/wall intersections (see page 8 of report for details)
Kickout Flashing (Secondary)			Х	
Kickout Flashing (Chimney)			X	
Chimney Caps	X			Chimney cap flashings are in place and functioning as intended

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Flashing (cont.)	Good	Not Adequate	N/A	Comments
Chimney Cricket			X	
Step Flashing			Х	
Parapet Cap Flashing		X		Gaps and inadequate seal at parapet cap flashing lap detail (see page 9 of report for details)
Deck Flashing			Х	
Balcony Flashing		X		No visible flashing beneath cantilevered balconies on south elevation (see pages 6 & 7 of report for details)
Window Head Flashing			Х	
Door Head Flashing			Х	
Column Flashing			Х	
Miscellaneous	Yes	No	N/A	Comments
Finish Coat Delamination		X		
Impact Damage	X			Impact damage observed at several locations. (see graphs for locations)
Algae/Mildew Staining	X			Staining on surface of EIFS at several locations. (see page 10 of report for details)
Compression Cracking	X			Compression cracking observed at some locations. (see page 13 of report for details & graph for location)
Flat Decorative Details	X			Decorative details are not adequately sloped (see page 10 of report for details)

SUMMARY:

The Homeowners Association should contact a qualified EIFS repair contractor to address the deficiencies outlined herein and implement remedial recommendations.

While the EIF system on this structure is applied over a secondary weather barrier it is in effect a barrier wall system (leading brand house wraps such as Tyvek and Typar are water-resistant, not waterproof). This means that the outer layers of coatings are intended to be a weather barrier designed to repel free water, while allowing water vapor to migrate through it. Problems can arise, however, if water is continuously introduced behind the system due to improper installation, low-grade construction materials, improper flashing and sealant details, poor coordination of trades and/or other substandard construction practices. Proper homeowner maintenance can also help to prevent moisture intrusion.

The design of the barrier EIF system does not allow water to escape from behind the system in a timely manner. <u>Although a moisture barrier is installed behind the insulation</u> boards on this structure, if there are breaches in the exterior barrier, moisture can penetrate the house wrap through mechanical fastener penetrations. Due to the limited vapor flow allowed by the insulation board, base coat, and finish coat, this moisture can result in deterioration of the wood sheathing and structural framing members. This deterioration may go unnoticed for years causing extensive structural damage.

As with any exterior cladding ongoing maintenance is important, however, if repairs are made to a barrier EIF system it is essential that the homeowners maintain the integrity of the system through visual observations of the sealants, and annual inspections of the system performance by a qualified EIFS inspector.

All system repairs should be performed by a manufacturer certified, and qualified EIFS applicator. Any repairs performed should meet the standards and approval of the manufacturer as identified. Any deviation from original manufacturer's details should be approved in writing from the manufacturer or an authorized representative.

The scope of this inspection was limited to reasonable testing for moisture within defined protocol and relies on matters of due diligence reported by others for correctness in it's content. High moisture content can only be determined by the use of a penetrating probe meter. Any areas not probed cannot be evaluated and no judgment is intended or given for any areas not tested.

This report was not a technically exhaustive study of its subject matter and its purpose was to alert the client to major deficiencies in the condition of the property. We assume no liability or responsibility for the cost of repairing or replacing any unreported defects or deficiencies, either current or arising in the future, or for any property damage, consequential damage or bodily injury of any nature. Hampton Court Townhomes, 220 Hampton Ave, Highwood, IL Page 16 of 16

This inspection is based on our interpretation of the product details and the intent of these details and relies on conclusions compiled from numerous other inspections, repairs and construction practices. We certify that this inspection was performed by visual observation and the physical operation of our equipment and our findings are as stated above. There are no warranties expressed or implied. Additionally, we reserve the right to amend and/or supplement our findings and opinions if further information becomes available.

Cliff Kapson

Inspector – Cliff Kapson

October 6, 2007

Date

Attachments:

- 1) Key to Sketches
- 2) Sketches
- 3) Understanding Moisture Readings
- 4) Glossary

Key to Sketch Abbreviations

Air Conditioning Line
Above Finished Grade
Chimney
Door (Basement)
Door
Doorbell
Decorative Gable Vent
Downspout
Impact Damage
Expansion Joint
Electric Meter
Electrical Outlet
Finish Coat Delamination
Hairline Cracking
Intercom
Improper Kick Out
Kick Out Present
Light Fixture
No Kick Out
Patio Door
Radon Vent
Scupper
Satellite Dish
Secondary Kickout
Sprinkler
Speaker
Transom Window
Vent
Window (Basement)
Window (1st Floor)
Window (2nd Floor)
Window (3rd Floor)
Wood Rot
Indicates Moisture Damage in Basement

Boxed Readings Indicate Soft Substrate Dotted Line Boxes Indicate Little or No Resistance in Substrate









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220-D



Understanding Moisture Readings

The Cliff Kapson Consulting, Ltd inspection protocol requires that the entire EIF system is inspected visually, as well as with the use of an electronic impedance meter (Tramex Wet Wall Detector). The Electronic impedance meter is used in a grid fashion to identify areas necessary for testing with deep wall probes. High moisture content can only be determined by the use of a penetrating probe meter. Any areas not probed cannot be evaluated.

In most cases moisture readings are recorded in either wood scale or gypsum scale as determined by the substrate material being tested. These moisture readings should be should be interpreted as follows:

Wood Scale

In all areas where moisture readings are in excess of 29% consideration should be given to the removal of the EIF System to allow the assessment and repair of the damaged substrate and affected structural members.

Experience data has shown that when moisture levels are above 29%, there is frequently damaged substrate, if not at the exact probe location, in the adjacent sheathing and/or framing. It is believed that most damage can be repaired, and proper remediation with ongoing maintenance should prevent future moisture intrusion. Upon completion of said repairs, a new water-managed EIF System, or other cladding should be installed.

Occasionally moisture readings will indicate "acceptable" levels, however, upon probing; the substrate is soft or will offer little or no resistance. This may be an indication of "dry rot", a condition that can occur when wood is exposed to excessive moisture over an extended period of time and the wood fibers have decayed to the point that the wood can no longer hold moisture. When this condition is discovered the EIF System should be removed to allow the inspection and repair of the damaged substrate and affected structural members.

In areas of the system where moisture readings are between 21% and 29% and probing has indicated that the substrate was in sound condition, although some moisture penetration has occurred, it is believed that through proper remediation, containment and isolation of points of moisture entry, would allow the previous effects of moisture to dry, producing no negative impact to the structure.

Areas of the system where moisture readings are below 21% or where readings are not recorded should be considered to be acceptable.

Moisture Readings Page 2 of 2

Gypsum Scale

In areas of the structure where probing has indicated that the substrate is soft and moisture readings are in excess of 2.5% on the gypsum scale, the EIF System should be removed to allow the assessment and repair of the damaged substrate and affected structural members. It is believed that most damage can be repaired, and proper remediation with ongoing maintenance should prevent future moisture intrusion. Upon completion of said repairs, a new barrier EIF system, water-managed EIF System, or other cladding should be installed.

At all locations where damaged gypsum board sheathing and/or framing members are discovered, sheathing should be replaced with Georgia-Pacific DensGlass Gold® Exterior Sheathing.

In areas of the structure where moisture readings are between 1.5% and 2.5% on the gypsum scale, some moisture penetration has occurred. However, it is believed that containment and isolation of moisture entry through remediation, particularly at windows, would allow the previous effects of moisture to dry, producing no negative impact to the structure.

Areas of the structure where moisture readings are below 1.5% on the gypsum scale are considered to be "acceptable".



Invasive Moisture Survey/ Synthetic Stucco Evaluation Report

GLOSSARY

Adhesive	A material used to attach the insulation board to the substrate.
Aesthetic Joint or Groove	A groove cut into EPS board for appearance purposes. It also may provide a place for the applicator to stop and start the application process.
Applicator	An independent contractor who installs EIF systems. They are instructed and sometimes certified by specific EIFS manufacturers in the proper handling and use of their products.
ASTM	American Society for Testing and Materials. An independent organization that is involved with setting standards and practices for all materials, including those used in EIFS. ASTM standards have recently been developed specifically for EIFS construction.
Backer Rod	Closed cell, flexible, polyethylene foam rod. It is sized for specific joint widths and is inserted into a joint cavity to a specific depth from the face of the joint. The rod limits the depth of the sealant joint, helps produce an hourglass sealant shape that helps to distribute stresses in the sealant, and prevent three-sided adhesion of the sealant.
Back wrapping	The practice of attaching a strip of reinforcing mesh to the wall substrate, adhesively attaching EPS insulation board to the substrate, then wrapping the mesh around to the face of the EPS board and embedding it in the base coat. When the base coat is applied in this manner and totally encapsulates the system, the system is resistant to water penetration.
Base Coat	A material applied to the face of the insulation board that functions as the weather barrier.
Class PB System	A class of EIFS applied over various types of insulation board where the base coat varies in thickness depending on the number of layers, or thickness, of reinforcing fiberglass mesh which is embedded into the base coat per EIFS manufacturer's recommendations and with no mesh color visible. Protective finish coats of various thicknesses, in a variety of textures and colors are then applied over the base coat.

Class PM System	A class of EIFS where the base coat is applied to a uniform thickness, which can range from a nominal 1/4 inch to 3/8 inch. The base coat thickness is not dependent upon the number of layers or thickness of reinforcing mesh. The reinforcing mesh is installed over the surface of the insulation board. The base coat is applied over the reinforcing mesh.
Deflection	The amount of movement in a wall as a result of the loads applied to it.
EIFS	Exterior Insulation and Finish System
EPS	Expanded Polystyrene. Type I Rigid EPS insulation board is typically used in Class PB EIFS. Thickness ranges from 3/4 inch to 4 inches.
Expansion Joints	Gaps that extend through the entire depth of the EIFS and allow movement of the wall system without damage to the EIFS. They are usually coincidental with expansion joints in the substrate and are sealed with the proper sealant to prevent water intrusion into or behind the system.
Finish	A decorative and protective textured coating applied over the base coat.
Flashings	Metal or plastic accessories used to deflect water away from EIFS terminations in the event of water infiltration. They are used at parapet tops, window and door heads, windowsills and the like.
Insulation	A preformed insulating material of a specific type and density that functions to reduce heat flow through the wall. Additionally, the insulation provides the surface to receive the base coat.
Isolation Joint	A joint provided around penetrations through the EIF system such as window and door openings, scuppers, etc. It may or may not incorporate flashings and is sealed with the appropriate backer rod and sealant.
Kick Out (Flashing)	A diverter flashing that is installed as the first piece of flashing at the end of the roof where it intersects the wall. Intended to prevent channeling of moisture behind system at roof/wall or roof/chimney intersections.
Lamina	The combinations of the base coat, embedded mesh and finish coat. The lamina provides strength and resistance to damage and gives the system its appearance, durability and resistance to water penetration.

Mechanical Fasteners	A device used to attach the insulation boards to the substrate.
Permeability	The relative ability of a specific material to allow the flow of water vapor. EIFS generally have a low resistance to the flow of vapor, so they are considered to have low vapor permeability.

Primer	A material that may be used to prepare surfaces prior to the application of another system component.
Reinforcing Mesh	Balanced, open weave fabric, treated for compatibility with other materials of the system, which functions to strengthen the system.
Sealant (also referred to as caulk)	A specially designed sealant used with backer rod to fill joints and make them waterproof. The sealant used must be flexible enough to expand and contract with the wall system while maintaining its bond to both sides of the sealant joint. Low modulus sealants are generally preferred for use with EIFS because of their ability to elongate without imposing high stress at the EIFS/sealant interface.
Substrate or Sheathing	The surface to which an EIFS is attached.
Terminations	Any place an EIFS ends. Terminations can be window or door openings, the bottom or top of a wall or both sides of an expansion joint. In any case, all terminations must be totally encapsulated with base coat and mesh and a sealant or flashing with appropriate backer rod installed to prevent water infiltration.