FLORIDA LATH & PLASTER BUREAU

Wall Water Management.

When applying cement plaster (stucco) systems over wall assemblies that are subject to disintegration when exposed to moisture or excessive water vapor, it is imperative to determine what water management (barrier) method will be used to protect interstitial framing cavities and affected substrates. This document discusses Concealed Barriers, Face Barriers, Hybrid Methodologies and Drainage Cavities.



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Technical Advisory

TA-ST #5 01.23.24

Water Management Systems for Stucco Wall Claddings

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INTRODUCTION

FROM MARK WILLIAMS, FAIA - COMMIT-TEE TASK GROUP TEAM MEMBER

Constructing durable exterior walls clad with Portland Cement Plaster (stucco) is an industrywide endeavor. This document is a first step towards publishing multiple FLAPB Technical Advisory publications (TAs) to help achieve that objective.

TAs will include technical points (drawn from data-based materials) such as testing, industry consensus standards, case studies, etc. Additionally, supportable opinions (drawn from individual experiences) will be included. Before our Task Group (TG) publishes a TA, we will reach a TG consensus with majority support for the content. When opposing opinions emerge on a particular topic (from the TG members or FLAPB membership) dissenting points of view will also be published.

STUCCO ASSEMBLIES, WATER MANAGE-MENT AND DURABILITY

Stucco (without a supplementary paint or coating) is considered water resistant, but not waterproof. However, stucco is likely to develop some cracking over time. Stucco related wall components (such as accessories) are also likely to separate from the stucco cladding, causing openings to form. Additionally, through wall penetrations (windows, doors, utility services, roof and deck junctures, etc.) are additional sources that may facilitate water intrusion. Regardless of cause, when openings develop and are sufficient in width, water will penetrate behind the stucco cladding.

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Under most circumstances, the largest source of water intrusion is not the uncoated stucco materials itself. Therefore, the underlying approach for stucco cladding is to either "enhance the water holdout" conditions of the wall assembly, or "manage the water" that intrudes past the stucco cladding, or some combination of each.

Recognizing the importance of water management for all claddings, water control may generically be categorized in four different approaches, which are:

- 1. Barrier
- 2. Concealed Barrier
- 3. Rainscreen
- Hybrid (A combination of features included in #'s 1-3 above)

Each of these approaches will be discussed in "stucco specific" terms, after considering overall issues that affect durability.

Proper design, material selection, construction installation methods, as well as timely maintenance are crucial to a successful project.

At the outset of each project a design is provided which includes both aesthetic features and technical parameters. The technical design should come from a qualified professional that applies building science principles to control water intrusion, air movement, vapor migration and thermal transfer. Proper materials selection, placement and integration of the "control layers", is paramount for a durable enclosure.

Construction includes procedures performed by a qualified installer where the necessary technical design components (materials and details)

EXTERIOR WALL WATER MANAGEMENT

are thoroughly installed and integrated to form the enclosure.

Maintenance of a stucco clad building enclosure is also important for long term performance. (See FLAPB Technical Bulletin, TB-ST-#04-03.21 Stucco & Building Exterior Maintenance).

All aspects of design, construction and maintenance deserve comprehensive consideration. However, this TA primarily focuses on water management for stucco clad exterior walls.

The interrelationship between water, air, vapor and thermal control layers and the integration of same with windows, doors, roofs, decks, utility penetrations etc. will be discussed further in subsequent TAs or Technical Bulletins (TBs).

Because all claddings are expected to protect the building structure and provide a functional interior, preventing bulk water from intruding past a certain point or preventing bulk water from remaining within the wall assembly is a universal

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goal. Although water control for stucco may vary somewhat from other cladding types, it's probably the single most important factor affecting durability.

Respectfully,

Mark Williams, FAIA

CLIMATE ZONES

This document was written for consideration of conditions existing in the warm humid regions of Climate Zones 1, 2 and 3. Principles of thermal loading, moisture migration, construction assemblies and application methodologies often vary with differing climate zones. Design and application adjustments should be applied accordingly by the applicable professional.

Robert Koning Chairman, Florida Lath and Plaster Bureau 2023



Water Management Barriers for Stucco Wall Claddings Face Sealed Barriers, Concealed Barriers, Rainscreens and Hybrids

THE BASICS

WHAT IS A BARRIER AND WHAT DOES IT DO?

In its simplest form, a barrier is a layer of asphalt felt, coating, sealant, or sheet material applied to or at an exterior wall to manage or resist the passage of water or water vapor. It serves to protect interstitial wall cavities and sub-framing or subcladding materials from deterioration or corrosion.

CONTROL LAYER A/K/A WEATHER RE-SISTANT BARRIER

When applied under exterior wall coverings (claddings), the layer(s) is / are oftentimes referred to as a "weather resistant barrier" (WRB) by field workers and "control layers" *a/k/a* "drain-plane layer" by design professionals since their primary function is to control the passage of water and water vapor.

Additional benefits

Other benefits of a weather resistant barrier is to protect the exterior wall from bulk water (rain) while the building readies itself for final wall cladding.

Additionally, if installed with joint tapes or sealants at the barrier's laps, it may be approved as an air-barrier - satisfying the requirements of the Energy Code regarding wall air infiltration.

SINGLE OR MULTIPLE LAYERS

This "control" layer may consist of a single layer or multiple layers. It can be located at the back (inward) side of the exterior wall system, in the middle of the exterior wall assembly or at the face of the exterior wall assembly (a/k/a face barrier) not unlike painting the outer face of exterior plywood such as T1-11. Hybrid designed systems can include multiple products or location placements.

WALLS THAT DO NOT NEED A WEATHER RE-SISTANT BARRIER OR CONTROL LAYER

Stucco applied directly to substrates such as Cement Masonry Units (CMUs - *a/k/a* "Block Walls"), poured cement or similar cementitious materials attaches itself by way of a "direct bond" method. Simply stated, the cement plaster (a/k/a "Stucco") bonds to its substrate through suction and attachment of the cement paste to its similar substrate by force (spray or pressing with a trowel) during its application processes. The Florida Building Code requires no WRB for block or cement walls.¹ No lath is required unless a specific design consideration is being addressed or bond cannot be achieved by direct application with some augmentation of the surface.

Stucco however does not bond to wood or noncementitious substrates. Wall coverings such as structural or non-structural wood sheathing, fiberboard, foamboard or structural panels, etc..

See Figures 1 - 4

WATER MANAGEMENT CONTROL LAYERS - WHEN AND WHERE

(Figure 1) Open Framing a/k/a (open stud construction). Fenestration (windows/doors) directly attached to the vertical wall framing members (studs). Vertical panels shown are for modern seismic resistance. This type of residential construction is the predominant method in the USA and abroad but NOT in High Wind Areas. It is ready for lath & stucco "as-is". The open studs may be covered with a "backing" material (nonstructural sheathing). If they are fully covered (top to bottom) with foam boards, it is referred to as a continuous insulated wall (see Figure 2). Both walls however need a moisture control layer. Figure 1's layer will be installed as a layer with the lath installation - Figure 2's is already in place behind the insulation which has been lathed with a "netting".



FIGURE 2

Figure 2 - Continuous Insulated Wall Sheathing. This "backing" sheathing remains NON structural, so lath attachments must remain in the vertical framing members (studs) and the thickness of the nonstructural sheathing needs to be added to the required fastener penetration length.

FIGURES COURTESY OF THE STUCCO INSTITUTE

(1) Weather Resistant Barrier (WRB) lapped over the flange of a mid-wall screed. (2) Lower section cement block (see figure 4 adjacent) (3) Pipe sealant (black patch) applied. (4) Wire Lath



Stucco directly applied to the cement block substrate - no water management layer (WRB) or lath normally required. System is considered a "mass wall assembly" for absorption properties.



FIGURE 4

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EXTERIOR WALL WATER MANAGEMENT

These non cementitious wall bases need to have some type of "lath" mechanically affixed to the wall framing or sheathing to which the stucco can attach itself by mechanical "keying" - meaning locking of the wet plaster through openings provided within the lath. However, since stucco systems are not to be considered waterproof by and of themselves - we need to determine a method of protecting for the wood (or steel) framing members, wall sub-components and interstitial wall cavities. This control layer must serve to protect the wall from moisture:

- Before the application of the stucco can begin.
- During the stucco application process.
- During the stucco hydration (curing) processes.
- Manage moisture after building occupancy. (The most important function since this feature continues the for the life of the building)

To accomplish this wall water management four (4) different framed wall protection methods are listed at Table 4 of the 2nd Edition of HUD's **"Durability by Design": A Professional's Guide to Durable Home Design Manual.**²

These methods a/k/a "systems" are also defined in the **ASTM E 2128 - Standard Guide for Evaluating Water Leakage of Building Walls** ³ and **Architectural Graphical Standards** by John Wiley & Sons Inc. ⁴

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Overarching, these can be segregated into two popular categories; either they manage incidental water that gets behind the outermost cladding by way of a hidden barrier (hence the term "Concealed Barrier") or they prevent incidental water from getting behind the outermost cladding by application of coatings and sealants creating a seal at the walls' exterior face (hence the term "Face Barrier").

A third method uses a "cavity" to channel, drain and manage sub-cladding moisture accumulation by way of a defined "space" venting to ambient atmosphere. These are termed Drained Cavity and Rainscreen Cavity by the HUD Design Document. These will be covered in subsequent publications.

Important regional considerations with moisture or vapor is its ability to collect behind a subcladding assembly. The amount of chlorides or contaminates in the local atmosphere, average relative humidities (exterior and interior), substrate materials and fire propagation etc., all play a part in the designer's consideration regarding control layer method and placement.

Since the vast majority of installations in Climate Zones 1-4 are either concealed barrier or face barrier systems (or hybrids discussed later) this document discusses their applications.

These two different control layers are termed by HUD's Durability by Design Manual as: "Concealed-Barrier Method and "Face-Sealed Method" - therefore we shall continue on using this terminology.

CONCEALED-BARRIER METHOD

a/k/a Water Management System or Drain Plane System (**Refer to Figure 5**)

Purpose: Protect the open framing or wall sheathing by applying a "Weather Resistant Barrier" (WRB), such as felt, housewrap, fluid coating or other product over the face of the studs or sheathing prior to the application of the lath and stucco cladding.

In addition to serving as a water management layer, this control layer (WRB) protects the frame wall from the elements until the stucco contractor can begin the stucco installation. This becomes more critical in high wind regions where the wall framing is covered with a structural wood sheathing since degradation can affect strength. The WRB further reduces moisture loss during the hydration process (curing of the wet stucco) especially when coupled with the required "densification" process (wet floating the curing cement base when hydration begins).

After the stucco cures, the sole purpose of this protective barrier is to serve to "manage incidental water" that enters through the cracks in stucco, around penetrations, etc. Remember these systems are not painted - color is achieved by way of an 1/8" thick colored "finish coat" of stucco. The stucco finish coat (either white or gray cement base) is tinted with powered dyes to achieve the desired color - or a pre-blended bag of manufactured "color coat" is mixed with water and applied. Incidental moisture entering around penetrations, terminations or through system fractures is intended to migrate down the face of the water resistive barrier and "weep" out at the bottom of the wall, by way of a pre-installed accessory called a "weep screed". *(Refer to Figure 5 - lower circle and Figure 6)*

This method is a non-alterable requirement when using colored stucco as a finish since there are no paints, sealants or other waterproofing material applied to the face of the stucco to prevent water infiltration. If penetrations are sealed, they are sealed at the WRB interface. In other words, the drain plane must "manage" any and all water entering the system. But remember, this is a "weep" screed - not a "drain" screed. The quantity of water is intended to be minor and infrequent. This minor water management is easily accomplished in regions where average monthly rainfall totals in August are < 0.75" and relative humidity outside is considerably less than inside humidities. In such areas predominant vapor drive is from the interior towards the exterior thereby promoting rapid exterior wall drying after infrequent rainfall.

Contrast that with a wall sited in a region with average monthly rainfall > 7.50" and exterior humidities considerably greater than inside humidities creating a constant inward vapor drive (maintaining wall wetness) as found in warm humid regions of Climate Zones 1, 2 and 3. It is then that the difficulties of design become self evident.

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CONCEALED BARRIER METHOD

FIGURE 5

Concealed-Barrier Method a/k/a Drain Plane or Water Managed System – Used with Colored Cement Finish – ASTM C926 Method. Note: You Cannot PAINT the INTERFACE! – It must be allowed to drain. 3/4" Accessory Weep (system thickness) = 7/8" System (after 1/8" <u>Cementitious</u> Color Coat is applied over cured brown coat). This system is NOT intended to be painted.



FIGURES COURTESY OF THE STUCCO INSTITUTE

Typically used over Open Framing or Structural or Non-Structural Sheathing. The white House Wrap has been folded to reveal sheathing. If one ply of house wrap is used, it goes over vertical weep flange – if two ply water management is used, the vertical is usually "sandwiched" between the two layers. If second layer is used as a bond breaker, the primary house wrap and bond breaker extend over the flange Minor Incidental Moisture can "Weep" out of the Screed Separation – See Figure 6



CONCEALED BARRIER METHOD - WEEP SCREED



White House Wrap folded to reveal sheathing for example. If one ply of house wrap is used, it goes over vertical weep flange – if two ply water management is used, the vertical is "sandwiched" between the two layers. If second layer is used as a bond breaker, the primary house wrap and bond breaker extend over the flange



DESIGNED FOR COL-ORED STUCCO FIN-ISHES – NOT TO BE PAINTED!



FACE SEALED (BARRIER) SYSTEM

a/k/a Face Sealed, Sealed Cladding, Face Barrier - (**Refer to Figures 7 and 8**).

Purpose: Protect the wall framing by preventing bulk water or excessive vapor from passing through the stucco cladding or its penetrations at its outermost exterior face.

The system starts with the same Weather Resistant Barrier (WRB) used in the concealed drainage since the wall must still be protected from moisture until the stucco contractor arrives, and is still needed to aid in even hydration by reducing water loss during the curing and densification processes.

It is at this point, however, that the methodology changes purpose. Using the face barrier system, there is no "finish colored coat" applied. Instead, the stucco finish (floated, textured or stippled) is applied to the face of the 2nd application coat. After curing to a PH of less than 10, the stucco is then coated with the required primer, (usually the same product used for the final coat). Next, all penetrations are properly face sealed with a quality sealant (fillets, "V" grooves and/or backer rod gaps tooled in place with spatulas). Then, the final top-coat application is applied.

These coatings are a high grade exterior waterproofing coating installed to a prescribed final system mil thickness (stated in thousandths of an Florida Lath & Plaster Bureau - www.flapb.com

inch), usually to a minimum of 14 - 16 mils Dry Film Thickness (DFT) as a system (both coats together).

When installed using an manufacturer approved waterproof coating (paint) system, the system coating and sealants will not only prevent the passage of bulk water, it will virtually bar the passage of water vapor, while its elastic properties will bridge anticipated cracking and movement of the stucco assemblage caused by normal substructure or hydration stresses.

This method is commonly used in climatic regions with high annual rainfall or high annual humidity (such as climate zones 1 and 2). Its purpose is to prevent bulk water infiltration and inhibit the passage (and accumulation) of ambient vapor behind the stucco assembly.

Radiant heat loss or other cooling factors can create condensing temperatures behind the stucco façade, creating an opportunity for vapor (trapped behind the cladding or WRB) to condense. With a face sealed system, reservoirs of vapor behind the stucco cladding or behind the weather resistant barrier, or on the lath laps, or on fenestration (window) sub-frames along with aerosolized contaminates are reduced to a quantity that imparts no harm to the substrate wall assembly. *(Figures 7 and 8)*

FIGURE 7

FACE SEALED METHOD

Face Sealed System - Water Managed at Exterior Coating and Sealant Interfaces - No Weeps Needed - Low Permeable Coatings used in Climate Zones 1 and 2



FIGURES COURTESY OF THE STUCCO INSTITUTE

Required mil thickness will completely SEAL this interface. Accessory serves as a "screed" for stucco installation only. No weeping outlet needed for face barrier system.

A two-piece screed can be designed to allow minor weeping - but its interface must remain un-painted - See hybrid system.



FIGURE 8

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HYBRID PROTECTION

Since Hybrids are a combination of different established methods they are not a single defined "system" - but rather a unique system prepared by a design professional for a particular job or project.

If one desired the protection of both a concealed

barrier and face sealed system, a hybrid system could be designed with changes to accommodate both systems.

Since face sealed systems closes off the weep ledge preventing any water escapement, an alternate method would need to be designed to accommodate the concealed barrier drainage requirements. Figure 9 is a **concept drawing**

> that will allow drainage after painting and provide for expansion. It is important to note that the gap between the upper wall casing stop and wall flashing shall NOT be sealed. This ensures the upper walls ability to weep. Subsequent owners should be made aware of this need.





SUMMARY OF SYSTEMS

Mr. Mark Williams, FAIA, prepares the summary of these systems in this concise format :

Stucco Specific Barriers, Concealed Barriers, Rainscreens and Hybrids

1.) Barrier Approach

This approach is based on the expectation that bulk water will be controlled by preventing intrusion into the building at the exterior face or within the cross section of the exterior wall materials. Multiple variations are further described next. Flashings are minimized which leads to a simpler installation.

Surface or Face Sealed Protection occurs where the control layer is a drainage plane on the exterior face of the building. The stucco exterior is enhanced with a coating or paint (along with sealants) to minimize water intrusion at the outer face. In this scenario the control layer can readily be inspected and renewed when necessary. The surface/face sealed barrier may be used over masonry or frame construction. When used over frame construction, certain additional code requirements apply. In climate Zones 1 and 2, the need for the surface coating to have a low permeability rating is crucial. Correct mil thickness and permeance of the coating are to be considered.

<u>Reservoir or Mass Protection</u> occurs where the control layer is behind the stucco. This approach relies upon a mass of masonry to store water that intrudes and subsequently to facilitate drying, without causing deterioration of the structure or interior during the process. The reservoir may also be coated prior to applying the stucco cladding to minimize water intrusion through the masonry back-up. This approach is especially critical under certain circumstances because CMU is water resistant, but not waterproof. In this scenario the control layer cannot be readily inspected or renewed if the quantity of water that intrudes exceeds the reservoir capacity.

<u>Hybrid Protection</u> occurs where the control layers combine a *Surface/Face Sealed Barrier* with a *Reservoir Barrier* to prevent water from intruding. Reducing water intrusion through the stucco face also helps to insure long term durability of embedded metal lath when present. Historically, the mass barrier approach is well proven and can be seen in cathedrals throughout Europe, dating back hundreds of years. The surface barrier and hybrid approach are more recent, but when properly implemented, are also recognized options.

2.) Concealed Barrier

<u>Concealed Barrier Protection</u> This approach is based on the premise that most bulk water will be controlled at the exterior stucco surface. However, because some water may intrude past the exterior stucco surface under certain conditions, additional protection for the structure and interior is provided behind the stucco cladding in a concealed location. Some flashings and weeps are needed; more than a barrier wall, but less than a rainscreen assembly. **Concealed Secondary Protection** occurs where a code mandated secondary control layer is required behind the stucco in frame construction. The secondary protection is often comprised of two material layers. Certain combinations of water resistive/weather resistant barrier sheet materials (WRBs), continuous insulation boards, or coatings applied to the sheathing substrate are available. Water that reaches the concealed plane has limited potential to drain out and dry out. This condition has been researched through laboratory testing and field case study investigations, which may be included in future bulletins. In this scenario the control layer cannot be readily inspected or renewed if the quantity of water that intrudes exceeds the protection offered by the concealed barrier control layer.

<u>Hybrid Protection</u> occurs where the control layers rely on a combination of the *Concealed Secondary Barrier* along with a *Surface/Face Sealed Barrier*. Reducing water intrusion through the stucco face also helps to insure long term durability of embedded metal lath when present.

Historically, the concealed secondary barrier approach worked well in frame wall construction where insulation was minimal and/or air barrier membranes were absent (older construction). Without these energy saving features, stucco walls could dry out more readily and deterioration of the underlying structure was minimized or not an issue. In newer frame construction where the drying potential is reduced, the hybrid approach (concealed secondary barrier with surface/face sealed stucco) appears effective because the amount of water that reaches the concealed secondary barrier is minimized.

3.) <u>Rainscreen Protection</u> This approach recognizes that most bulk water will be controlled at the exterior stucco surface. However, because some water may intrude past the exterior stucco surface under certain conditions, additional protection for the structure and interior is provided behind the stucco cladding. This approach provides more robust internal features than the concealed secondary barrier approach. Additional flashings and related components are required and must be integrated into the overall wall assembly.

Rainscreen Protection occurs where a fully drained, vented or ventilated secondary control layer is located behind the stucco in frame wall construction. The secondary protection is comprised of material layers that provide a dedicated air space between material layers. Certain combinations of a drainage spacer, water resistive/weather resistant barrier sheet materials (WRBs), continuous insulation boards, and/or coatings applied to the sheathing substrate may be used. Water that reaches the rainscreen concealed plane has maximum potential to drain out and dry out. This approach has been researched through laboratory testing and field case studies, which may be included in future bulletins. In this scenario the control layer cannot be readily inspected. However, if the quantity of water intrusion exceeds the protection offered by the rainscreen control layer, hybrid protection is also possible.

Hybrid Protection occurs where the control layers rely on a combination of the *Rainscreen* along with a

EXTERIOR WALL WATER MANAGEMENT

Surface/Face Sealed Barrier. Reducing water intrusion through the stucco face also helps to insure long term durability of embedded metal lath when present.

The rainscreen approach is first noted in construction journals dating back over 2,000 years. This approach is also commonly referenced in brick cavity wall construction. The rainscreen approach appears to offer supplementary provisions that enhance durability in conjunction with air and continuous insulation thermal barriers.

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Voted on by Membership in 2024 with the following totals:

Percent Affirmative 77% (27 out of 35)

Percent Negative 23% (8 out of 35)

Member comments and dissents (if any) will be published at the end of attachments and endnotes

End of Document

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ENDNOTE 1

1. 8th Edition of the Florida Building Code

1403.2 Weather Protection

Exterior walls shall provide the building with a weather-resistant exterior wall envelope. The exterior wall envelope shall include flashing, as described in Section 1405.4. The exterior wall envelope shall be designed and constructed in such a manner as to prevent the accumulation of water within the wall assembly by providing a water-resistive barrier behind the exterior veneer, as described in Section 1404.2, and a means for draining water that enters the assembly to the exterior. Protection against condensation in the exterior wall assembly shall be provided in accordance with Section 1405.3.

Exceptions:

<u>A weather-resistant exterior wall envelope shall not be required</u> over concrete or masonry walls designed in accordance with Chapters 19 and 21, respectively.

Compliance with the requirements for a means of drainage, and the requirements of Sections 1404.2 and 1405.4, shall not be required for an exterior wall envelope that has been demonstrated through testing to resist wind-driven rain, including joints, penetrations and intersections with dissimilar materials, in accordance with ASTM E331 under the following conditions:

2.1. Exterior wall envelope test assemblies shall include at least one opening, one control joint, one wall/eave interface and one wall sill. Tested openings and penetrations shall be representative of the intended end-use configuration.

2.2. Exterior wall envelope test assemblies shall be at least 4 feet by 8 feet (1219 mm by 2438 mm) in size.

2.3. Exterior wall envelope assemblies shall be tested at a minimum differential pressure of 6.24 pounds per square foot (psf) (0.297 kN/m2).

2.4. Exterior wall envelope assemblies shall be subjected to a minimum test exposure duration of 2 hours.

The exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings or intersections of terminations with dissimilar materials.

Exterior insulation and finish systems (EIFS) complying with Section 1408.4.1.

ENDNOTE 2 - EXCERPT FROM DURABILITY BY DESIGN

2. Durability by Design 2nd Edition: A Professional's Guide to Durable Home Design | HUD USER



Table 4–6: Exterior Wall Covering Assembly Methods

Drained Cavity Method—The drained cavity method relies on deflection, drainage, and drying to protect the wall from moisture damage. There are many possible variations. In general, a cavity exists to separate the cladding material from the surface of the underlying water-resistive barrier. The depth of the cavity, however, may vary. For example, vinyl siding may be placed directly on the WRB layer and still provide a cavity only restricted at points of contact (e.g., nail flanges). A minimum cavity depth of 3/8" is sometimes recommended, but often a depth of ¾" or 1 ½" is used based on the standard thickness of wood furring materials. Drained cavities increase the life of exterior finishes on wood surfaces and promote drying of wall assemblies after wetting episodes. For anchored masonry (brick) veneer, a 1" cavity depth is recommended to allow space for brick placement and mortar excesses. The drained cavity approach also can be applied to Portland cement stucco with use of a drainage mat or other appropriate means of creating a drainage cavity.

Face-sealed Method—This method relies exclusively on the ability of the outer surface of the wall and sealed joints around penetrations to deflect water and prevent it from penetrating the wall surface. If a defect in the wall surface or joint detailing (e.g., caulk) exists or occurs over time, then water will penetrate and potentially accumulate in the wall, causing damage to any moisture-sensitive materials within the assembly. One example of this type of system is known as conventional or barrier EIFS (exterior insulation finish system). However, current model building codes only allow the use of drainable EIFS (i.e., drained cavity) on residential wood-frame construction.

Table 4 continued on next page

ENDNOTE 2

2. Durability by Design 2nd Edition: A Professional's Guide to Durable Home Design | HUD USER



ENDNOTE 3

3. ASTM E 2128 – Standard Guide for Evaluating Water Leakage of Building Walls

A1.5.4 Water Managed Walls— a/k/a "Drain Plane"

The mechanism intended to prevent leakage in this type of wall is the control and discharge of anticipated and accepted amounts of water that penetrates the exterior surfaces.

A1.5.3.1 Barrier Walls— a/k/a "Face Barrier"

•(b) Face-Sealed Barrier—The exterior surfaces are relied upon as the only barrier. All joints and interfaces must be sealed to provide a continuous exterior barrier, and the absorption properties of the materials must also be controlled.....

ENDNOTE 4

4. ARCHITECTURAL GRAPHIC STANDARDS - John Wiley & Sons Inc,

WATER MANAGED WALL

FACE BARRIER WALL



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Approve with Comment. (Optional - You may leave a comment to be published if you wish) One of the best systems created in the stucco industry to prevent problems in the future.

The Face Barrier System has been the standard installation method in Florida for over a century and has performed flawlessly. It is fully code compliant and proven itself to be the standard-bearer of high-performance installation. It, like all other exterior claddings, must be installed properly.

I have been using the Face Barrier System for over 40 years and counting, initially, installing lath and components, installing both lath and applying stucco and have many years' experience in stone installing, EIFs and just about anything for exterior cosmetics. Anyone suggesting that the Concealed Barrier system be used in place of Face Barrier has to have zero experience in actually installing lath and stucco nor have they personally removed delaminating stucco and witnessed the many factors involved causing these issues. In my opinion, they are "code" readers that usually have an engineering degree and think they know more about stucco then individuals like myself and others that have decades experience in this industry. Just one example is making my lath crews reframe from stapling between the studs and using wire ties instead. Everyone in this industry with hands-on experience knows you MUST staple between the studs, ties are used for OPEN framing when no plywood is present and you must only staple into studs. The ties prevented our trowels from "catching" under the lath when applying stucco, these code readers do not understand this because they have never applied stucco or lath. Now, to cover for this mistake they have come up with excuse after excuse, such as, the staples will "vibrate" out of plywood and crack the stucco, now I hear it is because the vapor barrier will be compromised. Just can't be this stupid. In my opinion it is these code readers that have brought a multitude of problems to this industry by misreading and, more importantly, have no knowledge of the history of the codes.

If possible, a few terms could be clarified. For example, is this a Technical Advisory, Technical Bulletin, a Technical Advisory Bulletin, or some other name?

Been with the Face Barrier system for over 40 years and would not consider using the concealed barrier. Proper sealant using V groves, seal and paint will provide more than adequate for years and years.

My vote is YES

Face Sealed Systems have been the predominate stucco system in Florida for countless decades performing perfectly when done correctly. Understanding these various water management systems is critical to proper design and successful stucco application in Climate Zones 1, 2, and 3.

I have installed and repaired stucco systems in Florida for 42 + years and have seen firsthand how a drainage system does not properly perform in our climate zone. I don't think the designers realize a drainage system per the ASTM must be finished with a color stucco coat and not painted to properly perform in our climate zone and I believe this document will provide some valuable information to both designers and applicators.

Approved with edits uploaded

We don't add anyone's specific name to the other TA's, so why are we adding a name to the intro? I'd suggest publishing without calling attention to anyone specifically as we've done in the past.

Disapprove with Comment. (If possible, please leave a brief explanation to help us better understand your decision.)

I am not in agreement with the current direction of the FLAPB we are wasting valuable time and resources on infighting instead of promoting and defending stucco...too many secret agendas!!

Voting disapprove so I can submit a specific comment. Page 3 indicates that document is applicable in Climate Zones 1,2 and 3. That is too broad as Climate Zone 3 stretches all the way to Oklahoma and the California desert where the climate is dry. Stick to the FLLP geographic mandate (FL) and limit use to Zones 1 and 2 in the state of FL.

I am in favor of the "Face Barrier System"... Thank you

| Please add your Full name. | Disapprove with Dissent. (This will be published with your name attached to the dissent.) |
|-------------------------------|--|
| Michael J. Graham | Overall, the advisory presents a good summation of the different water management systems. I be- lieve it is premature to publish this advisory, due to the fact that testing has been conducted only for welded wire and stucco materials. Testing has not been conducted on expanded metal lath or other lath materials (woven wire or vinyl lath). Vinyl lath usage is not shown in the advisory. |
| Bill Egan | Some of the terminology such as concealed barrier and applications such as faced sealed barrier sys- tems are inconsistent with current industry standards and practices for Stucco on framed construc- tion. Additionally the concealed barrier system concept conflicts with IRC requirements for EIFS (barrier systems) which are limited to application over concrete and CMU. |
| | I strenuously object to the current process for the adoption of technical advisories published under the FLAPB name that does not allow All Members to review comments made by all parties prior to casting their final vote. In the absence of such a process, SEI offers the following. In previous communications, the leading advocate for the Face-Sealed Method has made reference to the following publications as a basis for his opinions: • "Durability by Design" guide published by HUD • "Architectural Graphic Standards" book published by Wiley • Code |
| Thomas E. Miller, P.E. | The devil is in the details The HUD guide states that "Face-Sealed Method current model building codes only allow the use of drainable EIFS (i.e., drained cavity) on residential wood-frame construction." Also, within the HUD document, if you work through Figure 4-10, Table 4-7, and Table 4-8, you will find that a Face-Sealed Method is NR (not recommended) for typical Florida wood-frame construction. Additionally, if you look into the "Architectural Graphic Standards," it states: "Many buildings clad with EIFS have suffered from problems. Therefore, the following recommendations should be followed to increase the likelihood of a suc- cessful installation: Use an internal drainage plane system, and avoid face-sealed barrier walls. Detail the drainage indi- cating flashing and weepholes." Last but not least, the Code specifically states: "Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drain- age." |
| | Additional information was sent to info@flapb.com with further comments / basis. Contact Thomas Miller, P.E. at tomm@seiflorida.com to receive the additional information. |

Felix Martin

Please add yourDisapprove with Dissent. (This will be published with your name attached to the dissent.)Full name.

The Florida Building Codes require the installation of a concealed barrier system by prescriptively adopting ASTM Standards C926 and C1063. ASTM C926 specifically states that plaster shall not be considered to be "waterproof". Laying aside that the installation of a concealed barrier system is required by the Code, the fact of the matter is that stucco construction in the Florida market has been compromised to the point where more and more it is not the preferred cladding system.

The standard of practice for residential construction in most of Florida is to apply two base coats, simultaneously (the double-back method) and to cover them with a textured acrylic paint layer in lieu of a true color coat as required by the Code. Skipping the installation of three separate coats and the lack of an appropriate curing time between the three coats has lead to excessive stucco cracking, water intrusion, and damage. This problem is further exacerbated by over-fastening the lath to the wall sheathing (instead of to the wall framing) which prevents the proper embedment of the lath into the plaster and does not allow it to aid in crack control.

The proposed "Face Barrier System" is very much like the current standard of practice in that the practice is already overly dependent on the acrylic textured finish to provide the protection from water intrusion provided by a true ASTM C926 installation. One only has to Google "Florida stucco" to come up with multiple articles decrying "Florida's billion-dollar stucco problem". The inability of current non-Code compliant stucco applications to provide weather protection in a wet state like Florida has placed an unwanted and undeserved financial burden on homeowners and community associations to pay for the repairs. Lawsuits against housing developers over the inadequacy of Florida stucco as a protective building envelope component is increasing the use of alternative claddings such as Cement Fiber Board Siding and vinyl siding.

As a trade organization, the FLAP should consider the means to expand and facilitate the use of stucco. It is my opinion that this proposal to support the use of stucco as a face barrier system is a mistake that will

| Please add Full nam | your Disapprove with Dissent. (This will be published with your name attached to the dissent.) e. |
|-----------------------------------|---|
| | I agree with Mr. Miller's comments below. |
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| | In the absence of such a process, SEI offers the following: |
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| | Additionally, if you look into the "Architectural Graphic Standards," it states: |
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| | Last but not least, the Code specifically states: "Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to the water-resistive barrier for subsequent drainage." |

within this assembly.

| Full name. 1. This TA-ST #5 12.23 document has no real purpose or usefulness of to lathers and plasterers. At 21 pages length the info level presented is still broad and undetailed yet deep into design/theory and far beyond a gen eral orientation to crafts persons - information which is available from many other industry sources. 2. Generally presenting various wall assemblies, without giving equal discussion to mass wall or rainscreen walls leaves this TA significantly incomplete. Not discussing IBC/FBC chapter 25 requirements for WRB and rainscreens is a significant omission, especially now that they are codified requirements. 3. This TA inaccurately describes technical stucco conditions, and over-broadly draws conclusion that do n apply everywhere and are technically incorrect. | Please add your | Disapprove with Dissent. (This will be published with your name attached to the dissent.) |
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| A. Cement finish stucco is routinely painted with acrylic latex paints - in most USA regions. B. Integrally colored stucco is not as common as portrayed. 4. Saying this TA is written for Climates Zones 1, 2, 3 of the map on page 3 is overreaching, because these and in multiple states. FLAPB's purview is FL only. This map covers different purposes which may be misinterpred. It IDs 7 climate zones which are not applicable to all states indicated due to state specific energy codes and no limitation notice is indicated. Its primary purpose is for drainmat requirements by county, which is no even discussed. 5. Obsolete and inconsistent terms for the same thing are used throughout. "Weather-resistive barrier" sho be "water-resistive barrier". 'Barrier' vs Face Sealed'. 'Cavity wall vs water management." 6. TA references Durability by Design, 2nd edition, 2012. The previous edition published in 2002 does not re ognize face barrier stucco as a valid assembly. Face barrier recognition in this publication is not based on lot mere results. 7. Face barrier stucco by definition is required to be a perfect barrier, requires maintenance as a perfect barrier in perptuity, and has no back up redundancy as does concealed barrier. 100% field testing for face barrier flectiveness is not code required or performed. A face barrier building is essentially an above ground subm rine. Would a reasonable person get into a submarine if it has never been fully submerged before? Reliance on face barrier stucco is unrealistic given typical stucco craftsman and homeowner maintenance skills, and will likely experience water leakage resulting in concealed damages. Face barrier is at the very least professionally irresponsible if not a professionally negligent design solution where over water sensitive substrates such as a wood-based framing and sheathing, and CFS metal framed wall systems. Face Barrier may be cor ditionally acceptable over non-water-sensitive conditions. Face Barrier at conc | I. This T length theral orie Genewalls learainscree This T apply ev A. Cema B. Integ A. Sayin in multiped. It ID and no lieven dis S. Obso be "wate Therm per 7. Face France The per 2. Genewalls learainscree This T apply ev A. Cema B. Integ Sayin in multiped. It ID and no lieven dis S. Obso be "wate TA reform per 7. Face France Fra | A-ST #5 12.23 document has no real purpose or usefulness of to lathers and plasterers. At 21 pages ie info level presented is still broad and undetailed yet deep into design/theory and far beyond a gen- ntation to crafts persons - information which is available from many other industry sources. rally presenting various wall assemblies, without giving equal discussion to mass wall or rainscreen wes this TA significantly incomplete. Not discussing IBC/FBC chapter 25 requirements for WRB and ens is a significant omission, especially now that they are codified requirements. A inaccurately describes technical stucco conditions, and over-broadly draws conclusion that do not erywhere and are technically incorrect. and finish stucco is routinely painted with acrylic latex paints - in most USA regions. rally colored stucco is not as common as portrayed. g this TA is written for Climates Zones 1, 2, 3 of the map on page 3 is overreaching, because these are les tates. FLAPB's purview is FL only. This map covers different purposes which may be misinterpret- s 7 climate zones which are not applicable to all states indicated due to state specific energy codes, mitation notice is indicated. Its primary purpose is for drainmat requirements by county, which is not cussed. lete and inconsistent terms for the same thing are used throughout. "Weather-resistive barrier" should arresistive barrier". 'Barrier'' vs Face Sealed''. "Cavity wall vs water management." 'erences Durability by Design, 2nd edition, 2012. The previous edition published in 2002 does not rec- ace barrier stucco as a valid assembly. Face barrier recognition in this publication is not based on long formance results. barrier stucco by definition is required to be a perfect barrier, requires maintenance as a perfect barrier ness is not code required or performed. A face barrier building is essentially an above ground subma- puid a reasonable person get into a submarine if it has never been fully submerged before? Reliance parrier stucco is unreali |

We should not support the publication or use of this TA due to its technical omissions, incompleteness and inaccuracies, the omission of references from other reliable industry sources supporting the positions pre-