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S.I. & C.I. NEWSLETTER 08-01-2020.2

Sealing of Window Bucks and Installing Flanged Windows in CMU (block) Wall Openings and Mounting and Sealing Fin Windows in Framed Wall Openings with Water Resistant Barriers

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Fully Code Compliant!
Two Separate Wall Models Constructed and Tested in Accordance with ASTM 331 and Section R703.1.1 Exception 2 of the Florida Building Code
June 22, 2020

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INTRODUCTION

There has been a rash of inconsistencies regarding understanding the flashing interfacing requirements for fenestration (window) installations according to the prescriptive and performance provisions found at 1405.4 of the Florida Building Code and R703.4 of the Florida Residential Code. The provisions in both codes contain the same text so we will address then singularly.

When installing fenestration (specifically a window) the code provisions require adherence to the manufacturer's instructions which are usually found by reviewing their requisite submittals for Florida Product Approval Number or Notice of Acceptance (NOA), or, by way of the applicable Building Codes for prescriptive requirements (if any)..

The problem is very few window manufacturers provide complete interface detailing - they document their mounting requirements and simply defer to other industry application standards for interface waterproofing details or defer to the designer or contractor of record for them. The code does not prescriptively describe installation methodology, waterproofing or sealing requirements - it simply refers to a list of options:

R703.4Flashing.
Approved corrosion-resistant flashing shall be applied ….. Fluid-applied membranes used as flashing in exterior walls ... **The flashing shall extend to the surface of the exterior wall finish…**

1.Exterior window and door openings….. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:

1.1.The fenestration manufacturer’s installation and flashing instructions, or …, in accordance with the flashing manufacturer’s instructions. Where flashing instructions or details are not provided, …

1.2.In accordance with the flashing design or method of a registered design professional.

1.3.In accordance with other approved methods.

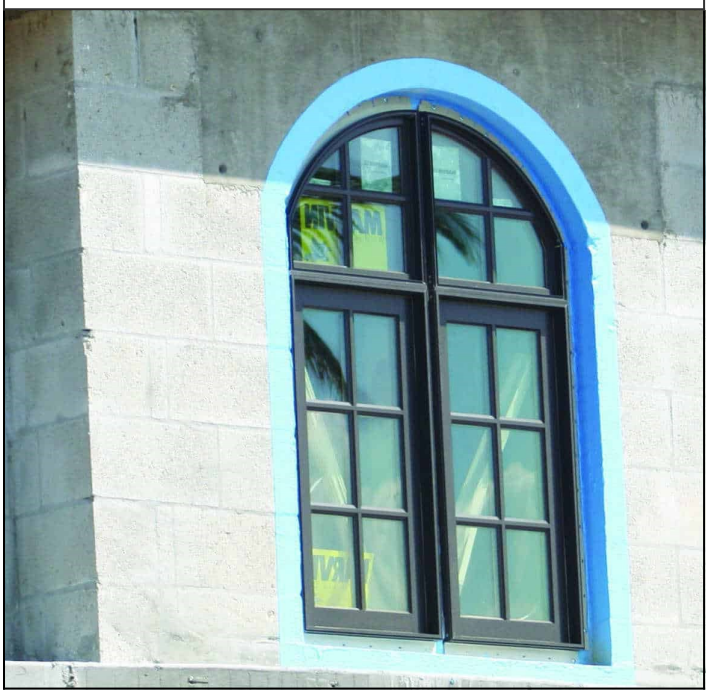
1.4.In accordance with FMA/AAMA 100, FMA/AAMA 200, FMA/WDMA 250, FMA/AAMA/WDMA 300 or FMA/AAMA/WDMA 400.

The code statement "**The flashing shall extend to the surface of the exterior wall finish…"** (concerning fluid applied membrane as a flashing) remains a source of confusion - exactly where is the "surface of the exterior wall finish"? The forward face of the window's mounting flange? Carried through to the outer CMU's corner? Continued around the corner? If so, how far? And what of cement plaster bond? When cement plaster is to be applied, metal lath must be attached with fasteners since the bond is compromised - but, the fasteners compromise the waterproofing intent of the membrane. So, the dog chases its proverbial tail….. Refer to Figures 1 - 2 and 3

FIGURE 1 - WINDOW RECESSED FROM OUTSIDE FACE. THESE RECESSES ARE TERMED "RETURNS"

FIGURE 2 - WINDOW BUCK SEALED TO CMU AND HORSESHOE SHIM

FIGURE 3 - CMU WITH FLUID MEMBRANE BRUSHED ALL THE WAY OUT THROUGH THE RETURN AND WRAPPED AROUND THE FACE



HISTORY

Installing fenestration in a normal CMU (block) wall requires the buck attachment strips to be recessed from the face of the wall. The recesses are termed window “returns” from the outside prospective. See Figure 1. The buck strip is sealed, installed and fenestration shimmed from the inside. See Figure 2.

The methodology we used to install these bucks and windows remained relatively the same until Circa 2003 when chromated copper arsenate (CCA) was removed from pressure treated lumber and different chemicals were used. These initial replacements were found to be aggressive to some ferrous and non-ferrous metals such as aluminum.

Several “cures” were developed to isolate the fenestration assembly from contact with the newer chemically treated wood. Wrapping the face of the buck with bituthene type tape was first used but did not encapsulate all sides of the buck leaving newer and larger (2x4) soft woods serving as bucks subject to decay in warm humid environments.

The concept of coating the opening behind the buck and then, after attachment, coating the outboard face and sides of the buck would not only isolate the buck from the corrosive wood treatment by encapsulating the entire wood member, but also would serve as a waterproofing coating for humid and wet environments. Or so we thought....

So these fluid applied membranes purported a two fold benefit; (1) isolation of the buck from the window extrusions and its components, and, (2) moisture protection of the wooden attachment buck when untreated lumber or softwoods were used.

We have since moved beyond that with newer pressure-treating compounds (and reformulation of existing compounds) such as:

- Copper dimethyldithiocarbamate (CDDC)
- ACQ (alkaline copper quaternary),
- Borates.
- Copper azole.
- Copper naphthenate.
- Copper-HDO
- Polymeric betaine
- etc.

These newer (or modified) formulas are compatible with the fenestration and its components, (just as the “old” way) - we thought we could simply return to the old way of installing, fastening and sealing the bucks (and window flanges) that had worked before - no need for any “fluid membrane” anymore.

Not so fast, the interests of those fluid applied membrane manufacturers contended the product was “necessary” to ensure adequate water-

proofing. And look at the post 2003 language added to the code at R703.4; **1.3.In accordance with other approved methods.**

Some code officials contended the “old way” now needed “approval” or needed to be specifically mentioned in one of the manufacturer's installation standards or publications. Because of this statement: **1.3.In accordance with other approved methods.**

MEANWHILE - TO MAKE MATTERS WORSE

During this time period, others started to imply that a surface mounted fin window (used with frame wall construction) must have it extrusions separated by way of a casing stop and backer bead in order to comply with the code referenced ASTM -C926 and C1063 provisions. There is no such restrictive mandate in either. (See the “Truth about Florida Stucco” or “Inspecting Stucco for Code Compliance”) amongst other educational references at the Stucco Institute.

When there is no manufacturer prescribed installation or specific prescriptive methodology, the code allows for the use of a prescribed methodology if it has been appropriately tested and approved. That test is the ASTM-331. The test must be performed on an assembled wall model, and is performed to specific protocols by an accredited testing agency.

Due to requests from contractors, architects and Inspectors to certify the “old way” - we assembled a cement masonry unit wall (block) and a wood frame wall covered with standard OSB, house wrap, and metal lath. Both wall sections where then stuccoed using standard type S masonry cement. Polyurethane sealants and two coats of exterior paint (DRYLOK Extreme) were applied per standard construction painting and sealing details.

The systems were tested and BOTH were fully approved by way of the ASTM 331 criteria and therefore deemed compliant with all code provisions regarding fenestration waterproofing and installation.

CAD DRAWINGS AND TESTING APPROVAL (and direct download information)

The following pages include the CAD drawings for installation (these can be directly downloaded at the ***sealedcladdingsystem.com*** under the CAD DRAWINGS flyout. They are file numbers 06_01 through 06_06. They also represent the testing conditions of the wall and are approved by the Testing Approval contained in this document. The Testing Approval document can be **directly downloaded** without this accompanying text at the ***stuccoinstitute.com*** under the ASTM REPORTS flyout tab; Titled: ASTM 331 -“Sealing of Window Bucks and Installing Flanged Windows in CMU (block) Wall Openings and Mounting and Sealing Fin Windows in Framed Wall Openings with Water Resistant Barriers”

It is our intent to provide architects, engineers, designers, contractors, fenestration installers, stucco installers, waterproofers and painters with simple diagrams that will yield a successful watertight installation and provide the consumer with years of trouble-free service.

Respectfully,

Robert Koning,

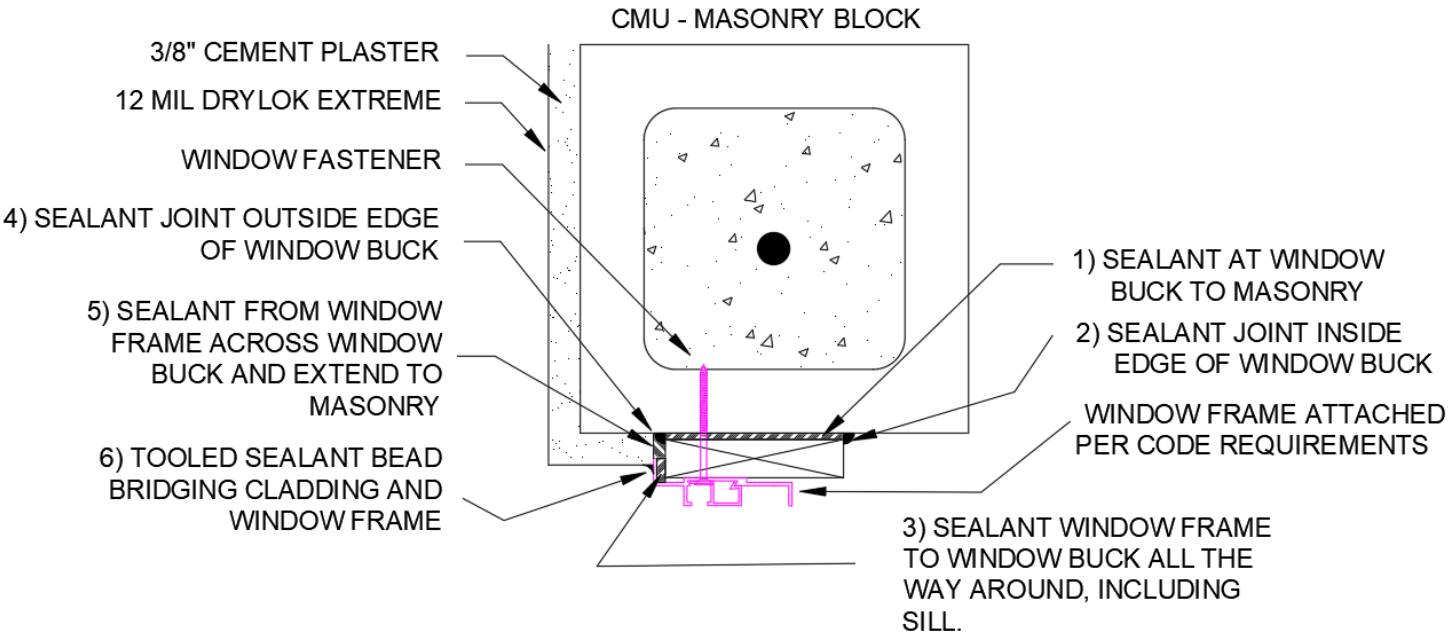
Director - The Stucco Institute

Drawings and Report Follow

CAD details may be downloaded at:
www.sealedcladdingsystem.com

CMU - 6 POINT BUCK MOUNTING DETAIL

Detail 06_05 is CMU (Block) is wall specific and has all detail requirements for mounting and sealing the buck strip to a masonry wall.

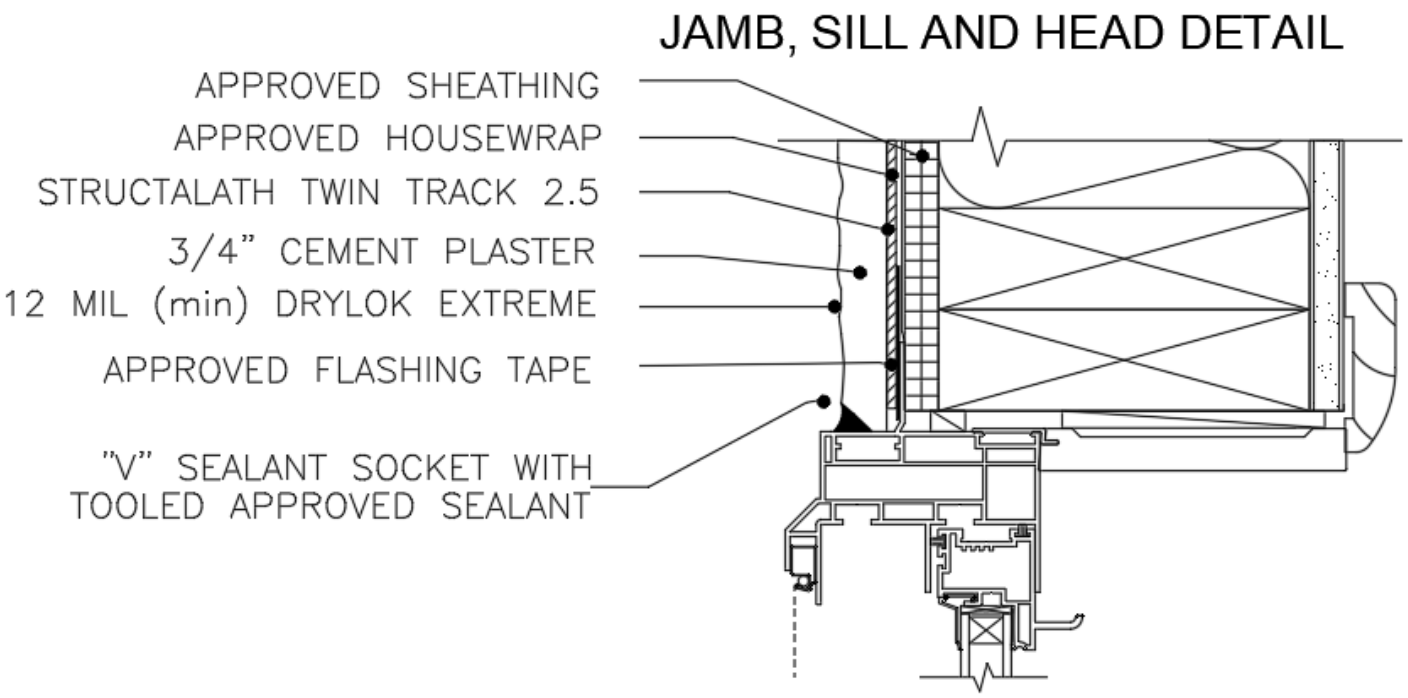


SCS 06_05 CMU INSTALLATION
6 POINT BUCK AND FENESTRATION
INSTALLATION AND INTERFACE

CAD details may be downloaded at:
www.sealedcladdingsystem.com

FRAME WALL - JAMB, SILL AND HEAD DETAIL

Detail 06_02 is Frame Wall specific where stucco abuts the fenestration's extrusion shoulder using a "V" groove sealant socket. See "V" tool instructions Figures V-1, V-2 and V-3

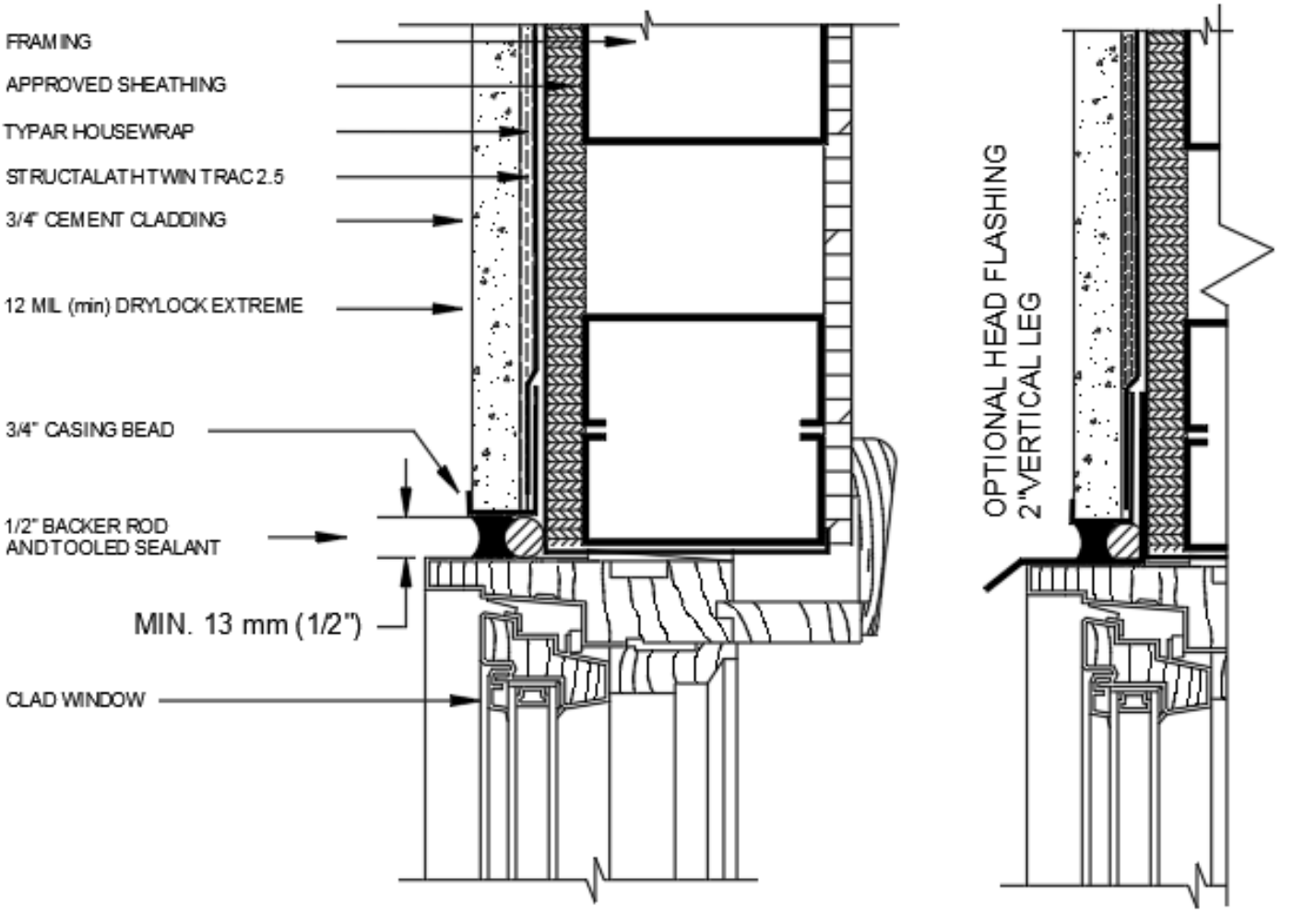


SCS 06_02 WINDOW FIN INTERFACE WITH EXTRUDED SHOULDER

CAD details may be downloaded at:
www.sealedcladdingsystem.com

FRAME WALL - JAMB, SILL AND HEAD DETAIL

Detail 06_03 is Frame Wall specific where stucco abuts the fenestration's extrusion shoulder using a casing bead and backer rod.

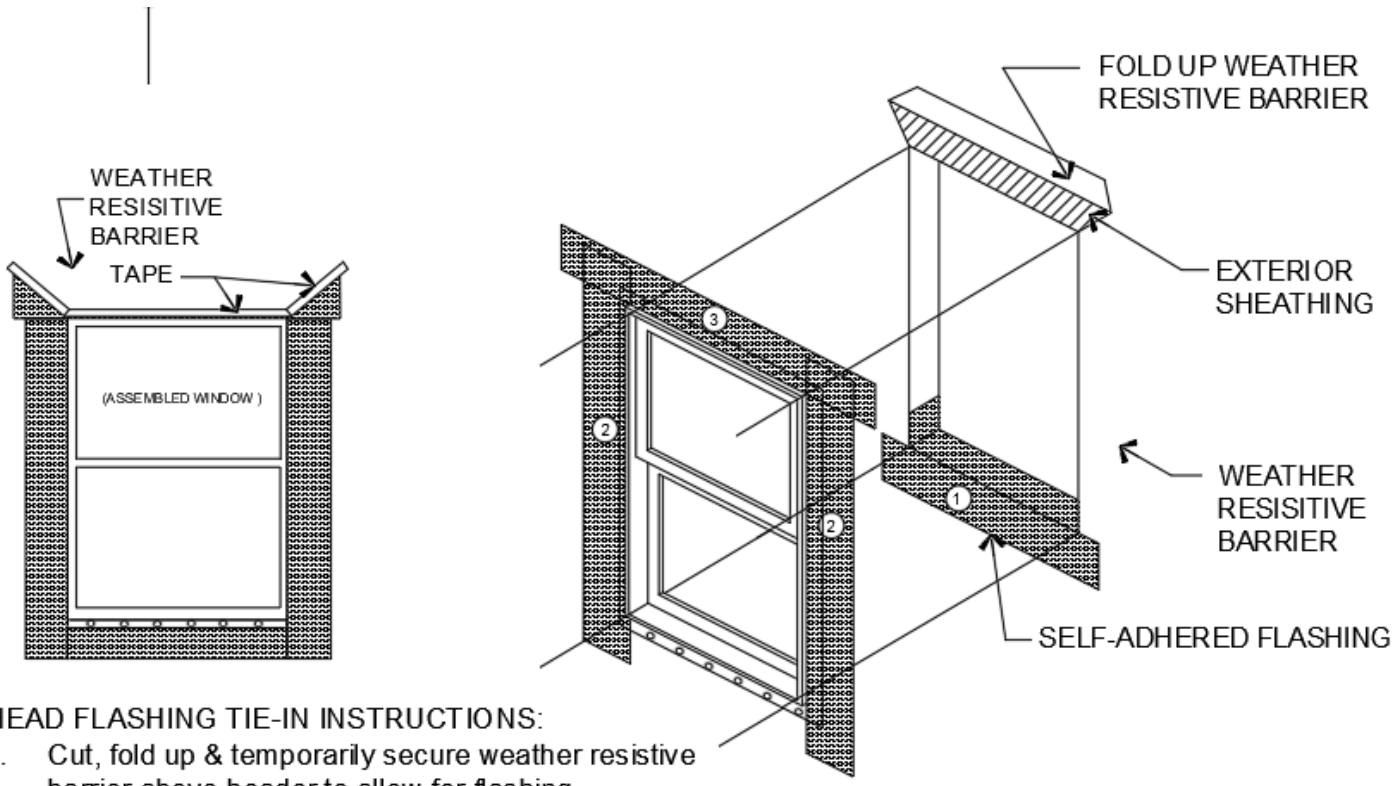


SCS 06_03 JAMB INTERFACE WITH CASING STOP

CAD details may be downloaded at:
www.sealedcladdingsystem.com

SELF ADHERED FIN FLASHING

Detail 06_04 is Frame Wall specific where the Cement Cladding Interface is either by way of “V” groove sealant socket or by casing bead (stop) and backer rods



HEAD FLASHING TIE-IN INSTRUCTIONS:

1. Cut, fold up & temporarily secure weather resistive barrier above header to allow for flashing installation
2. Self-adhered flashing plus head flashing under weather resistive barrier
3. Fold weather resistive barrier back over head flashing and seal with tape

SCS 06_04 SELF-ADHERED FIN FLASHING
(AFTER WEATHER RESISTIVE BARRIER)

Figure V-1 "V" tool minimum dimensions. Handle 3/8" x 3/8" x 8". Field fabricate cutting blade from metal banding or steel strapping. Handle made from wood, aluminum or composite material. Tape metal blade to handle with electrical tape. Field fabricated or purchase from the Stucco

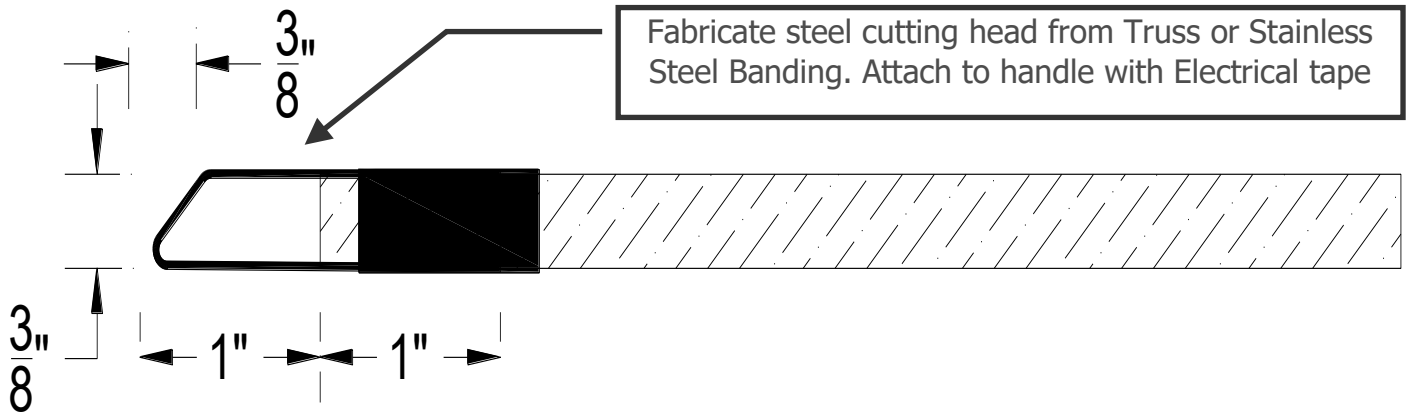


Figure V-2 "V" Tooling a sealant seat along the shoulder of a fin window extrusion shoulder installed in a frame wall. Applicable for all penetrations

Figure V-3 Brushing the "V" socket to smooth edges, clean shoulders and seal for application of tooled sealant on frame wall with fin window. For further details refer to the Sealed Cladding Installation Manual at sealedcladdingsystem.com

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Laboratory Test Report

WATER RESISTANCE EVALUATION SERIES 3540 FLANGE PVC, SINGLE HUNG, STEEL REINFORCED WINDOW IN A CMU AND WOOD-FRAMED STUCCO WALL ASSEMBLY IN ACCORDANCE WITH ASTM E 331 AND SECTION R703.1.1, EXCEPTION 2 OF THE FLORIDA BUILDING CODE, 6TH EDITION (2017), RESIDENTIAL

(PROJECT NO. 1809T0004)

For

KONING CONSTRUCTION CONSULTANTS
8301 JOLIET STREET
HUDSON, FL 34667

JUNE 22, 2020

Purpose: Evaluate for water resistance in accordance with **Section R703.1.1, Exception 2 of the Florida Building Code, 6th Edition (2017), Residential** and **ASTM E 331: *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*.** In addition, this testing conforms with Section 1403.2, Exception 2 of the Florida Building Code, 6th Edition (2017), Building, and the 2012 and 2015 International Building Code (IBC).

Test Methods: Testing was conducted in accordance with ASTM E 331-09(2009): *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*. Testing was modified in accordance with Section R703.1.1 as follows:

> The tested assembly was tested in a 4 feet by 8 feet exterior wall format containing at least one opening, one control joint, one wall/eave interface and one wall sill. The wall assembly was tested at a minimal differential pressure of 6.24 pounds per square foot (299 Pa) for a minimum 2 hours.
>
> The "passing" criteria for this test is that the exterior wall envelope design shall be considered to resist wind-driven rain where the results of testing indicate that the water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings penetrations or intersections with dissimilar materials.

Sampling: All products applied to the assembly were provided by Koning Construction Consultants. Below is an itemized list of products that are used in the Sealed Cladding System.

Product Identification	Manufacturer
GreenGuard Building Wrap	Kingspan
GreegGuard Flashing	Kingspan
StructaLath No. 17 SFRC Twin Trac 2.5	Structa Wire Corp.
DRYLOK® Extreme Masonry Waterproofer	United Gilsonite Laboratories
Vinyl Corp E-Flange Casing Beads	ClarkDietrich
Florida Super Stucco	Argos Cement LLC
DRYLOK® Extreme Masonry Waterproofer	United Gilsonite Laboratories
Series 3540 Flange PVC, single hung, steel reinforced window	MI Windows and Doors

Specimen #1 (Wood): Framing: A 8-ft x 8-ft mock-up was constructed from No.2 2x6 dimensional lumber with studs located 16-inch o.c. and sheathed with CAT 7/16 PS 2-10 OSB sheathing attached 6" o.c. with #8 x 2" bugle head wood screws. The OSB was installed with a single horizontal and single vertical joint.

Building Wrap: Kingspan GreenGuard BuildingWrap was installed with a T-Joint, having a minimum 6" overlap. All joints were taped with 4" wide Kingspan GreenGuard Flashing. The building wrap was tacked in place with 1" plastic cap nails placed randomly to hold in place.

Stucco Finish: Vinyl Corp 3/4" E-Flange Casing Beads was attached along the perimeter

of the water with #8 x 1" lath screws spaced 24" o.c. StructaLath No. 17 SFRC Twin Trac 2.5 was installed with #8 x 1" truss-head, K-lath screws spaced maximum 16" o.c. along the horizontal dimension on the twin track. The attachment rows were spaced vertically a maximum 6" o.c. and offset 8" o.c. from the preceding row. The stucco finish was prepared by mixing Florida Super Stucco and sand at a 1:4 ratio and applied in two (2) 3/8" coats for a total thickness of 3/4". The walls were coated with DRYLOK® Extreme Masonry Waterproofer at a rate of 100 ft^2/gal applied in two coats (13-21 wet mils per coat).

Opening: Prior to installing the building wrap, Kingspan GreenGuard Flashing was applied to the OSB sheathing over the head of the opening. The Kingspan GreenGuard BuildingWrap was cut and folded inside the opening and connected to the back of the stud. Kingspan GreenGuard Flashing was applied to the, of the inside of opening over the Kingspan Green Guard BuildingWrap. At each corner, a 4" x 12" piece of Kingspan GreenGuard Flashing was placed at 45° angle extending 12" onto the face of the wall.

Window: MI Window Series 3540 36" x 62". An ASTM C 920 Sealant was used between the flange of the window and the OSB sheathing on the head of the window; and between the flange of the window and the Kingspan GreenGuard BuildingWrap on the Jambs. The window was fastened in through the flange at 4" in from each corner and 12" o.c. between the corners using a #6 x 2" wood screws. After the Stucco was applied and cured, an ASTM C 920 sealant was used around the perimeter of the window. After the ASTM C 920 sealant was applied and cured, DRYLOK® Extreme Masonry Waterproofer was applied around the perimeter of the window and allowed to cure.

Specimen #2 (CMU):

Wall: An 8-ft x 8-ft mock-up was constructed using CMU blocks, and Amerimix pre-blended mortar type S.

Stucco Finish: The stucco finish was prepared by mixing Florida Super Stucco and sand at a 1:4 ratio and applied in one 3/8" coat. The walls were coated with DRYLOK® Extreme Masonry Waterproofer at a rate of 100 ft^2/gal applied in two coats (13-21 wet mils per coat).

Window: MI Window Series 3540 36" x 62.5". A 1x wood buck was installed around the head and the jambs of the opening using 3/16" x 2-3/4" tapcon screws. After the 1x wood buck was installed an ASTM C 920 sealant was applied around the perimeter of the buck. The window was installed using 3/16" x 2-3/4" tapcon screws 4" in from each Jamb in the head. Each jamb was installed 4" down from the head then 16.25", 22", and 16.25" using 3/16" x 2-3/4" tapcon screws.

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Results: The specimen was tested May 27, 2020. Results of testing are shown below.

Table 1. Results for ASTM E 331 (Modified per Section R703.1.1, Exception 2)

Property	Test Method	Result	Requirement
IBC 2015: Section 1403.2			
Water-penetration of Specimen #1 *[Pass/Fail]* 8' x 8' wood frame wall assembly; ΔP=6.24psf for 2h; 3.4 L/m²·min water spray	ASTM E 331	Pass	Water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings penetrations or intersections with dissimilar materials.
Water-penetration of Specimen #2 *[Pass/Fail]* 8' x 8' CMU wall assembly; ΔP=6.24psf for 2h; 3.4 L/m²·min water spray	ASTM E 331	Pass	Water did not penetrate control joints in the exterior wall envelope, joints at the perimeter of openings penetrations or intersections with dissimilar materials.

Note(s): None

Statement of Attestation:

The performance evaluation of the Sealed Cladding System was conducted in accordance with ASTM E 330-02(2010): *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference* as described herein. The laboratory test results presented in this report are representative of the material supplied.

Signed:

Zachary Priest, P.E.
Director

Report Issue History:

Issue #	Date	Pages	Revision Description (if applicable)
Original	06/22/2020	15	NA

APPENDIX FOLLOWS

1809T0004

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Construction Photos

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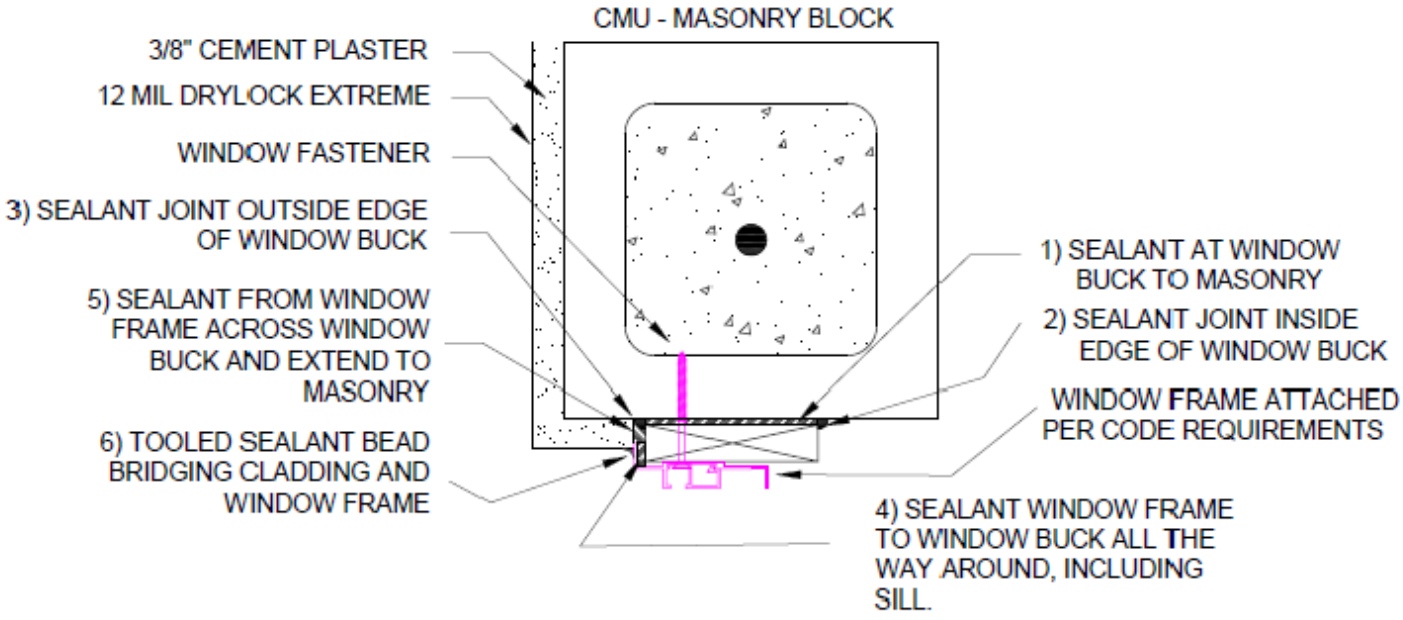

CMU INSTALLATION
6 POINT BUCK AND FENESTRATION
INSTALLATION AND INTERFACE

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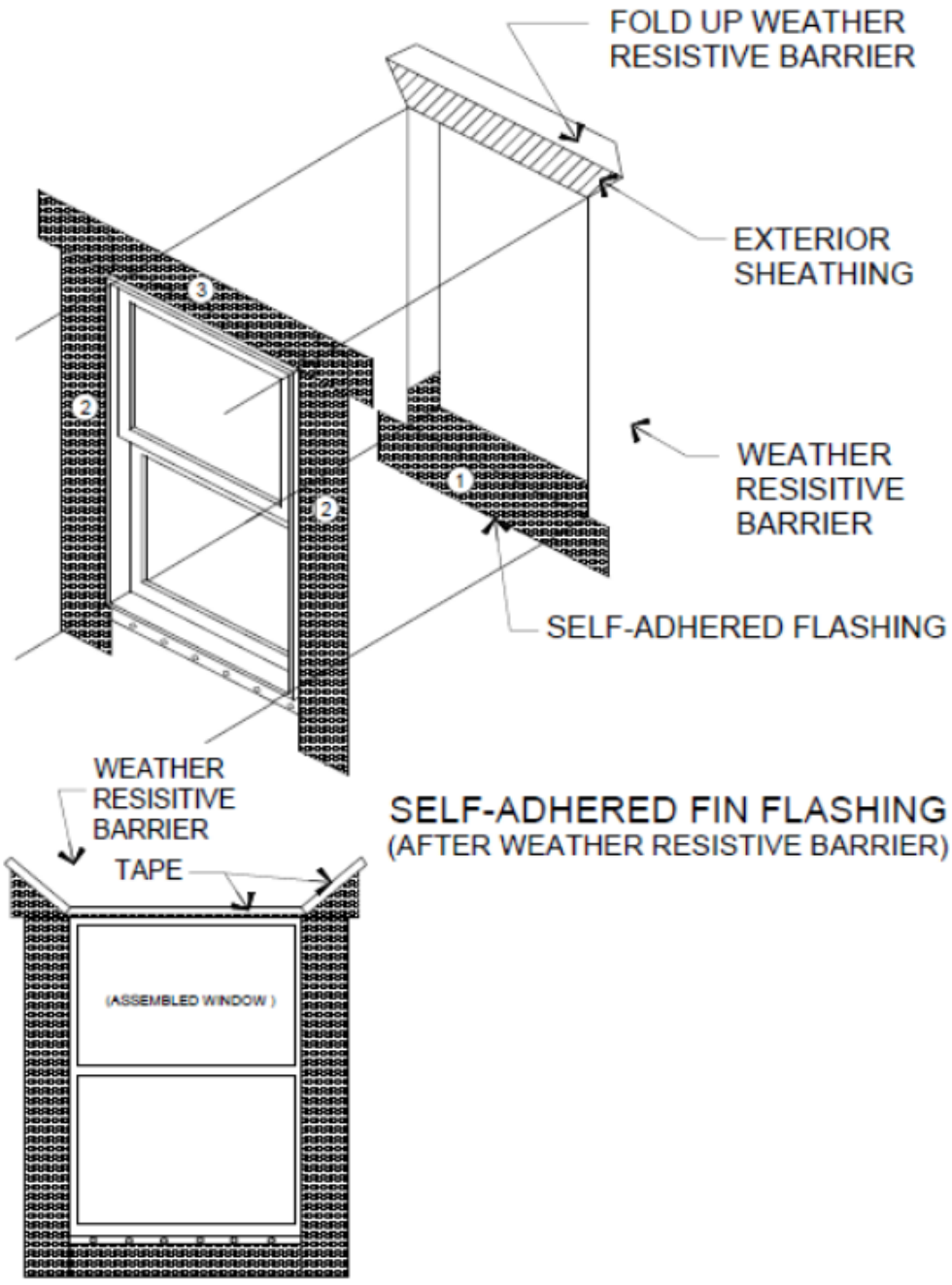
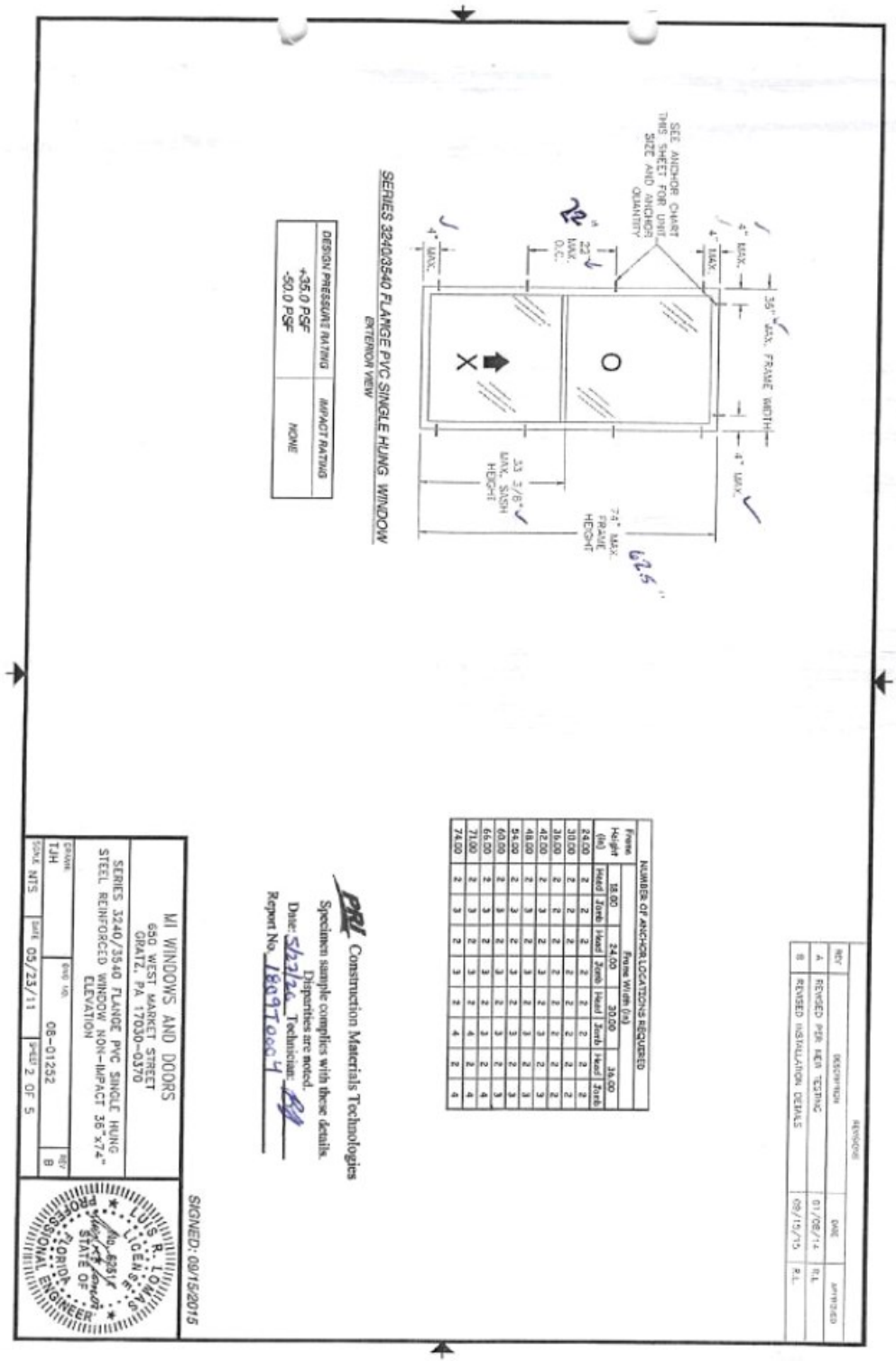


SELF-ADHERED FIN FLASHING
(AFTER WEATHER RESISTIVE BARRIER)

HEAD FLASHING TIE-IN INSTRUCTIONS:

1. Cut, fold up & temporarily secure weather resistive barrier above header to allow for flashing installation
2. Self-adhered flashing plus head flashing under weather resistive barrier
3. Fold weather resistive barrier back over head flashing and seal with tape



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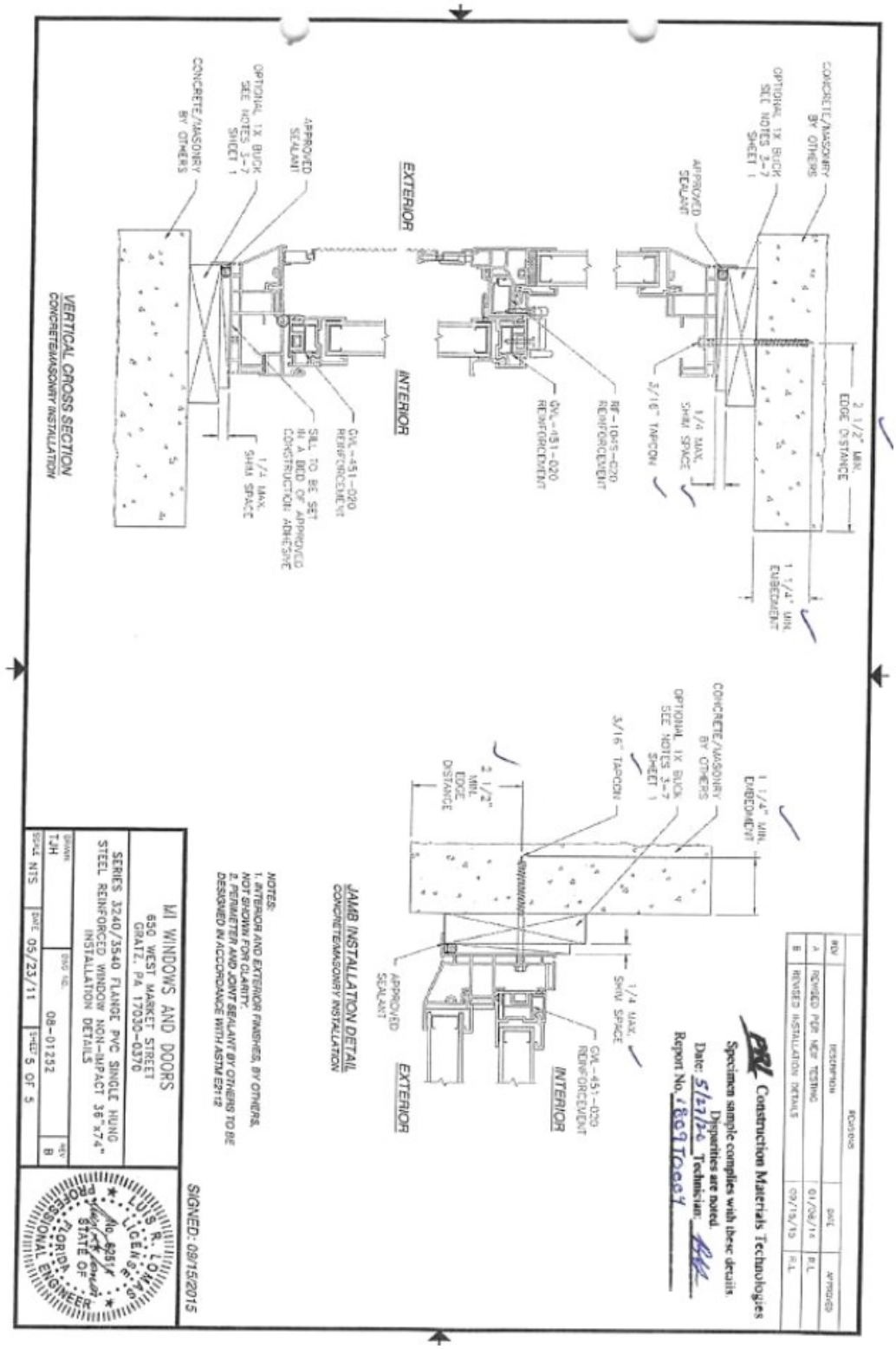

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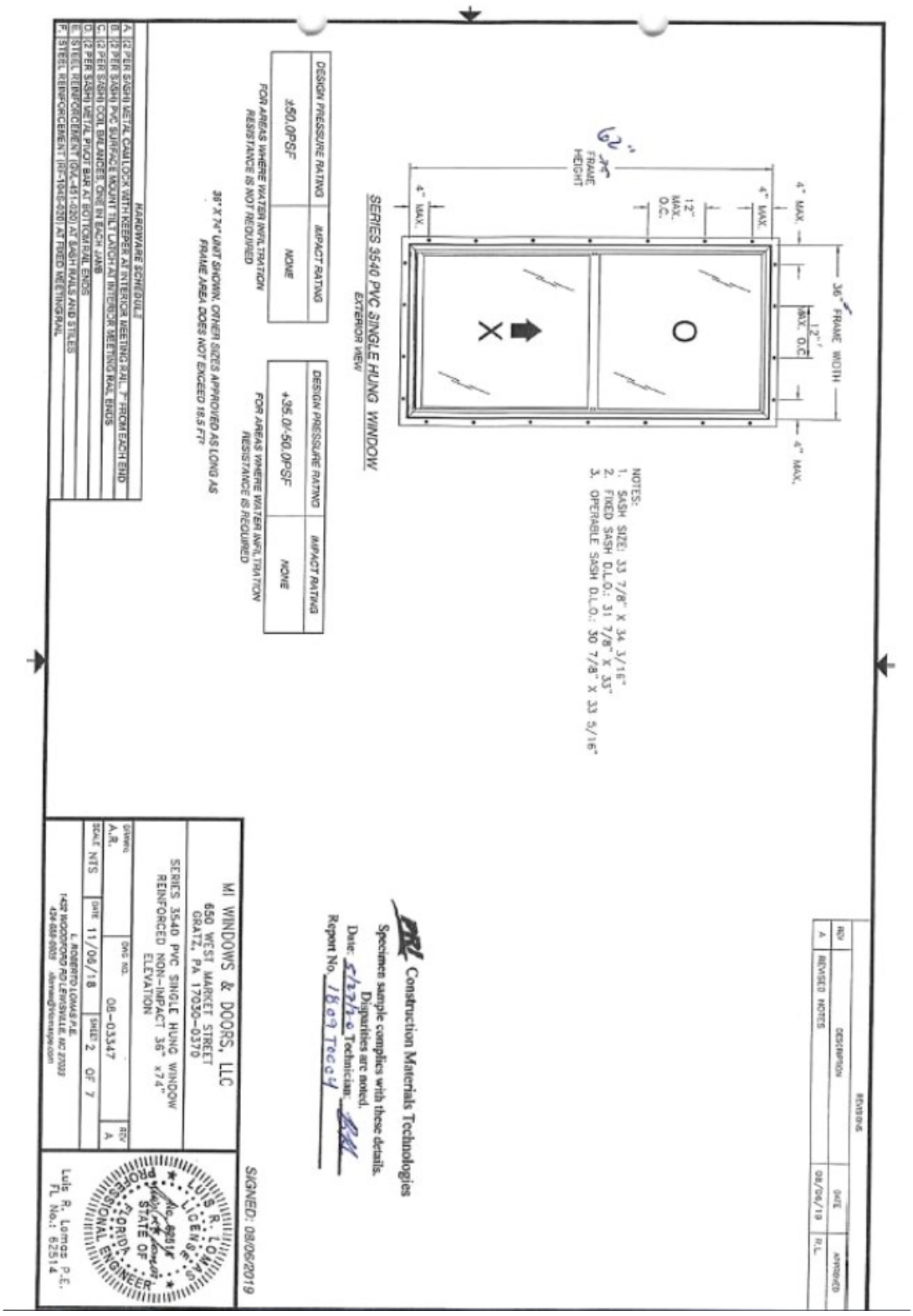

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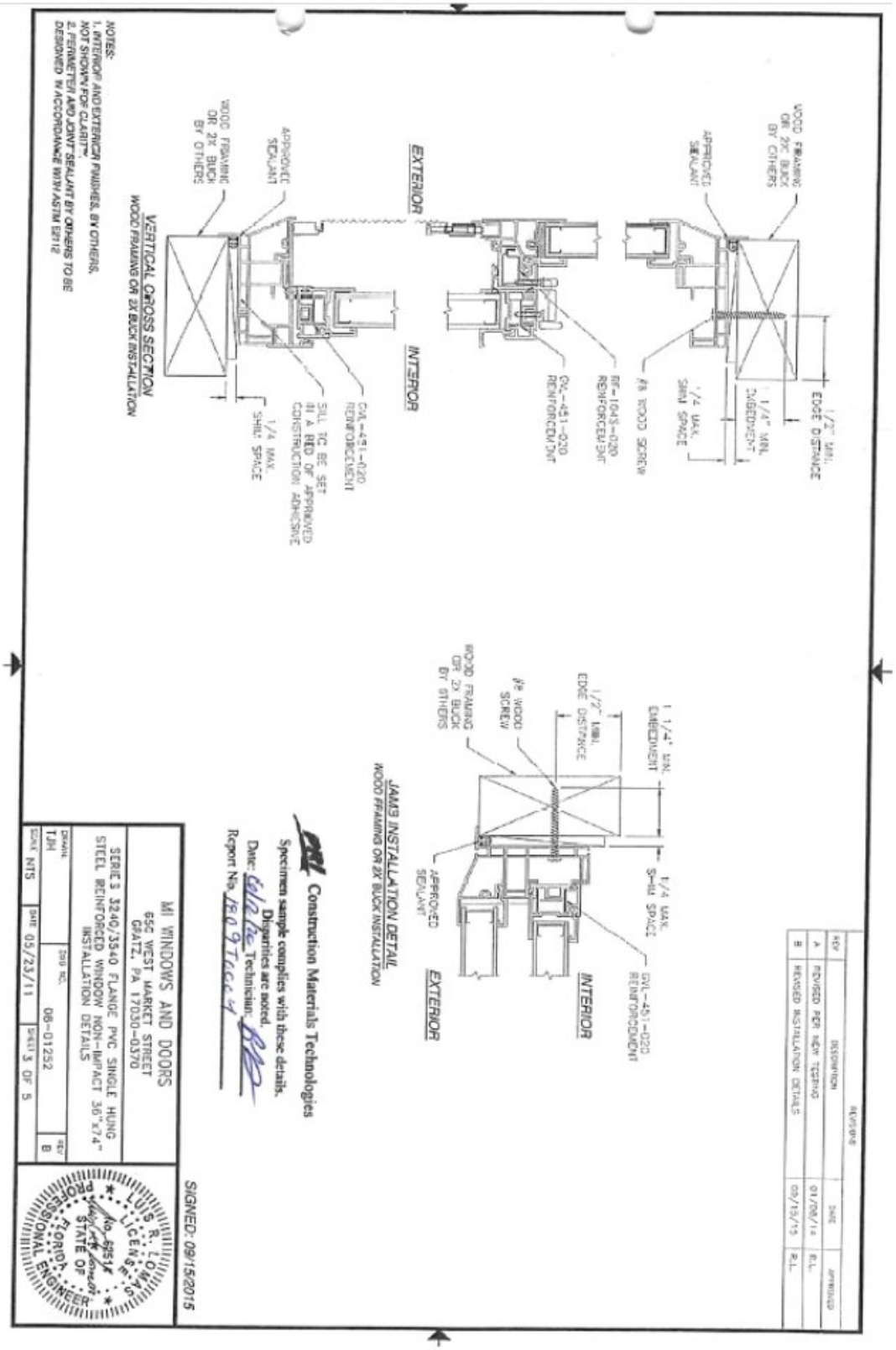

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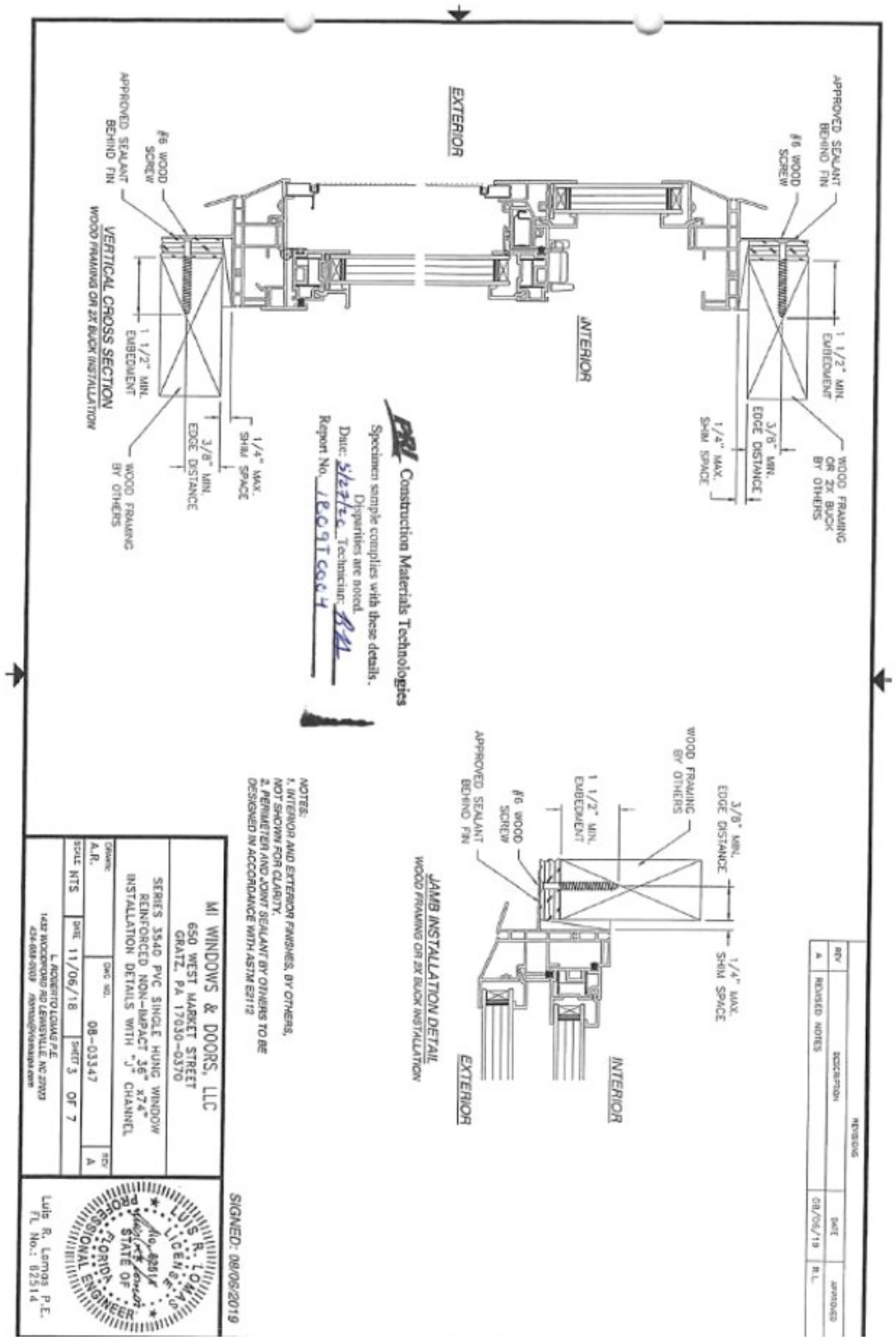

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