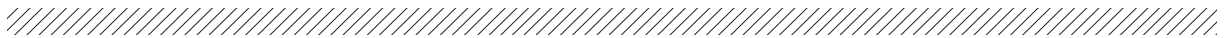


CGI Windows and Doors, Inc. CGI015- Fenestration Installation Guidelines

Provider L315

This course qualifies for 1.0 LU AIA/CES credit

Speaker- Oscar E. Cordova, Sr.
Director of Architectural Services



Credit(s) earned on completion of this course will be reported to **AIA CES** for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.



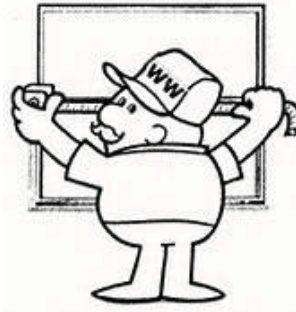
This course is registered with **AIA CES** for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Objectives

- Understand standards and installation practices
- Evaluate material selection and compatibility
- In depth examination of fasteners, sealants, joint types and backer rods
- Review the critical components and methods used in new construction, replacement/retrofit projects



All sealant and/or installation specifications are interpretations of ASTM 2112 and/or FMA/AAMA 110-07 and FMA/AAMA 200-09.

For detailed material usage, sealant procedures and installation procedures, refer to the above mentioned tested installation practices and fenestration Manufacturer's Installation Instructions

CGI Windows and Doors offers no warranty or guarantee that the following methods will work for any specific application



Standards



Installation Masters Training Manual-

Residential and Light Commercial Window and Door Installation Training and Certification Program
Level RLC-1



American Society for Testing and Materials

ASTM-E2112-Installation Practice for Window, Doors and Skylights

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Standards

FMA/AAMA 100-12...standard practice for installation of windows with flanges or mounting fins in wood frame construction (wood, aluminum or vinyl)

FMA/AAMA 200-12...standard practice for installation of windows with frontal flanges for surface barrier masonry construction for extreme wind/water conditions (aluminum and vinyl).

FMA/WDMA 250-10...standard practice for installation of non-frontal flange windows with mounting flanges for surface barrier masonry construction for extreme wind/water conditions (wood).

FMA/AAMA 300/400-12...standard practice for installation of exterior doors in wood frame construction (300) and masonry construction (400) for extreme wind/water exposure



6



Flashing

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

- The flashing manufacturer's written instructions
- The fenestration manufacturer's written installation instructions
- In accordance with FMA/AAMA 100, FMA/AAMA 200, FMA/WDMA 250, or FMA/AAMA 300/400
- In accordance with the flashing method recommended by a registered design professional.



Building Components



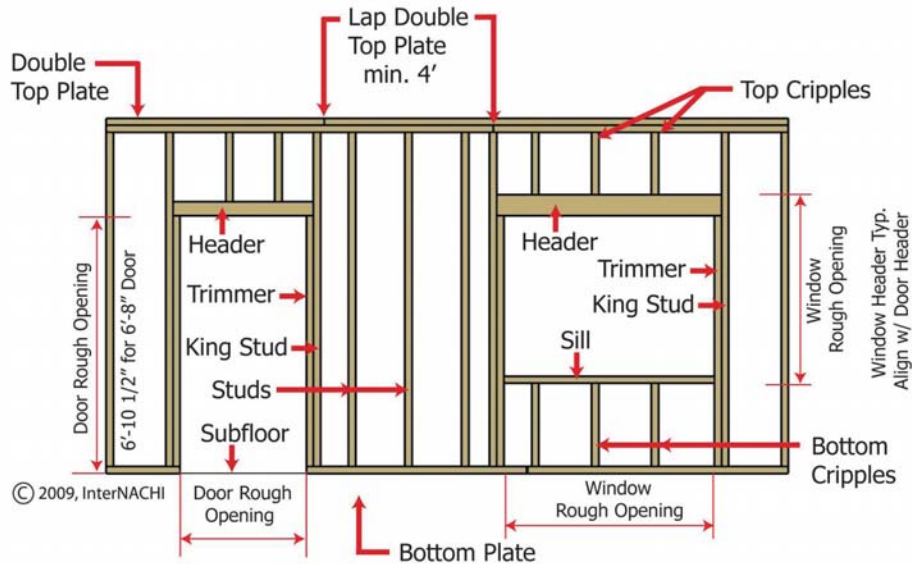
Having a general idea of how openings are built is important to help the installer identify the type of barrier system employed, as well as checking for construction deficiencies.

It is important to keep in mind that construction continues experiencing significant changes and we are going to visit typical construction practices.



Building Components

Wood Construction Rough Opening



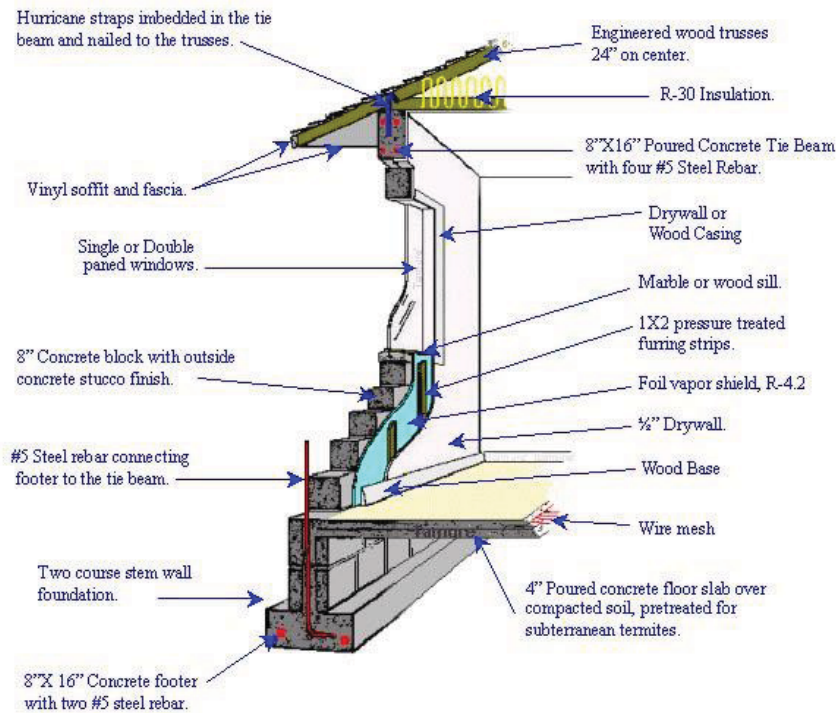
Building Components

- Exterior Sheathing- Usually plywood
- Weather Resistant Barrier (WRB)
- Flashing
- Exterior Façade-Typically stucco, wood or vinyl siding



Building Components

Masonry Construction



Material Selection



Selecting materials that are compatible, meet local building codes, and suit the environment they are being used in, is crucial. The use of improper products can result in loss of structural integrity, damage to property, and costly re-works.

The following considerations should be taken when choosing building materials.



Compatibility

- Adhesion failure
- Color Leaching
- Softening or Hardening
- Galvanic corrosion



Helpful sites:

www.adhesives.org

www.sealants.org



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Types of Flashing

- **Flexible – Self-Adhered**
- **Flexible – Mechanically Attached**
- **Liquid Applied Flashing**
- **Sill Pan Flashing (rigid or flexible)**



1.



Weather Resistive Barrier (WRB)

- Commonly referred to as Building Wrap, diverting water to the exterior of the building
- WRB chosen should comply with AC 38-2004
- Product chosen should be compatible with all other materials being used
- For the practices contained herein the WRB should be in place prior to the window installation
- WRB must be applied to the building in water shedding fashion, meaning each top layer should overlap the one below

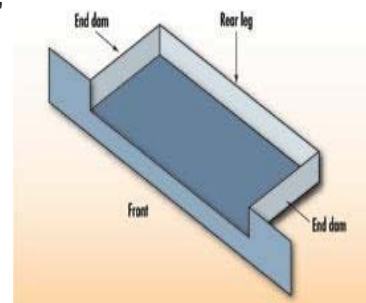


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Sill Pans

- Multitude of different options for use of sill pans: Copper fabricated, Aluminum fabricated, Self adhering flashing, Rigid and Semi-rigid sill pans
- Sill pans should have end dams; if self adhering flashing is used it should extend 6" up each jamb
- Sill pans shall direct water to the exterior
- Copper, aluminum, rigid and semi-rigid sill pans should have an upturned leg
- Sill pan materials must be compatible with other materials



Flexible Flashing

- Mechanically attached flexible flashing—at least 9” wide
- Self adhering flexible flashing—at least 4” wide
- Must comply with **AC 148-2006**
- Must meet 24 hour minimum water resistance test in accordance with **ASTM-D779**, for self adhering **AAMA 711-07**



Self adhering flashings should not be used in conjunction with any solvents based sealants because of compatibility issues



Rigid Flashing

- Typically Aluminum, or copper sheet metal
- Rigid ABS plastic and/or fiberglass also available
- Usually formed on the job to fit the opening as needed
- Often used on sloped window installations
- Must be compatible with all building components
- Consult the supplier of these materials for specific instructions on assembly and installation



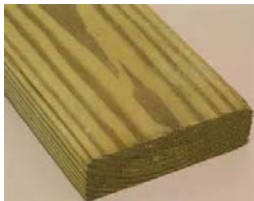
Bucking Materials

Non-treated lumber

- _ Typically not allowed by code in masonry applications
- _ High risks of rotting and/or termite/insect damage



Pressure treated lumber



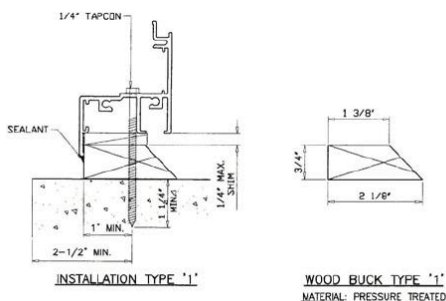
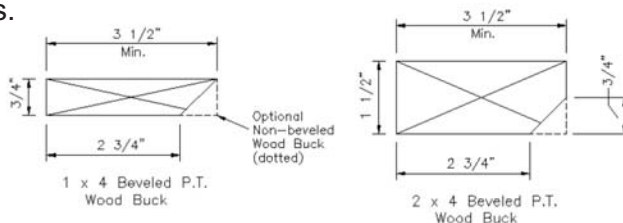
- _ CCA (Chromate Copper Arsenate) banned in 2004 for residential uses other than "lumber used for permanent wood foundations".
- _ ACQ types B and D (alkaline copper quat) and Copper Azole, replaced CCA and should not come into contact with aluminum or steel
- _ Borate treated Lumber, Less likely to react with metals.

Make sure wood bucks are of the correct size and type, properly bed in sealant and securely attached to structure. Wood bucks should not be separated at corners. Verify that wood bucks are plumb, level and square.

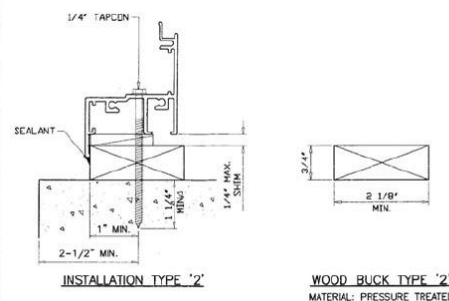


Bucking Materials

Buck sizes are dependent of the product being used. Refer to current Product Approval/ Miami-Dade Notice of Acceptance (NOA) and manufacturer's Installation Instructions for size specifics.



TYPICAL INSTALLATION DETAIL
ON ALL FOUR SIDES/USING WOOD



TYPICAL INSTALLATION DETAIL
ON ALL FOUR SIDES/USING WOOD



Opening Preparation



- Inspect masonry opening for any voids or cracks that may allow passage of air or water. voids and cracks should be corrected prior to install



- Apply a sealant joint where the sub-sill meets the CMU



- Voids and cracks should be corrected prior to install

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Opening Preparation



- Apply a 3/8" (nominal) diameter bead of sealant to the back side and cut ends of bucking material



- Bucks must be installed true to create a planar surface with the precast sill
- Bucks must be attached in accordance with local building codes
- All fasteners must be properly sealed



- Gaps between bucking and masonry and between bucks shall be less than 1/8" and must be thoroughly sealed
- Bucking shall not be multiple layers of materials

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Installation Fasteners

- All fasteners must meet manufacturers specifications for size and strength, and shall conform to proper and current Product Approval/ Notice of Acceptance
- Fasteners must be long enough to provide proper embedment into substrate in accordance with manufacturers installation instructions, as called for on Product Approvals and based on local codes.
- Fasteners must be corrosion resistant



TYPICAL ANCHORS: SEE ELEV. FOR SPACING

1/4" DIA. KWIK-CON II BY 'HILTI' (Fu=163 KSI, Fy=157 KSI)
 INTO 2BY WOOD BUCKS OR WOOD STRUCTURES
 1-1/2" MIN. PENETRATION INTO WOOD
 THRU 1BY BUCKS INTO CONC. OR MASONRY
 1-1/4" MIN. EMBED INTO CONC. OR MASONRY
 DIRECTLY INTO CONC. OR MASONRY
 1-1/4" MIN. EMBED INTO CONC. OR MASONRY

#14 SMS OR SELF DRILLING SCREWS (GRADE 2 CRS)
 INTO MIAMI-DADE COUNTY APPROVED MULLIONS (MIN. THK. = .090")
 INTO METAL STRUCTURES
 STEEL : 1/8" THK. MIN. (fy = 36 KSI MIN.)
 ALUMINUM : 1/8" THK. MIN. (6063-T5 MIN.)
 (STEEL IN CONTACT WITH ALUMINUM TO BE PLATED OR PAINTED)

TYPICAL EDGE DISTANCE
 INTO CONCRETE AND MASONRY = 2-1/2" MIN.
 INTO WOOD STRUCTURE = 1" MIN.
 INTO METAL STRUCTURE = 3/4" MIN.

CONCRETE AT HEAD, SILL OR JAMBS f'c = 3000 PSI MIN.
 C-90 HOLLOW/FILLED BLOCK AT JAMBS f'm = 2000 PSI MIN.

ANCHOR EDGE DISTANCES (UNLESS OTHERWISE NOTED)
 INTO CONCRETE AND MASONRY = 2-1/2" MIN. AT 1/4" ANCHOR
 3-1/8" MIN. AT 5/16" ANCHOR
 INTO WOOD STRUCTURE = 1" MIN. AT 1/4" ANCHOR
 1-1/4" MIN. AT 5/16" ANCHOR
 INTO METAL STRUCTURE = 1/2" MIN.



Shims

- ❑ Used to fill gaps between fenestration product and rough/masonry opening
- ❑ Shims shall be used at every fastener that has a Greater than or equal to 1/16" gap between the fenestration product and the rough/masonry opening
- ❑ Shims must be made of high compression material
 - Composite, plastic or hardwood wedge shaped shims
 - Plastic horseshoe shims
 - Stackable breakaway shims



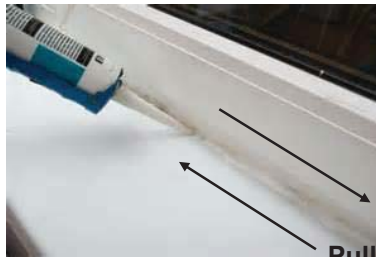
Do not exceed "Maximum" shim space as called for on Product Approval/Notice of Acceptance (NOA)



Sealants

Must comply with AAMA 803.3 Section 1.4 or ASTM C 920 Class 25 Grade NS or greater

- Movement
- Adhesion
- Weatherability
- Compatibility
- Surface Preparation
- Application



Push method

Pull method

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Sealants Joint Types/ Preparation

Joint Types:

- **Fillet joint** is used often in corners where two different materials meet
- **Bedding joints** are applied to seal two surfaces together usually a thinner joint
- **Butt joint** is used to fill gaps between two parallel substrates. Depth and width should be equal up to $\frac{1}{4}$ ". Must use backer rod to control joint depth



Preparation:

- **Clean**- Joint surfaces must be clean, dry and dust free
- **Prime**- If required, should be applied to clean surface(s)
- **Pack**- Backer rod or bond breaker as required
- **Shoot**- Sealant is applied by "pushing the bead" into the joint cavity
- **Tool**- Dry tooling techniques are used to achieve a flush joint and make certain the sealant has the proper configuration and fully contacts the joint walls

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Backer Rod

- Used to control the depth of sealant being applied
- Used to prevent three point adhesion allowing sealant freedom to move
- Material used should be 1/8" larger in diameter than the width of joint it is bridging
- Materials should not be absorbent
- Closed cell backer rods does not allow for absorption



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CMU or Masonry Water Resistant Coating



- Breathable coating applied to masonry which prevents the passage of water through masonry surfaces
- Must be compatible with sealant used
- Must not prevent the adherence of stucco or other exterior façade component



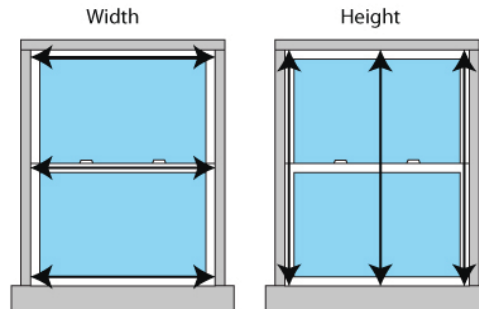
28



New Construction

Job Assessment

- Check openings sizes and locations noting the size of the openings to compare against the blue prints



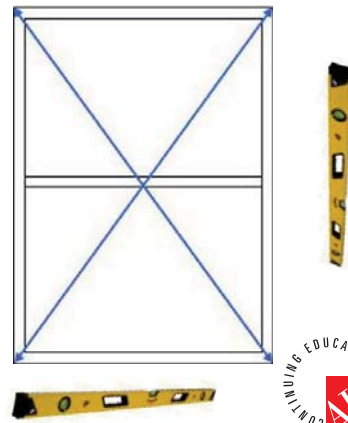
- Measure opening width and height in three places; top, middle and bottom (horizontally) as well as left, center and right (vertically). Use the smallest dimension so that you don't have to force the product into the opening. Any deviations in the substrate greater than $\frac{1}{4}$ " will require substrate corrections.



New Construction

Job Assessment (Continued)

- Check openings for **SQUARE** by measuring diagonally across the opening corner to corner in each direction. If the dimensions are the same the opening is in square. If there is a deviation greater than $\frac{1}{4}$ ", corrections to the substrate should be made
- Check opening for **PLUM** by placing a level vertically against the face of the wood framing, buck, or block
- Check the opening for **LEVEL** by placing a level on the rough sill and header.



New Construction

Job Assessment (Continued)

- Any substrate deviation greater than a ¼" will have to be corrected prior to installation. Either inform the responsible party or come prepared to make corrections during the actual install
- If working with a masonry opening and using wood bucks, make calculations to accommodate the applicable buck thickness
- Window installers should install the bucks rather than carpenters or wood framers (exception: when prior accommodations have been made to ensure a third party installs and seals the bucks and substrate appropriately)



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Retrofit

- Site inspections and Job Assessments are absolutely imperative in retrofit applications.
- Retrofit jobs pose more challenges than new construction and require significantly more safety precautions.



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Retrofit

Job Assessment



- Determine the type of construction used for the building, i.e. wood, metal, block, poured concrete, etc.
- Determine the type of barrier system being used on the building and opening (surface barrier or membrane drainage). Remember not all wood structures employ membrane drainage systems.
- Review the floor plan and if residential, determine which windows are in bedrooms (egress) and which are in common rooms
- If dealing with a complete home; review the contract Documents against the actual openings. Remember to always list the dimensions in width by height and allow for any substrate corrections that must be made

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How to Properly Measure (Retrofits)



www.clipartof.com · 443862

- Applications can be a challenge and can require cutting into stucco or removing casing and trim in order to view the body of the product or tip of flange. **Depending on the product type and manufacturer, some products will require tip to tip (TTT) of exterior flange or equal leg dimensions, and others require interior frame dimensions.**
- On the majority of older concrete installations , drywall was tucked behind the main frame using beveled bucks. It is always important to know the original size of the window. Not all installations are finished the same and there will be different ways to obtain the proper measurements

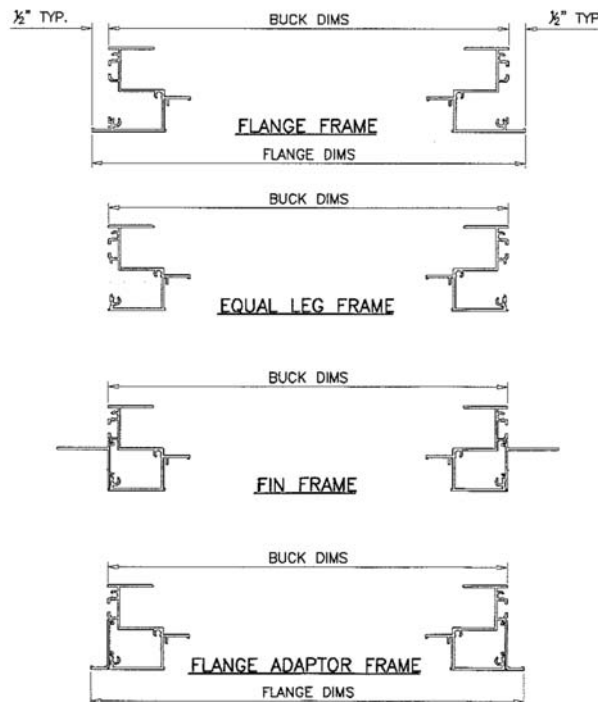


Typical Frame Types

Many manufacturers “call” their “window dimension” from Tip to Tip (TTT) of the exterior flange frame or equal leg

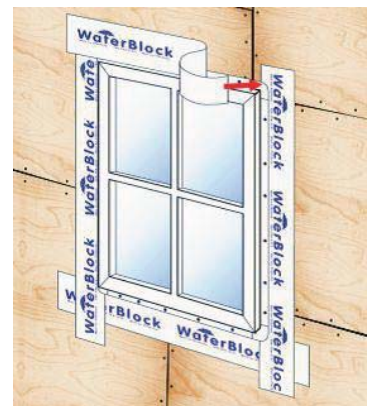
Fin frame fenestration products are usually measured from the Interior frame, also referred to As the “buck dimension”

Extreme care should be taken when ordering products to make sure there is no question or doubt about sizing.



Step by Step- Membrane Drainage Retrofit

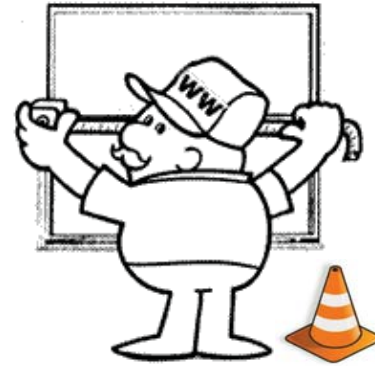
- Inspect existing structure for water intrusion, mold, or structural degradation
- Replacement fenestration products must be integrated into the existing drainage system
- When removing a fenestration product installed into a membrane drainage system, siding/exterior façade must be cut back at least 3” to expose the mounting flange/integral fin
- Fenestration products should be removed without damaging existing draining plane
- Remove all fasteners holding the product in
- Carefully cut the sealant behind the existing mounting flange
- Once existing product is removed, install the replacement product in the same manner that you would with a new product



Installation



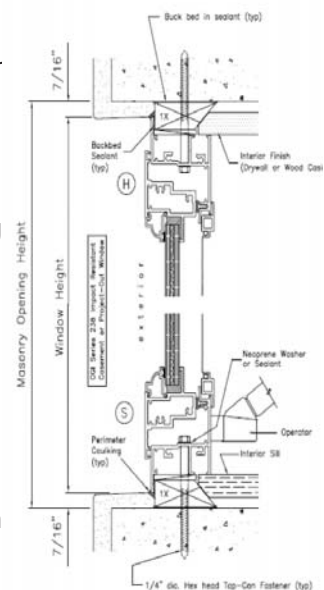
- Make sure you have all the materials and tools to get the job done
- All products should be re-inspected just prior to the actual install
- Prior to installing any products always check to make sure the correct product is going in the correct opening. Inspect and verify information on product “labels” match job requirements
- Verify all openings are free from obstructions, clean all openings as needed
- Check each opening is plumb, level and square
- Familiarize yourself with Manufacturer’s Installation Instruction
- Have easy access to Product Approval/ Miami-Dade Notice of acceptance and consult any discrepancies with manufacturer



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Installation

- Set fenestration product in the opening (dry fit) to ensure proper fit. If the product fits correctly with adequate and acceptable shir space, remove the window and proceed. At this time address any corrections that may be needed, if the product does not fit properly
- Apply water resistive coating/sealant , or a self-adhering flashing membrane over wood bucking material, covering the exposed exterior face and the return (**AAMA 711**). The return must be coated at least 6” up from the sill member. Coating the entire return is preferred
- Make sure the opening is appropriately clean for the window installation
- Remove packaging and cartons from the fenestration product an inspect corner joinery for gasket and/or sealant tears
- Clean the back side of the flange to ensure a good sealant bond



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Installation

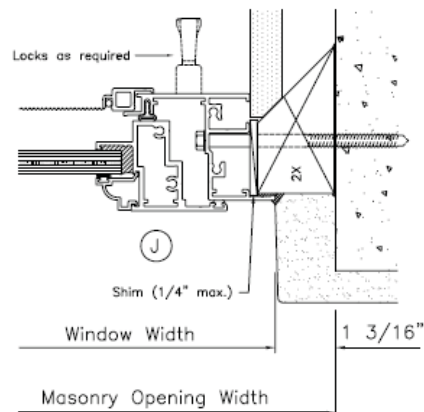
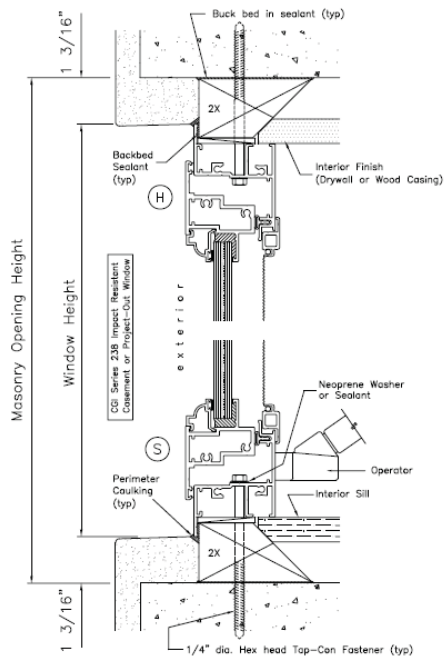
- Apply a 3/8" (nominal) bead of sealant to the back side of the flange, or to the buck where the flange will come in contact, at the head and jambs
- Apply additional sealant at all corner joinery to help prevent water intrusion
- Apply sealant across the back side of the flange at the sill
- If the application is a drainage application a two inch void should be left in the sealant near both corners of the sill. This will allow water to drain. In this case weep screed or wicking system are acceptable; however, exterior façade shall not interfere with the drainage of said water
- The fenestration product may now be set into the opening pressing the sealant against the buck and/or precast member



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Installation



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Installation

- Periodically check plum, level, square and true, as well as checking operation of the product once it is secured
- Tool squeeze out on the exterior side of the product, ensuring the buck is completely covered with sealant
- On the interior, apply backer rod in the space between the fenestration product and the buck, using a blunt probe. Make sure the backer rod is inserted to allow for a ¼" sealant joint or use an aerosol foam sealant without backer rod conforming to AAMA 812-04
- Apply sealant between the buck and window frame using the push method, then tool the sealant into the joint to insure adhesion. This seal is imperative and must be capable of handling the required wind loads
- If a rigid or semi-rigid sill pan is used, verify the seal between the upturned leg and the product, and correct any inconsistencies. Also make sure the interior air/water seal around the rest of the window is integrated into this seal



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Installation

- Ensure product is working smoothly and correctly and all parts are applied correctly. Sometimes screw covers may have to be applied after fastener inspection is completed
- Inspect any weep holes in the product to ensure they are not obstructed and working properly
- After stucco or other cladding is installed, apply a perimeter bead of sealant around the product, between the exterior flange and the stucco and/or cladding. Make sure when using a drainage system voids are also left in this seal, in line with the voids behind the flange
- Stucco or cladding should not obstruct the drainage of water



Retrofit Installation

- Any window dressing as well as any pictures or breakable items must be safely removed from the vicinity of the work area
- Consider applying Visqueen or other type of protection to floors and/or carpeting of the intended area
- Workers should consider using shoe covers whenever you enter the customer's home
- Customer shall be made aware of the areas to be worked on and ask the he/she remain out of the direct work area for safety



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Retrofit Installation

- Waste materials must be properly bagged and disposed
- Existing openings and bucking must be inspected for any degradation, cracks in masonry, evidence of water intrusion/mold, etc.
- Verify whether or not the existing buck will fully support the new product
- If the buck must be replaced with a new or wider buck, a determination must be made whether to alter the interior or the exterior finishes
- Ample space must be left between the buck and drywall/casing to allow for installation of shims, backer rod, and sealant

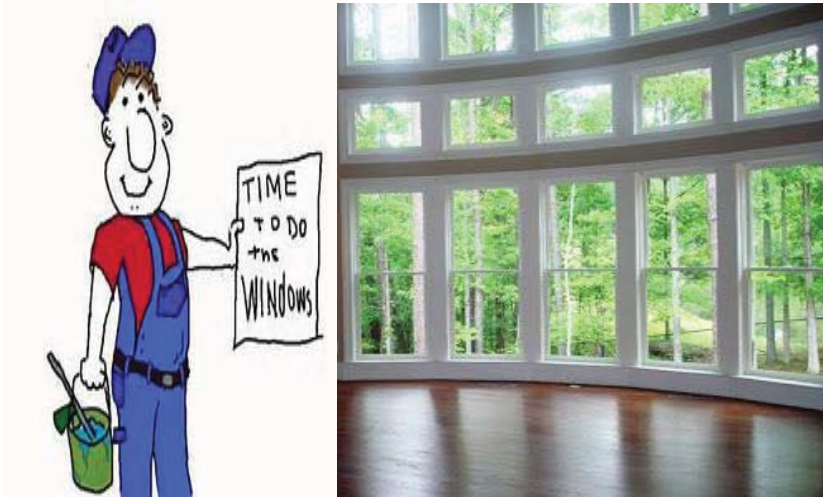


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Mechanical Care and Maintenance

Windows and doors can provide years of service with proper maintenance and care.



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Mechanical Care and Maintenance

- Clean windows and doors with a mild soap solution and soft rag.
- Hardware and moving parts, hinges and locks should all be lubricated after cleaning.
- Tracks and sills should be cleaned and debris vacuumed away regularly.
- Weep holes should be free of debris.
- Inspect weather stripping to ensure an even seal around the perimeter. Replace if crimped or dislodged.
- Swing door hinges and hardware should be wiped clean of sand, salt and debris.
- Sliding glass door and horizontal rolling window rollers should be lubricated with graphite or light oil (3-in-1) lubricants.
- Window and door hardware such as operators and locks should be lubricated with lithium grease from a tube as necessary or every 6 months. Coastal environments require more frequent maintenance-please view Coastal Environments Section. Spray lubricant is not recommended. Some swing door hinges should not require lubrication as these contain a special nylatron bearing design.
- After cleaning, it is important to lubricate all moving parts.



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Mechanical Care and Maintenance

❑ Important Cleaning Advice

Avoid abrasive cleaners, vinegar, high pH or citrus based cleaners, industrial strength cleaners, and lacquer thinner solvents, razor blades, scrapers or abrasive pads or high pressure cleaners. Avoid the use of silicone based sprays or lubricants as silicone can cause some parts to become brittle.

❑ Coastal Environments

Coastal environments require cleaning at least every 3 months, if not more frequently. Salt builds up quickly on and can permanently scar the glass. Note that windows and doors are not 100% airtight and salt may be visible on interior or exterior product areas. Implement a maintenance schedule that removes any salt, sand, or dirt buildup quickly so as to avoid corrosion.



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//////
THANK YOU FOR YOUR KIND ATTENTION

This concludes The American Institute of Architects
Continuing Education Systems Course

ANY QUESTIONS?



Oscar E. Cordova, Sr.

ocordova@cgiwindows.com

800.442.9042



CGI Overview

- Established 1992, first approved impact windows with laminated glass
- Made in the USA (Doral). Glass and Aluminum also sourced in Florida.
- Residential, commercial, new and retrofit - schools, condos, hospitals, hotels, residences

- **The Estate Collection** – Premium value product line.

- Some of the highest design pressures available with detailed design features.

- **Estate Entrances** – A unique line of entry door systems for hurricane and security applications

- A compelling alternative to more expensive wood options and now with many attractive design options.

- **Sentinel by CGI** – A mid price point product offering with features ideal for new construction and remodeling

- With many incremental improvements adding up to a big difference in performance, functionality and design versus competition.

- **Commercial Series** – Impact and blast resistant products available

- Specified for many light commercial applications including hotels, schools, office buildings, hospitals, etc.

- **Targa by CGI** - New line of energy efficient vinyl impact resistant windows and doors.

- Designed to maximize security, protection and energy efficiency.

