Window Wall Systems

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Installation Guidelines for Window Wall Systems

Approved 07/01/2020

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Installation Guideline Disclaimer

This document contains general installation guidelines for Graham Architectural products and does not address each particular condition or installation. Shop drawing installation details may vary from these Guidelines as these Guidelines do not address each particular condition so any variances should be addressed by the design professional. If there are any details that conflict between these instructions and the shop drawings, contact the Engineering department of Graham Architectural Products for clarification.

These Guidelines do not address the structural adequacy on any installation and such should be addressed by a design professional. Anchorage to existing or proposed wall conditions are not addressed in this document. Sealant compatibilities and application details should be reviewed by the sealant manufacturers. This document does not address the interface between the window wall system and the building's weather barrier system and should be reviewed by the waterproofing consultant. It is generally recommended that insulation be installed in all voids created in the installation of a thermally improved system, but the application of insulation in wet areas needs to be addressed by the design professional and the particular type of insulation may need to be specified.

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Thank you for your purchase of Graham Architectural Windows. These instructions include the installation and initial adjustment instructions of our window wall system. Read these instructions before starting any installation.

Receiving, Handling, and Storage

The proper receiving, handling and storage of windows and doors is critical to the performance of the products throughout their service life. Abuse of the products during these processes will affect their operation and appearance. Even if the effects are not immediately noticed, they could surface later in the life of the product. The following are precautions that need to be followed.

Receiving: Prior to receiving the shipment of the windows, ensure that there is an adequate location to receive the windows and enough manpower and equipment to off load the products.

- Depending on the glass configuration and the size of the windows, the windows may be extremely heavy. A loading dock or glass manipulator may be needed to offload the windows or doors without damaging them. Contact Graham Architectural to determine the weight of any windows that are over 40 square feet.
- Most trucking companies allow a 3 hour off-loading time, and will charge a detention fee if the truck is not off-loaded within that time period. That should be considered when determining the location where the truck will be off-loaded and how much manpower will be needed to complete the process.
- Ensure that the storage location is close to the off-loading area. The product storage area must meet the requirements listed in the “Storage” section below.

Handling: HANDLE CAREFULLY – DO NOT DROP.

- It’s recommended to use a glass manipulator for large or heavy units. Ensure that there is enough manpower to lift and maneuver the windows. Use glass cups when possible. Only use material handling equipment that will not damage the finish of the products.
- Be careful handling windows with pre-loaded sash or vents. Make sure pre-loaded sash or vents are fully locked prior to moving windows. Never have fingers or hands inside the operating area of a sash or vent.
- Do not use any of the hardware or grids for lifting or manipulating the window or door. Glazed products must always be transported vertically.

Storage:

- The storage location for any finished products must be cordoned off to prevent damage from other trades, such as moving equipment.

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- Stack vertically and on their sills with adequate separation so window parts (including hardware) will not rub together, including any protruding hardware such as handles. All products should be stored on top of wood blocking to protect the finish and weather-strip. Blocking will also be needed between the frame and any object that can damage the window or door frame. Ensure that the products cannot be blown over by the wind, and limited to stacking of five (5) units before alternate support is given.
- Protect windows completely from moisture and dirt prior to installation. It is important that all windows that are not installed, are protected from direct contact with rain, snow, or ice so as to protect the finish and glazing of the product. If water gets into, and is retained in the glazing pocket it will cause the edge seal of the insulating glass to fail.
- Storing the windows or doors in the building is preferred, as long as they are not in a high traffic area. If stored in a trailer, or under clear plastic, there must be adequate ventilation to prevent the temperature of the products from exceeding 110° F (43.3° C). Temperatures exceeding this threshold can damage the sealants in the insulating glass. Heat build can also cause stress fractures in the glass. If storing outside, the products must be covered in a manner that will prevent water from getting into the products, while allowing ventilation to prevent excessive temperature or humidity build-up.
- Construction debris and dirt within the frame will affect the operation of the window or door. Protect all products from paint, weld spatter, construction debris, cement, plaster, terrazzo, and other construction materials, which include, but are not limited to, alkali based materials or caustic cleaners. This must be removed immediately to prevent damage to the finish of the aluminum or to the clarity of the glass.
- If the windows have been wrapped in a transparent plastic protective wrap, this wrap cannot be on the product for more than 90 days from the date of manufacturing, otherwise, it will be very difficult to remove protective wrap from the window finish.
- Prior to applying sealants, the surfaces must be cleaned and prepared as directed by the sealant manufacturer.

CAUTION – Windows are not to be used as ladders, scaffolds, or supports. Installed window openings are not to be used as construction entrances, unless adequate protection to the window sill and jambs is provided. Damage to any products from any construction activity will void the product warranty for the products in question.

***Note:** Copies of these instructions can be downloaded from www.grahamwindows.com/architectural-resources/technical-information/*

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General Installation Instructions

A. Upon delivery carefully check that all windows have been received undamaged. If any of the windows have been damaged, immediately notify your Graham Representative.

B. The sill will need adequate support. The sill must be level in accordance with Table 1.

Table #1	Installation Tolerances (+/- Target)		
	Inches/ foot	**Inches Maximum**	**Method of Measurement**
Level (Horizontal Measurement)	1/32”	1/8”	Measure sill using level
Plumb (Vertical Measurement)	1/32”	1/8”	Measure jambs using level or plumb bob
True (In Plane Measurement	1/32”	1/8”	Attach strings across corners. Measure where they cross
Extrusion Straightness	1/64”	1/16”	Measure with straight edge.
Square (Diagonal Measurement)	N/A	1/16”* 1/8”**	Measure diagonal corners (Difference/2)
* Openings up to 20 sq. ft. **Openings 20 sq. ft. and over			

C. All work should start from established bench marks and column center lines established by the architectural drawings and the general contractor.

D. The sequence of installation should be coordinated with the job superintendent so delays are prevented.

E. Fasteners will be required to penetrate the sill; but they must penetrate the interior channel of the sill starter, which is a dry area. However, sealant will be needed over the fastener after the sill starter is installed.

F. Be aware of allowable edge distance requirements for the fasteners into the substrate, especially when the substrate is masonry. Refer to the fastener manufacturer's instruction for proper usage.

G. Seal the exterior in accordance with the shop drawings.

H. Insulate between the window frame and the rough opening.

I. Isolate all aluminum to be placed directly in contact with the masonry or incompatible materials (metals) with a heavy coat of zinc chromate, bituminous paint, or equal.

Receptor System Installation

A. The sill starter will need sections of backer rod at both ends of the outer channels. Insert the backer rod deep enough into the channels to allow for sealant application. Seal over the channels with a silicone based sealant and tool the sealant (See Figures #1 and #2).

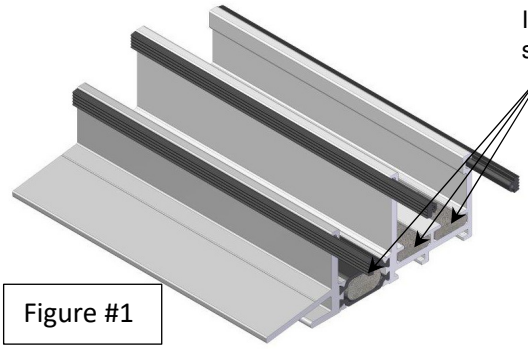

Figure #1

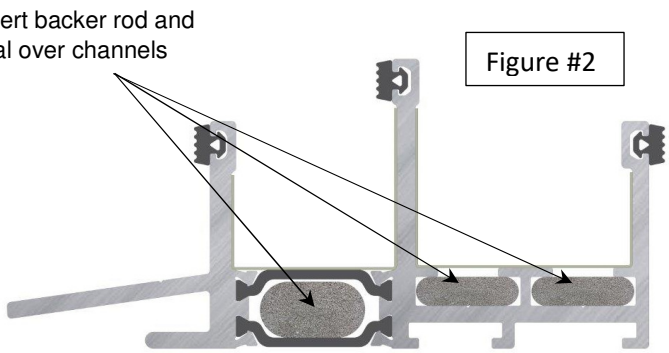

Figure #2

B. If the exterior edge of the sill starter is not in line with the exterior edge of the window frame, determine the set-back from the shop drawings and install the sill starter at this location. Install the fasteners as shown in the shop drawings. Seal over the fastener heads.

C. Whenever more than one length of sill starter is needed, space the two sections ½" apart from each other. Cover the inner surfaces of the joint with a sealant tape (Dowsil 123™ or equal) that extends at least 1-1/2" from edges of the joint. (See Figures #3 and #4) Insert backer rod in any location where the sealant tape wouldn't back up the exterior sealant joint.

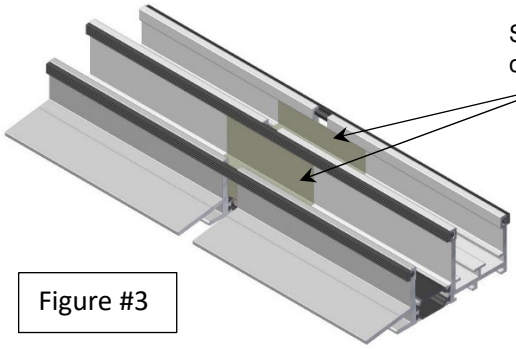

Figure #3

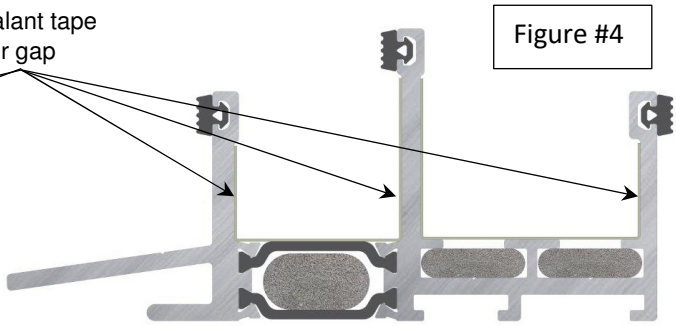

Figure #4

D. Install the gaskets that will run continuously across the joint. Apply color-matched sealant to the interior and exterior legs of the joint between the extrusions, using the sealant tape and backer rod as a back-up (See Figure #5).

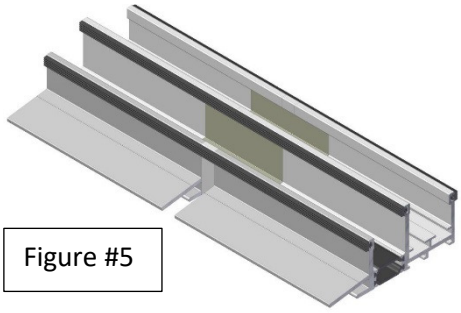

Figure #5

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E. Where there are corners, cut the sill starter on a 45 degree angle and attach the corner key (corner gusset) (See Figure #6).

F. Whenever there is a height transition, end both sill starters like at the end of a wall (See Figure #7).

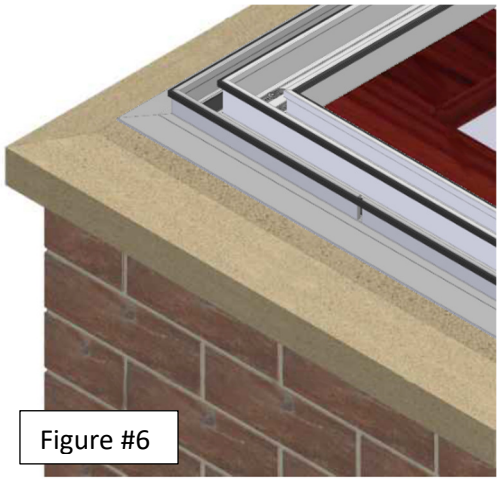

Figure #6

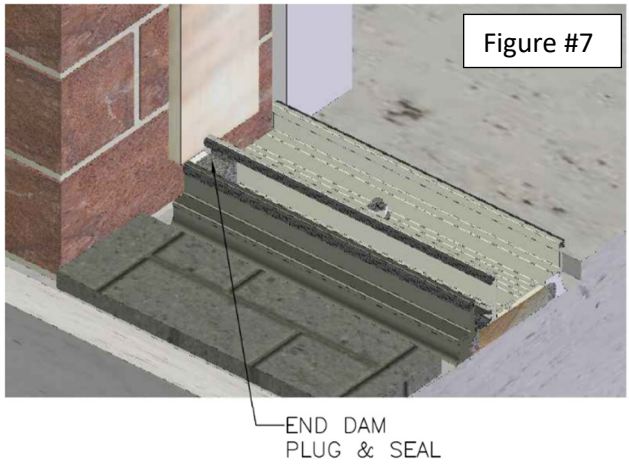

Figure #7

G. Prior to installing the head receptor, attach and seal the receptor end dams to the ends of the head receptor (See Figure #8).

H. Align the head receptor and attach as required by the shop drawings or fastener calculations. Seal over the fastener heads.

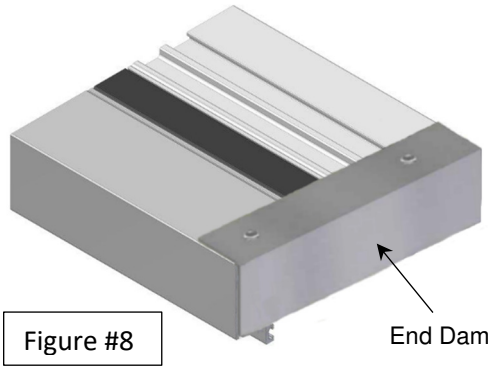

Figure #8

I. Whenever more than one length of head receptor is needed, space the sections ½" apart. Install the exterior gasket so it will run continuously across the joint (See Figure #9).

J. Cover the inside surface of the exterior leg with a sealant tape that extends at least 1-1/2" from edges of the joint. Seal the exterior leg of the extrusions from the exterior with a color matched sealant. (See Figure #10).

K. Install backer rod and seal the joint across the top of the extrusions (See Figure #11)

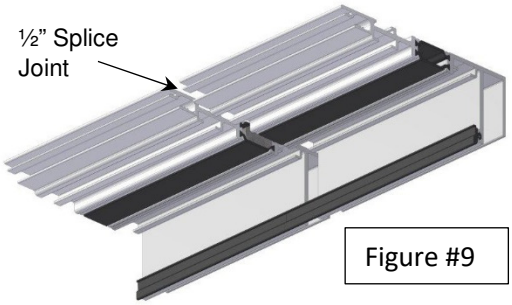

Figure #9

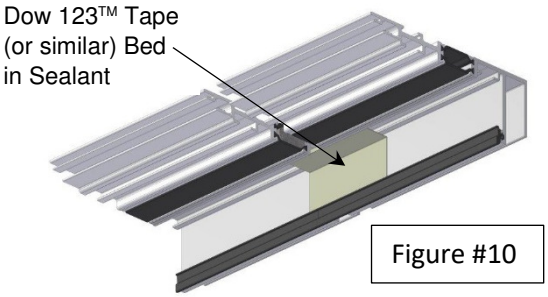

Figure #10

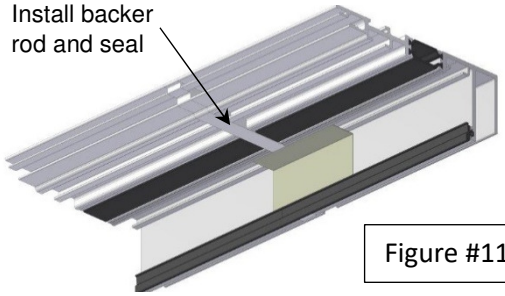

Figure #11

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L. Apply backer rod and sealant around the perimeter of the system. The transition where the jamb and sill meet needs particular attention.

M. If there are slab covers, install them at this time. DO NOT locate a splice in the slab covers at the same location as the head or sill splices (must be staggered).

N. If the slab cover is a multi-piece cover, install the bottom slab cover and then the mid and top slab covers. At each splice use the leg on the mid slab cover to hold the splice plate in place (See Figures #12 - #14)

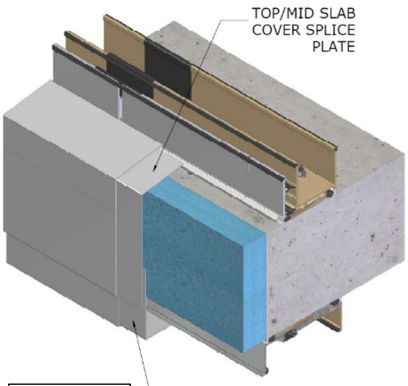


Figure #12

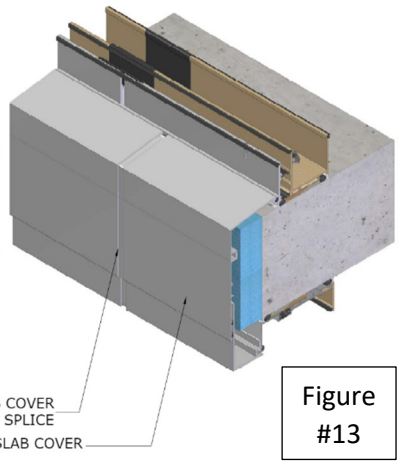
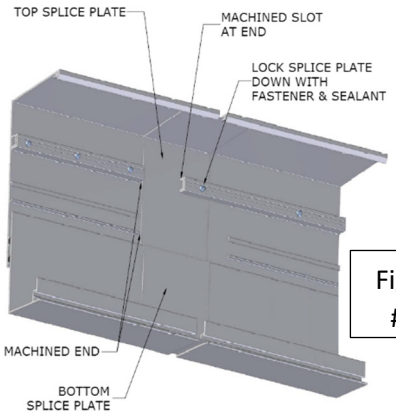


Figure #13



VIEW OF SLAB COVER SPLICE FROM BACK SIDE

Figure #14

Window Wall Installation

A. Ensure all of the exterior hollows of the windows have been sealed at the factory. Re-seal, if necessary.

B. Install insulation in any large accessory cavities.

C. In some cases, the jamb doesn't use a jamb cap (See Figure #15). In those cases skip to step F.

D. If a jamb cap is used, apply a liberal amount of sealant to a closed-cell foam plug and insert it at the top end of the exterior jamb cap. Remove the adhesive backing from the open-cell foam plug and insert it in the bottom end of the exterior jamb track (See Figure #16).

E. Apply sealant to the interior edge of the jamb cap, to seal to the interior window leg. Apply a bedding bead of sealant where the center leg of the window will contact the jamb cap. Also apply sealant around the top foam plug on the window. Install the jamb cap on to the window jamb.

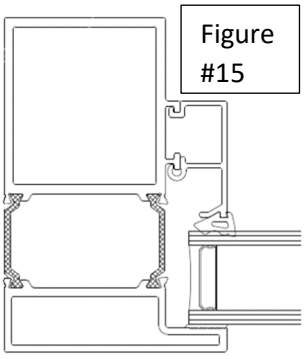


Figure #15

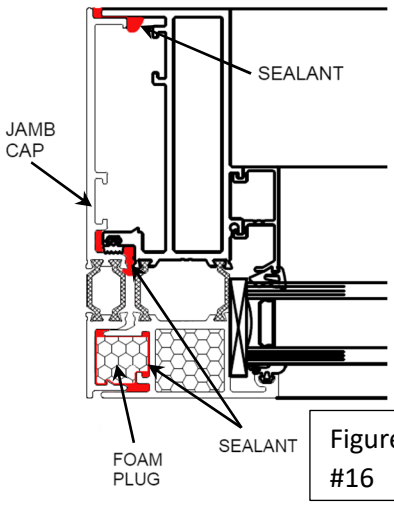


Figure #16

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F. Apply a bedding bead of sealant on top of the center leg of the sill starter. Also apply a large amount of sealant on top of the exterior channel foam plug.

G. Tilt the sill of the window on top of the sill starter, and rotate the window while lowering it onto the sill starter. Temporary head receptor clips may be needed to hold the window in place while the other windows are being installed.

H. Apply a liberal amount of sealant to the closed-cell foam plug and insert it at the top end of the exterior jamb track (See Figure #17). Remove the adhesive backing from the open-cell foam plug and insert it in the bottom end of the exterior jamb track (See Figures #19 & #20).

I. Apply sealant at the foam plug at the head of the window, and to the interior male/female joint of the jamb. In addition, apply a bead of sealant to the center leg of the jamb. Make sure this bead of sealant ties into the seal on the center leg of the sill (previously applied).

J. Rotate the next window onto the sill starter, and then slide it into the first window. Make sure the foam plug at the top of the jambs are thoroughly sealed (See Figure #18).

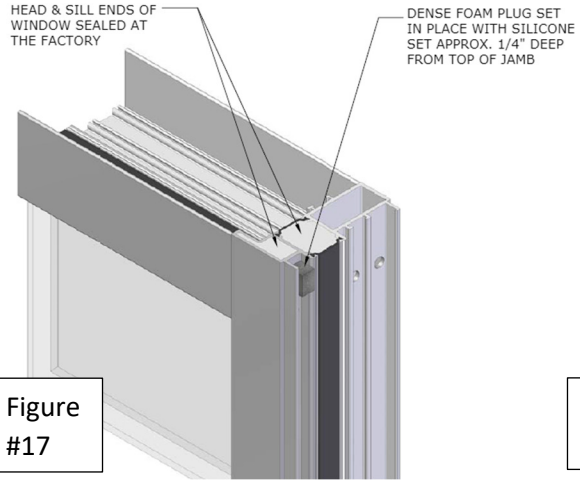

Figure #17

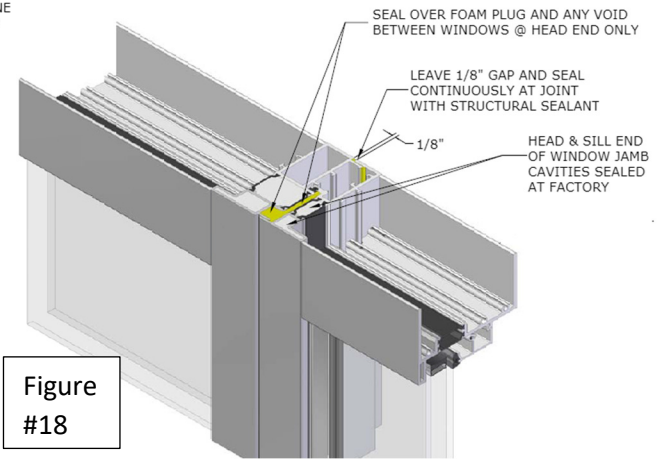

Figure #18

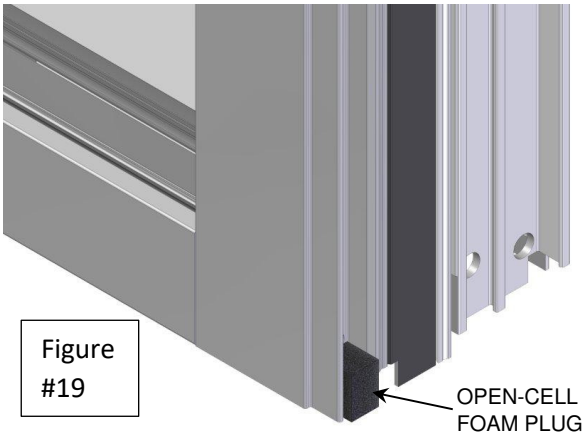

Figure #19

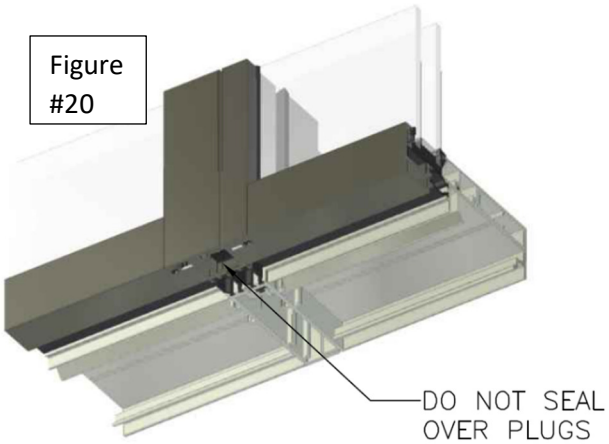

Figure #20

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K. Tool the interior sealant at the male/female joint. Continue the window installation along the rest of the window wall.

L. When a corner is encountered, apply a liberal amount of sealant to the closed-cell foam plug and insert it at the top end of the exterior jamb track. Remove the adhesive backing from the open-cell foam plug and insert it in the bottom end of the exterior jamb track (See Figure #21).

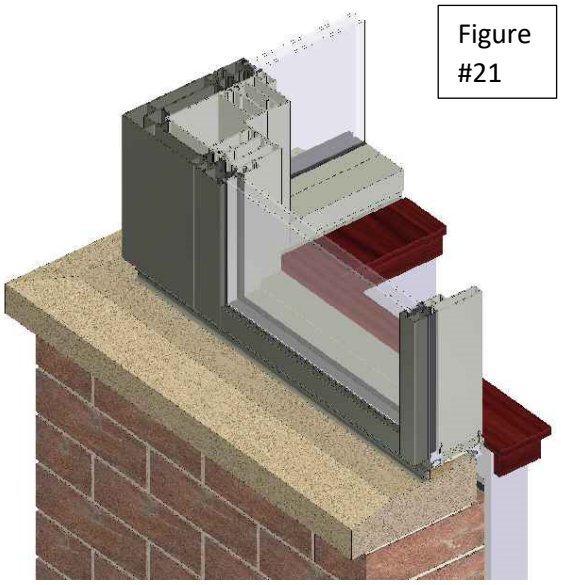

Figure #21

M. Apply sealant to the interior male/female joint of the corner mullion. In addition, apply a bead of sealant to the center leg of the jamb. Make sure this bead of sealant ties into the seal on the center leg of the sill.

N. Install the mullion and seal the interior leg of the mullion to the window.

O. When a transition occurs, end the shorter windows with a jamb cap. Then install continuous shimming along the knee wall and continuing along the edge of the shorter window (See Figure #22).

P. Start the taller window in the same manner as an end window. Once both windows are installed, install backer rod and sealant in the joint between the two windows (See Figure #23)

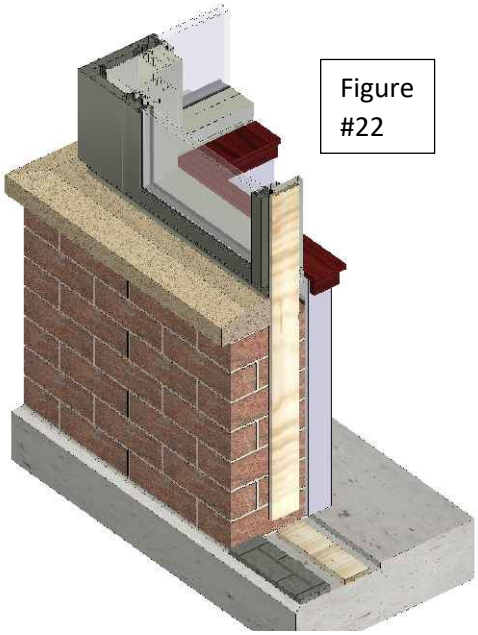

Figure #22

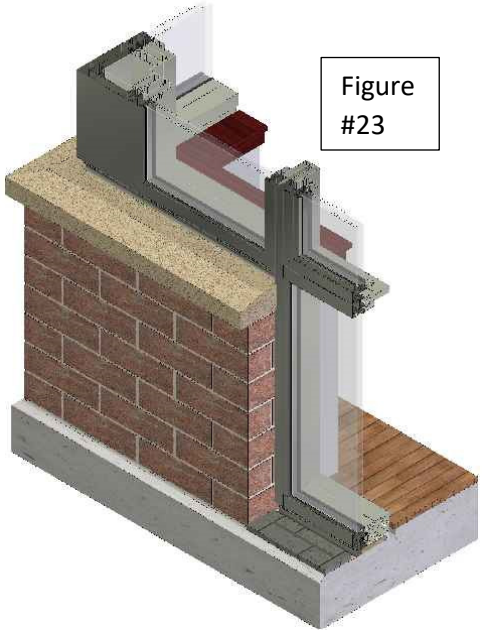

Figure #23

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Q. When doors are to be installed in a window wall system, end the sill starters on either side by installing backer rod and sealing the exterior channel and the strut pocket (See Figure #24).

R. Install continuous shimming/blocking along the window wall jambs (See Figure 25).

S. Then install the door(s) in accordance with the installation instructions for that product. Install backer rod and seal the gap between the door jamb and the window jamb (See Figure #26).

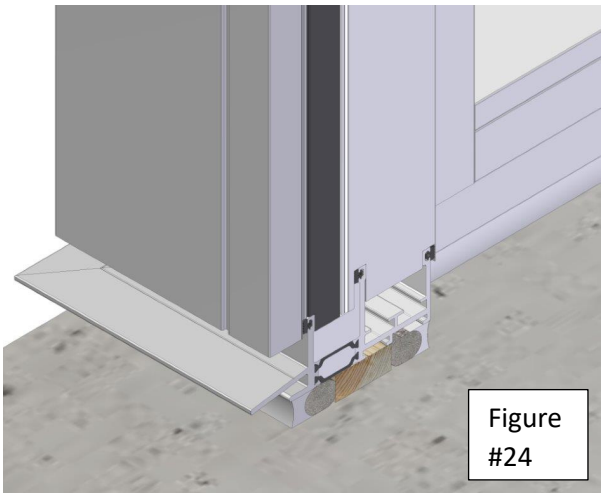


Figure #24

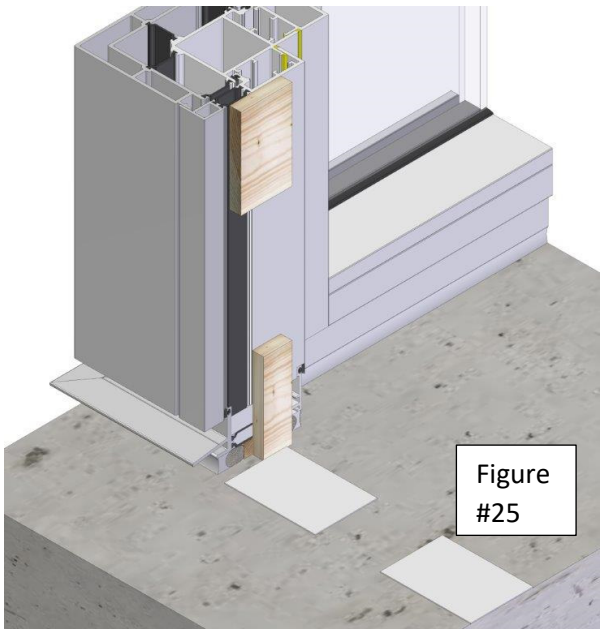


Figure #25

Electrical Raceway

A. If the system requires electrical raceway installed on the interior of the window wall system, attach the electrical raceway to the sill of the window wall (See Figure #27).

B. Provide the attached Electrical Raceway instructions to the electrician.

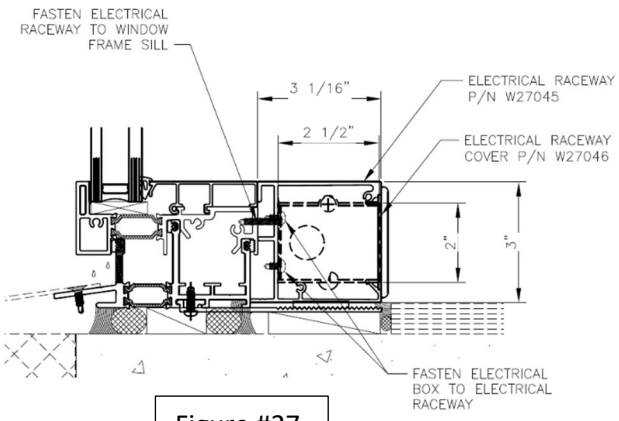


Figure #27

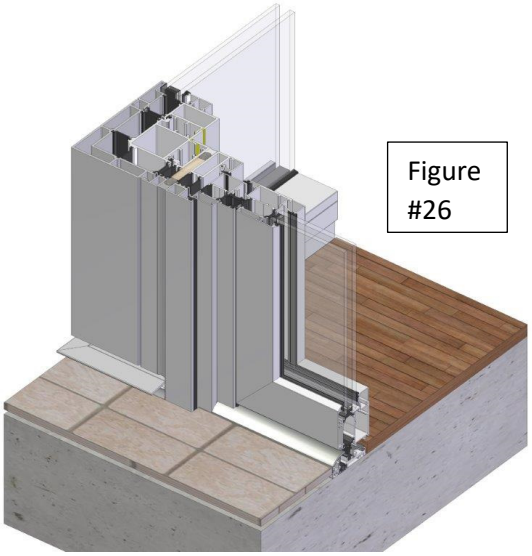
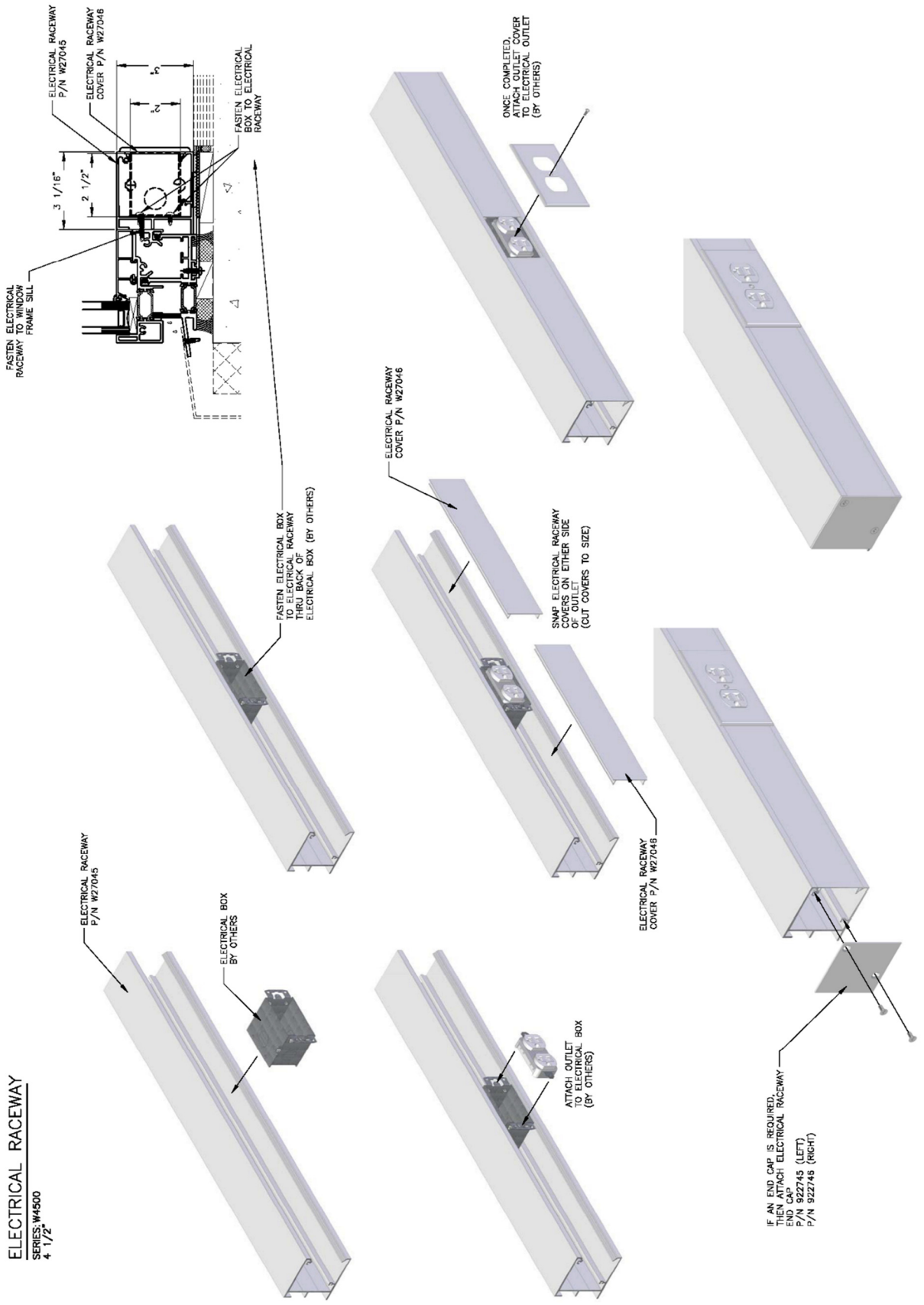


Figure #26

Window Wall Systems



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Locks and Operators

A. All operable windows and doors need to be checked for operation, and adjusted as necessary. For installed windows or doors, refer to the specific window or door installation instructions for that product on how to make adjustments.

B. If the window wall incorporates projected or casement windows, refer to the hardware and hinge adjustment sections of the Graham Architectural Products G6 Maintenance Manuals or the Installation Guidelines for the Projected/Casement (or Door, if required) products.

Cleaning/ Lubrication

A. After a window has been exposed to the conditions at a construction site, the window will need inspected, cleaned, and should be lubricated.

B. Inspect the window for damage and missing parts. Damage from the construction trades, including exposure to alkaline products (e.g. stucco and mortar), acidic cleaners, and weld splatter may require replacement of window parts or replacement of the entire window. The Graham warranty does not cover these types of damage.

C. If there is construction dirt and debris in between the vent and the frame, a vacuum cleaner should be used to remove the larger debris. Then a mild detergent mixed with water can be used with a soft cloth or sponge to remove the dirt. The mixture will then need rinsed with clean water. DO NOT USE AGGRESSIVE ALKALINE, ACIDIC, OR ABRASIVE CLEANERS.

D. The interior and exterior can also be cleaned using a mild detergent mixed with water, or mild cleaning agents. Do not use aggressive organic solvents such as chlorine bleach, grease removers, or nail polish remover. DO NOT USE AGGRESSIVE ALKALINE, ACIDIC, OR ABRASIVE CLEANERS.

E. Commercial glass cleaners can be used to clean the glass. Do not use abrasive cleaners to clean the glass. DO NOT USE SHARP METAL OBJECTS (SUCH AS A RAZOR BLADE) TO SCRAPE THE GLASS.

F. If the hinges, limit devices, and/or the multi-point lock systems were exposed to cleaners and/or construction dirt, lubricate the pivot points and/or guide areas with a non-petroleum based lubricant, such as spray silicone.