GRAHAM
ARCHITECTURAL PRODUCTS

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Installation Guidelines for Single and Double Hung Windows

Approved 07/18/2024

Single and Double Hung Windows

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. 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 system and the buildings 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.

Graham reserves the right to ship windows with the sash out, if the sash(s) are excessively heavy.

Single and Double Hung Windows

These instructions include the installation and initial adjustment instructions of the Single and Double Hung windows. Read these instructions before starting any installation.

Receiving, Handling, and Storage

The proper receiving, handling and storage of windows 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 and/or sash may be extremely heavy. A loading dock or glass manipulator may be needed to offload the windows without damaging them. Contact Graham Architectural to determine the weight of any assembled windows that are over 40 square feet, or sash over 20 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. Make sure pre-loaded sash are fully locked prior to moving windows. Never have fingers or hands inside the operating area of a sash.
- Do not use any of the hardware or grids for lifting or manipulating the window. 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.
- Stack vertically and on their sills with adequate separation so window parts (including hardware) will not rub together, including any protruding hardware such as lift rails. 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 frame.

Single and Double Hung Windows

Storage: (continued)

- Ensure that the products cannot be blown over by the wind and limited to stacking of five (5) units before alternate support is given. If the windows and sash are going to be stored for a short period of time (less than 1 month), they can be leaned at a 15° – 20° angle from vertical, with blocking to prevent them from rubbing/deforming. If they are going to be stored for an extended period of time, they will need stacked vertically (<3° from vertical) with strapping to prevent them from being blown over by the wind.
- Protect windows and sash completely from moisture and dirt prior to installation. It is important that all windows and sash 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 and sash 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. 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 and/or sash 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 or sash 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/

Single and Double Hung Windows

General Installation Instructions

A. Upon delivery carefully check that all windows and sash 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			
Note: *Jambs can be bowed in 1/16” but cannot be bowed out.*			

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. It is not recommended to drill through the sill. If fasteners are required to penetrate the sill; sealant must be applied in the pre-drilled hole first. Drill the hole, clean out the drill shavings/debris, clean around the hole area, apply sealant in the hole, install the fastener, and then seal over the fastener head.

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 (or receptor, if used).

I. If the windows are to be installed using panning, refer to the Graham Installation Guidelines for the type of panning being used. *www.grahamwindows.com/architectural-resources/technical-information/*

Note: *Panning cannot support the weight of a window.*

Single and Double Hung Windows

Window Installation

Trim and Clip Installation

A. If trim and clip are used, trim clips can be full length or 3" long sections. If sections are used, they will need to be lined up in order for the trim cover to snap in place.

B. The trim clip to window fastener must be a minimum of #8 x 1/2" screw, or heavier as required to meet project design loads. The trim clip must be attached to the rough opening before attaching it to the window. The trim clip to rough opening fastener is dictated by the substrate. Graham Architectural recommends that the fastener is greater than, or equal to, that of the fastener used at the clip to window (as required to meet project design loads).

C. The fastening schedule will generally be determined by a structural engineer. If a fastening schedule has not been specified, Graham Architectural recommends applying fasteners a maximum of 9 inches from each corner, and then a maximum of 18 inches apart. (Note: Recommended fastening does not apply to projects that have blast mitigation or hurricane requirements)

D. When installing trim clip fasteners, make sure not to twist the frame. Additional shims will be needed at the mid-span of the jambs to prevent bowing and rotating of the jambs during window operation.

E. The head, jamb and (if used) the sill trim covers are field cut to size. Snap trim covers on using a rubber mallet, or a block of wood with a hammer. Be careful not to dent or scratch the finish on the trim cover when installing it.

F. The window must be level, plumb and square in accordance with Table 1 shown on the previous page.

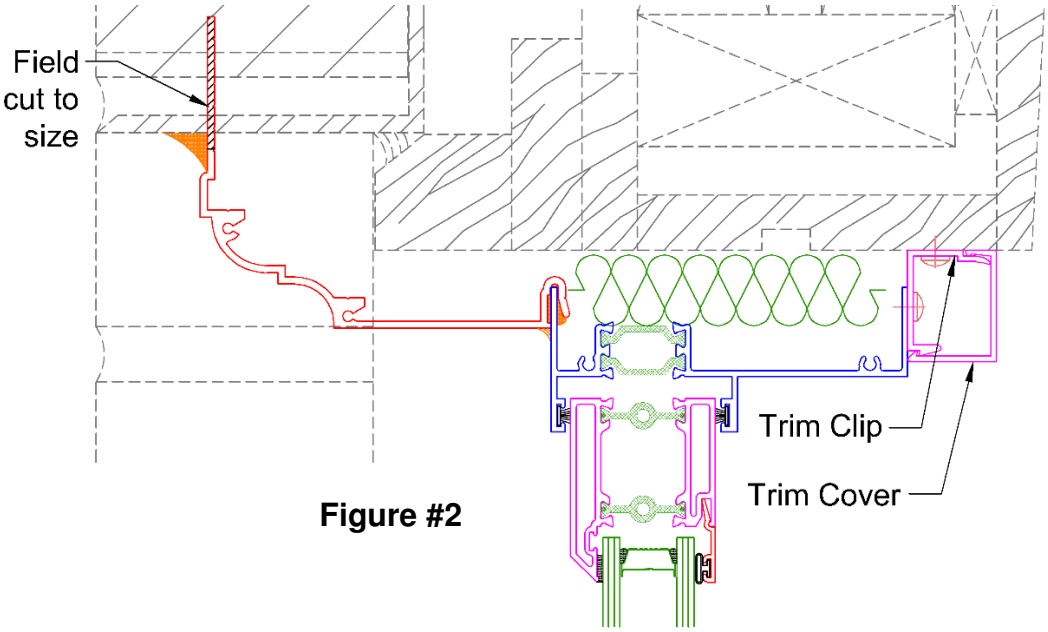


Figure #2

Single and Double Hung Windows

Window Installation

Receptor Installation

A. If the windows are to be installed in a receptor system, refer to the Graham Installation Guidelines for Receptor Systems for more detailed instructions. www.grahamwindows.com /architectural-resources/technical-information/

B. Shims will be needed between the jambs and the receptor at the mid-span of the jambs (See Figure #5). This will prevent bowing of the jambs during window operation.

C. The window must be level, plumb and square in accordance with Table 1 shown on Page 5.

D. Insulation is recommended between the receptor and the head and jambs of the window. Insulation is not recommended in the sill area.

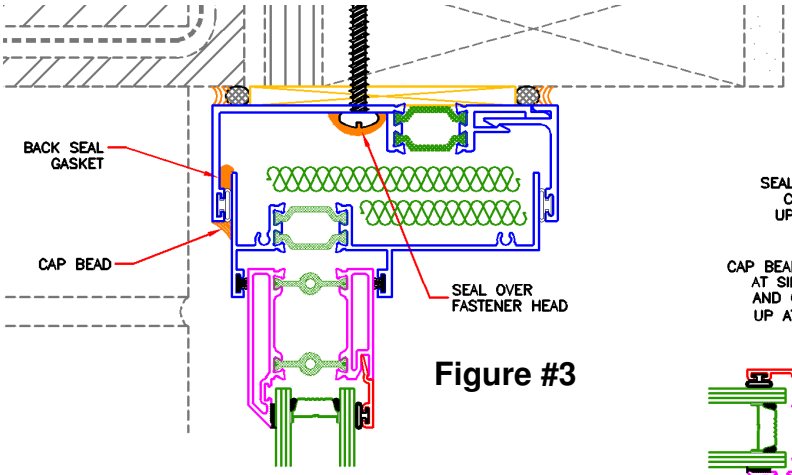


Figure #3

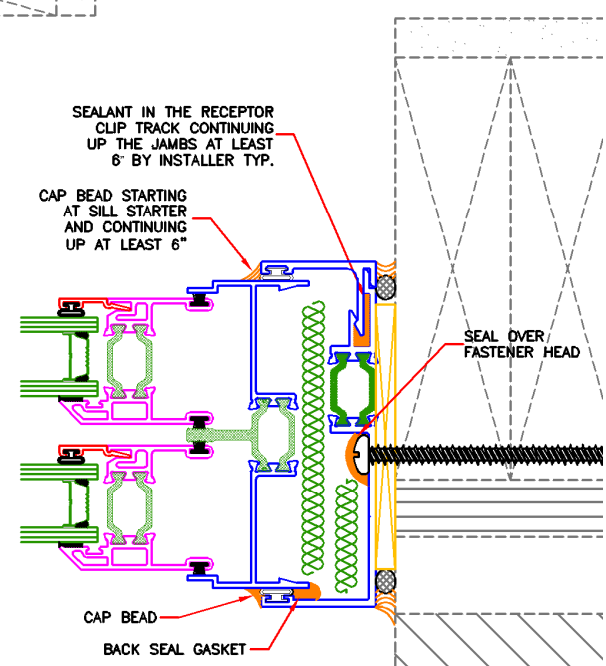


Figure #5

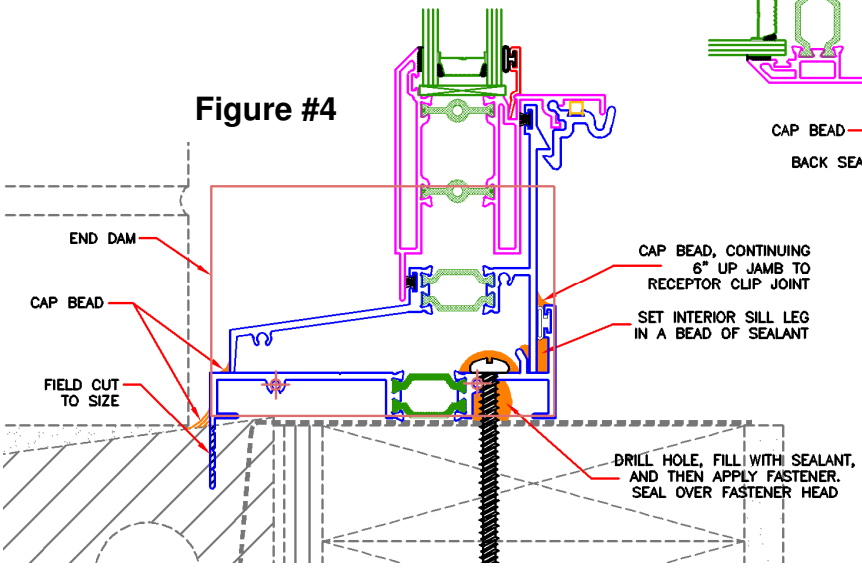


Figure #4

Single and Double Hung Windows

Window Installation

Strap Anchor Installation

A. Attach the strap anchors to the window frames at the required spacing with the screws provided. If necessary, bend the strap anchors so they point to the interior of the opening.

B. Apply shims at the sill to support the interior and exterior portions of the sill. Make sure the sill will be level within the tolerances in Table #1.

C. Position the window into the opening, making sure that the window is plumb and at the proper set-back from the exterior.

D. Apply fasteners through the pre-drilled holes in the strap anchor. Apply shims, if needed to position the window properly (See Figure #6).

E. Apply sealant to the exterior perimeter

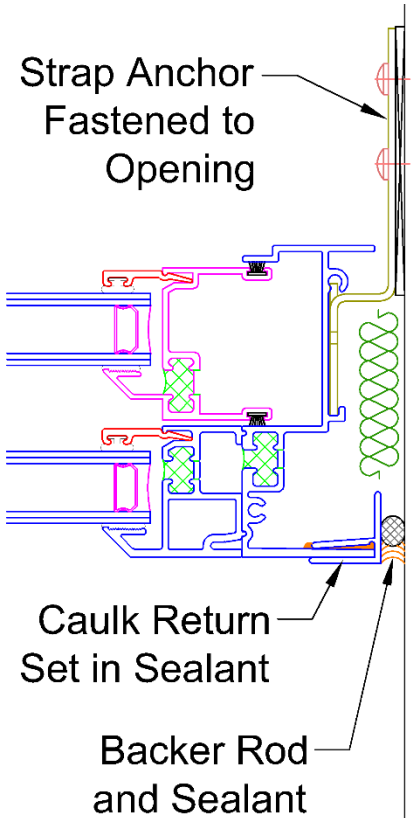


Figure #6

Frame Expander/ Caulk Return

In certain situations, a frame expander or a caulk return will need to be added to a window frame, panning leg, or receptor frame. The procedure for applying these products is listed below.

1. Apply a continuous bead of sealant in the "V" groove of the Frame expander/ Caulk return (See Figure #7).
2. Slide the expander onto the frame leg, pushing it into the sealant bead. The sealant bead should squeeze out around the frame leg. If it doesn't squeeze out, add more sealant (See Figure #8).
3. Firmly press the expander onto the frame leg. Clean up any squeeze out of the sealant on the exterior (See Figure #9).

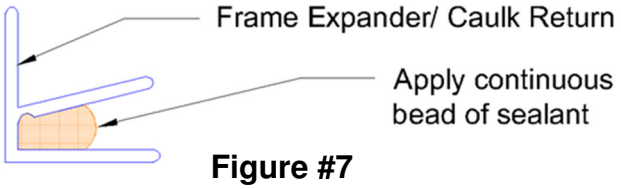


Figure #7

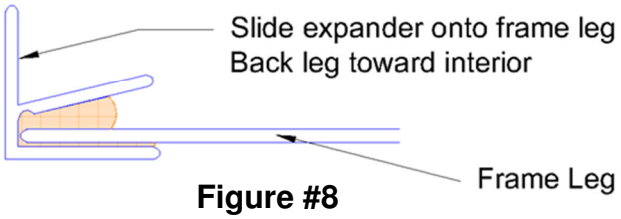


Figure #8

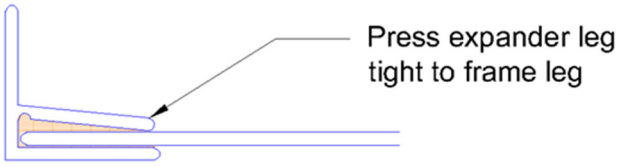


Figure #9

Single and Double Hung Windows

Vertical Mullions

A. Vertical 3-piece mullions will need attached to the head and sill of the rough opening with one or more mullion clips or angles. The mullion will need back-sealed to the window jambs, and cap-sealing is recommended (See Figure #10).

B. Mullion pressure plates (covers) should be back-sealed starting at the sill and continuing up at least 6". If needed, the pressure plates can be attached to the jambs with #10 x 1/2" screws (not supplied by Graham), a maximum of 9" from the ends and a maximum of 18" on center (See Figure #10).

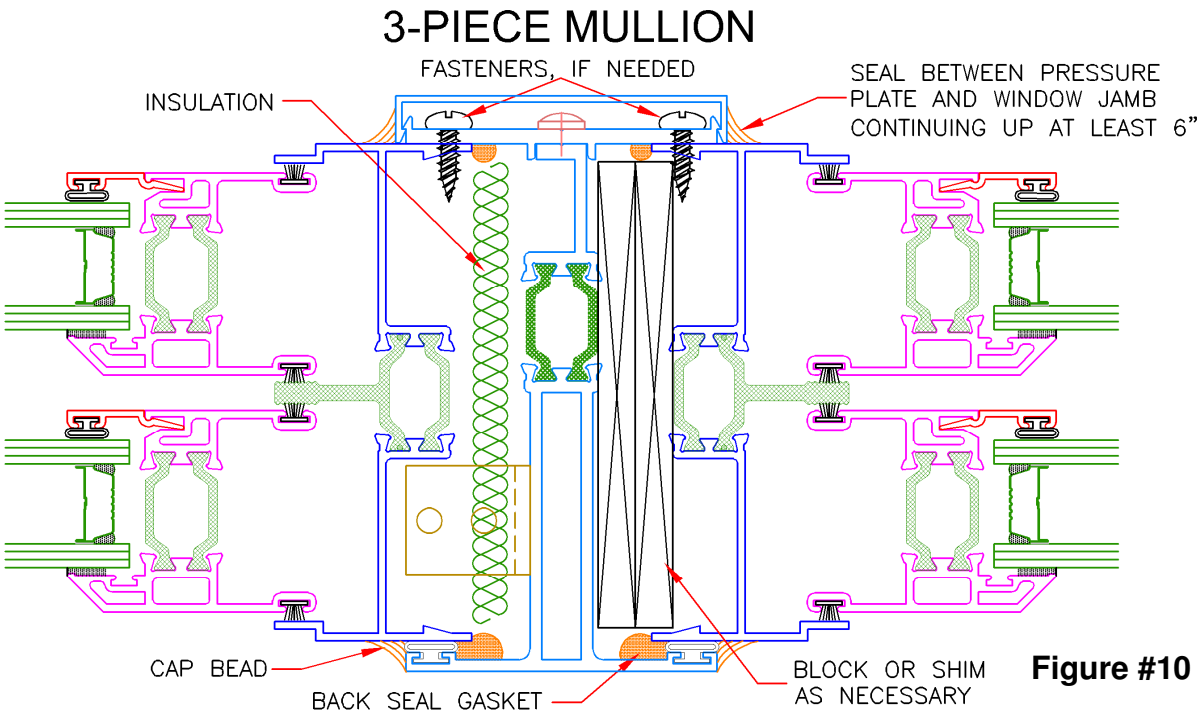


Figure #10

C. Zero, 1/16", and Self-mullions (male/female) need sealant applied to the interior and exterior legs of the jamb prior to final assembly. Zero and self-mullions also need cap sealed on the exterior.

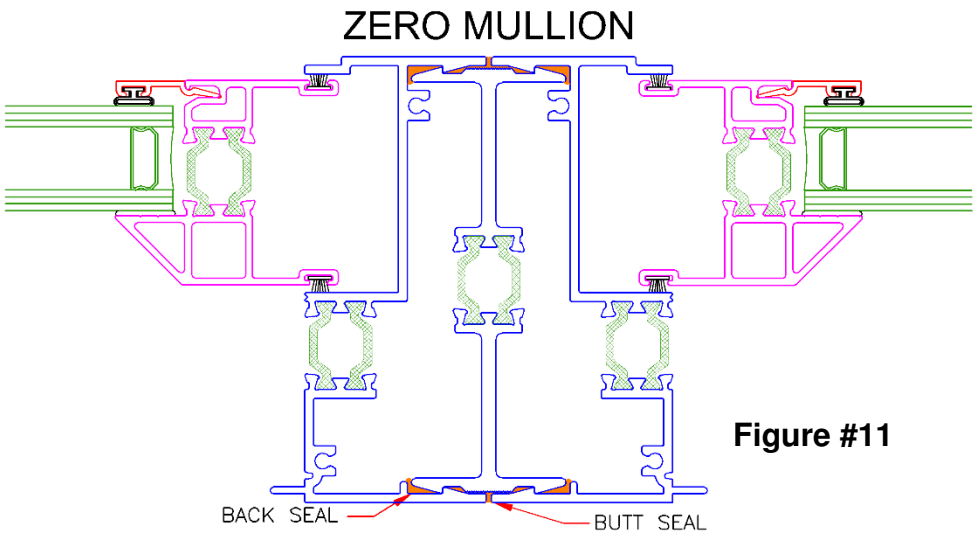


Figure #11

Single and Double Hung Windows

Horizontal (Stack) Mullions

A. Horizontal (stack) mullions need sealed to the frame of the window above and below the mullion. The exterior legs must be sealed, and GAP recommends that the interior legs are sealed (See Figure #12).

B. Mullion anchor clips may be required depending on the size of the window, and/or the design load requirements. Reference the project shop drawings or contact the Engineering Department of Graham Architectural to determine when mullions clips are needed for each type of stack mullion.

C. If multiple stack mullions are used in an opening, clearance will be needed between the stack mullion and the window below to allow for movement. Contact the Engineering Department of Graham Architectural for stack mullion and clearance recommendations for each specific project.

D. Some windows have a fixed sash (transom) above the hung window, that is separated by a field assembled astragal. The fixed sash needs installed in the frame before the astragal is attached (See Figure #13).

   1. Before the astragal is attached, the ends of the astragal need sealed at the inside legs and the thermal break. A row of sealant must be applied to the bottom rail of the fixed sash.
   2. Attach the astragal with the angles at the ends, and then attach the astragal to the fixed sash with screws through the pre-drilled holes. The head of the window will also need attached to the fixed sash.
   3. Cap-seal the interior leg of the astragal to the fixed sash, and then continue this bead up the jambs at least 3".

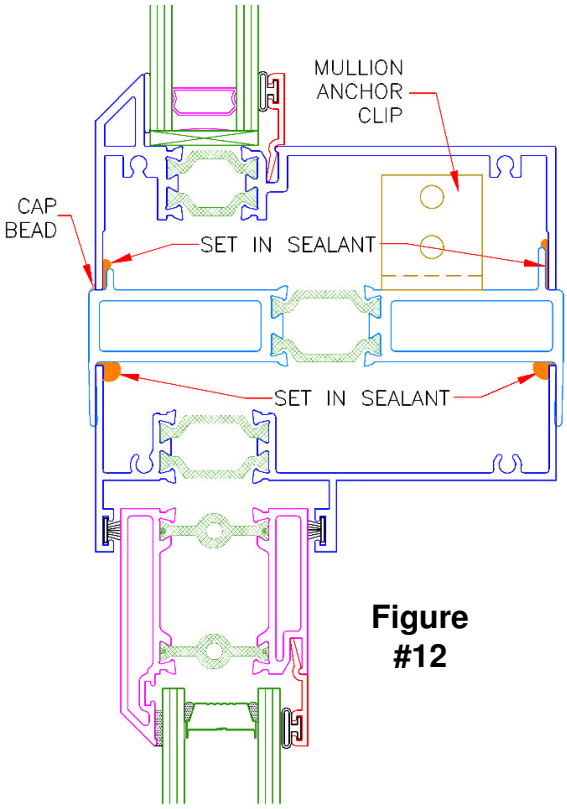


Figure #12

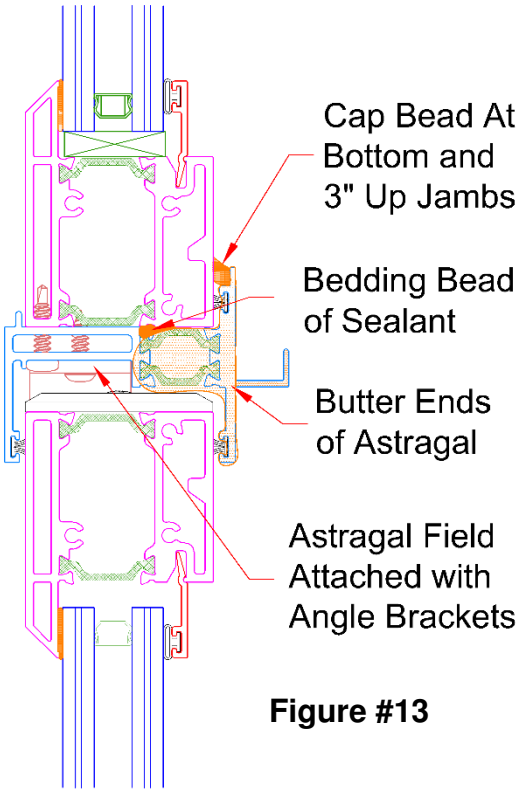


Figure #13

Single and Double Hung Windows

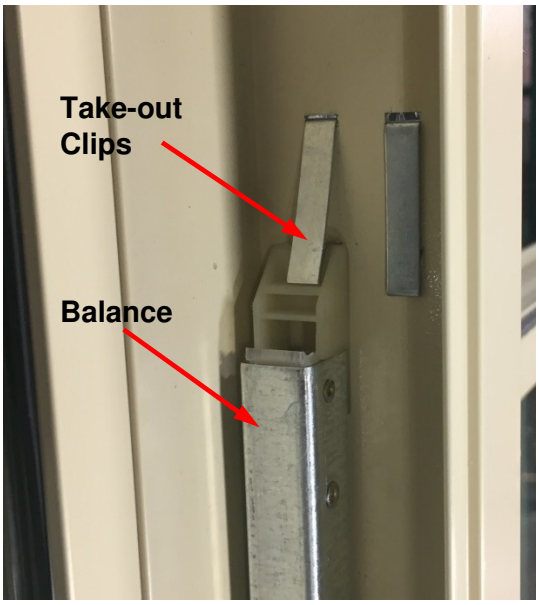
Side Load Sash with Block and Tackle Balances

In certain cases, the sash are shipped separate from the frame. The following are the instructions for installing the sash.

Note: *Prior to loading sash, make sure that the frame jambs are straight and secured.*

A. When side-loaded sash are used with block and tackle balances, the balances are held in place on the jambs by take-out clips (See Picture #14). The sash cams at the top of the sash hook onto the tops of the balances (See Picture #15).

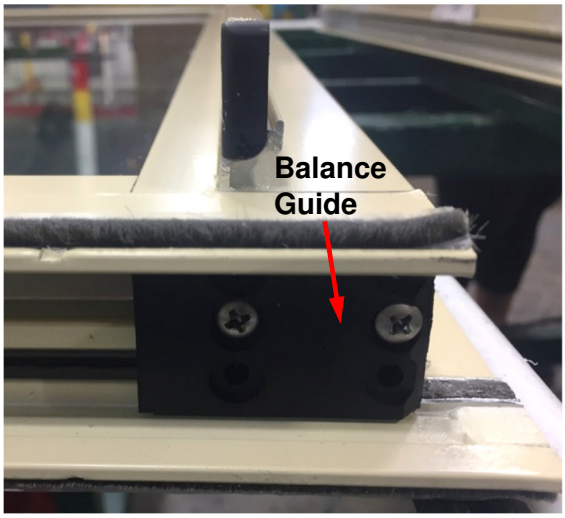
B. The bottom of the sash is supported by ribs on the bottoms of the balances (See Picture #16) and balance guides on the bottom of the sash (See Picture #17).



Picture #14

Picture #15

Picture #16



Picture #17

Single and Double Hung Windows

Side Load Sash with Block and Tackle Balances (continued)

C. To load the sash, cock the sash so one side will go into the jamb. Align the top of the sash at least 3" above the top of the balance, but below the sash stops (See Picture #18).

D. Slide the sash as far as possible into that jamb, and then rotate the sash into the frame (See Picture #19). Center the sash, and then push the sash toward the sill. When loading the bottom sash, make sure that the weatherstrip holder on the exterior side of the lock rail is centered.

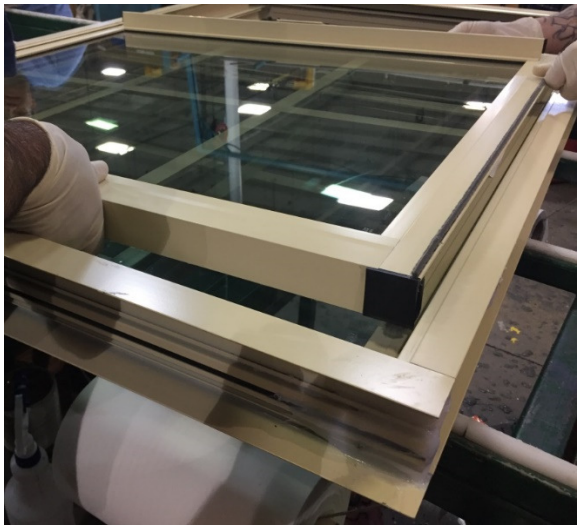
NOTE: *Don't let go of the sash until you are certain that both balances have engaged the sash and are supporting the weight of the sash.*

E. Both balances should have engaged the sash. If they didn't, raise the sash and engage both balances. Once the balances are engaged, push the take-out clips back into the jambs so they lay flat.

Note: *Sash stops are installed at the factory to prevent the balances from being over-extended. If they had to be removed to install the window frame, they must be re-installed before the balances are operated.*

F. Install the limit stops (Sash limiting devices) as required.

Picture #18



Picture #19

Single and Double Hung Windows

Side-load Sash with Class V Balances

Note: *Prior to loading sash, make sure that the frame jambs are straight and secured. Bowing jambs can make loading the sash difficult.*

A. When side-loaded sash are used with Class V balances, the sash carriers (shoes) are held in place on the jambs with hinged latches at the bottoms of the carriers (See Picture #20).

B. On the bottoms of the sash stiles, there is a sash bracket that catches the sash carrier (See Picture #21).

Note: *Before installing sash, make sure the Tamper locks are on the balances (See Picture #20).*

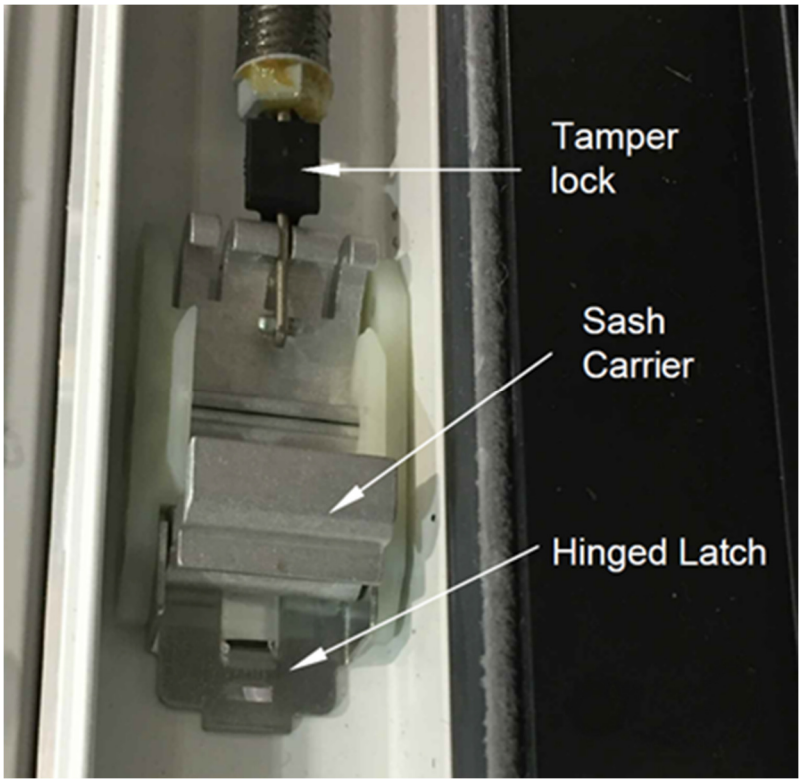
C. To load the sash, cock the sash so one side will go into the jamb. Align the bottom of the sash brackets at least 4" above the sash carriers.

D. Slide the sash as far as possible into that jamb, and then rotate the sash into the frame.

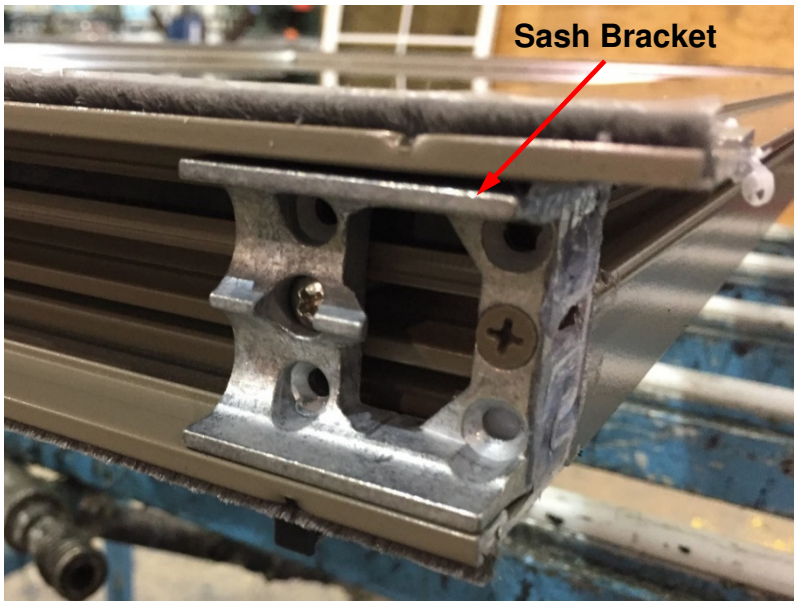
E. Center the sash, and then allow the sash to slide down until the sash brackets engage the sash carriers. The sash may have to be shifted side to side until both sash carriers have been engaged.

Note: *Don't let go of the sash until you are certain that both balances have engaged the sash.*

F. When loading the bottom sash, make sure that the weatherstrip holder on the exterior side of the lock rail is centered.



Picture #20



Picture #21

Single and Double Hung Windows

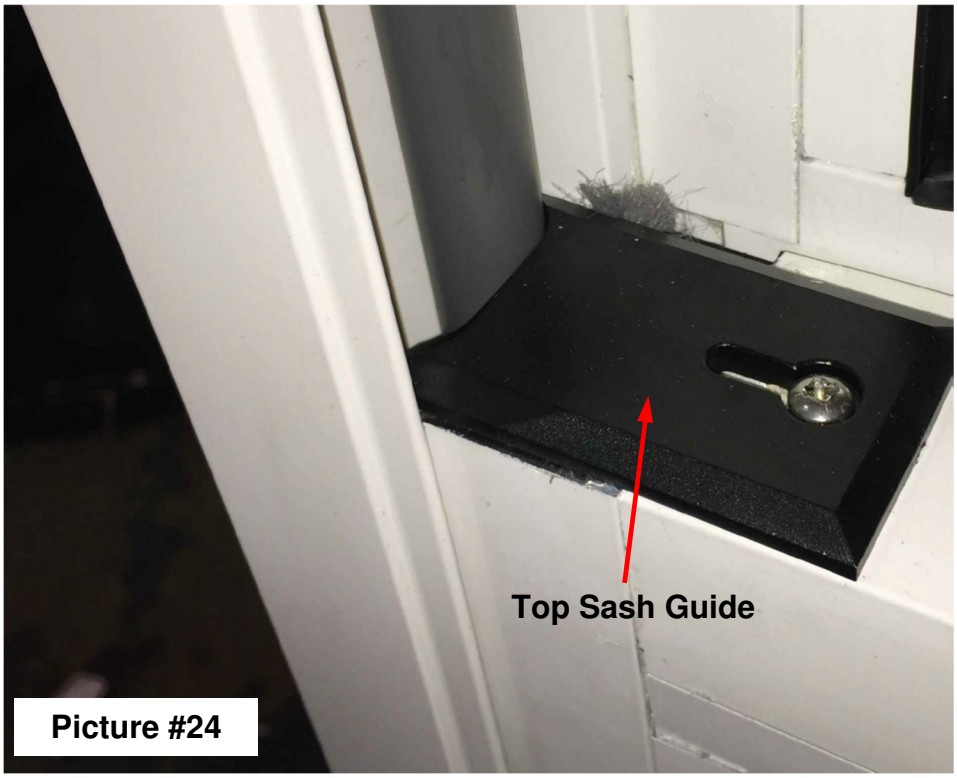
Side-load Sash with Class V Balances (continued)

G. Once the sash brackets are firmly engaged in the sash carriers, rotate the carrier latches out of the jamb, and rotate up until they snap into the bottom of the carrier assembly (See Pictures #22 and #23).

Picture #22

Picture #23

H. Center the sash in the frame. The weatherstrip needs to be in the sash track on both sides. Attach the top sash guides with #8-32 screws (See Picture #24).



Picture #24

Single and Double Hung Windows

Self-Balanced Sash

A. The self-balanced sash system uses a pulley and cable system to operate the sash together. The exterior sash carriers are held in place with zip ties for shipping purposes (See Picture #25).

B. The top sash must be loaded first. Cock the sash so one side will go into the jamb. Align the bottom of the sash brackets at least 4" above the sash carriers (See Figure #26)

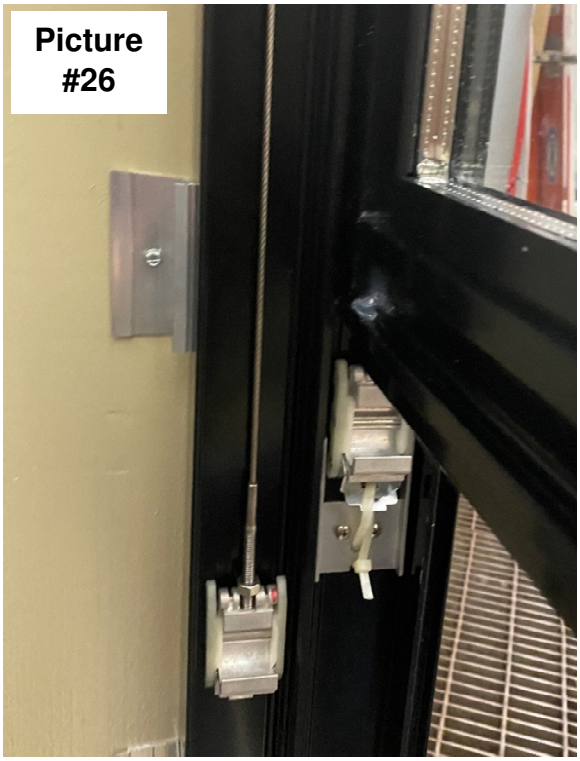
C. Slide the sash as far as possible into that jamb (See Figure #26), and then rotate the sash into the opposite jamb. Center the sash, and then allow the sash to slide down until the sash brackets engage the sash carriers. The sash may have to be shifted side to side until both sash carriers have been engaged.

Note: *Don't let go of the sash until you are certain that both sash carriers have engaged the sash.*

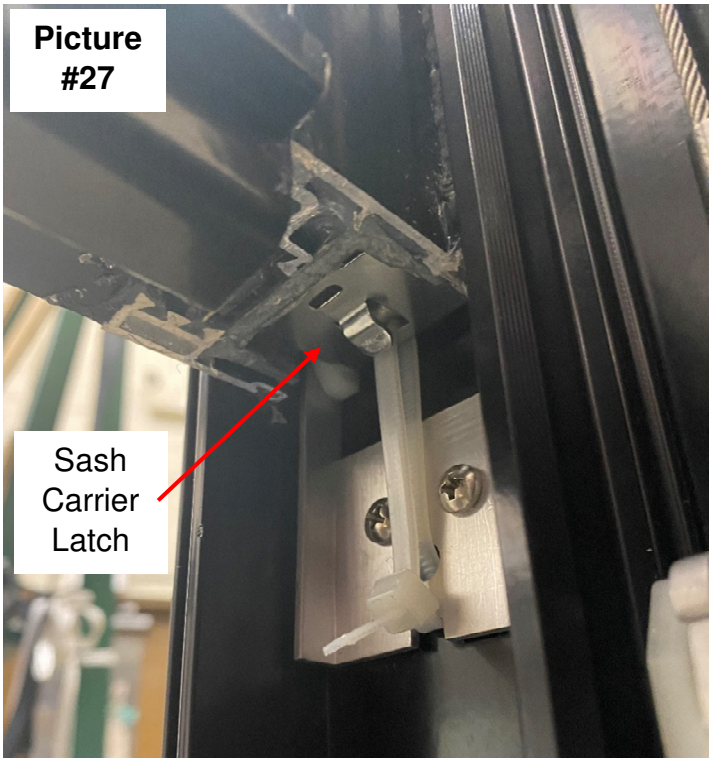
D. Rotate the carrier latches up until they snap into the bottom of the carrier assembly (See Picture #27).

Picture #25

Picture #26



Picture #27



Single and Double Hung Windows

Self-Balanced Sash (Continued)

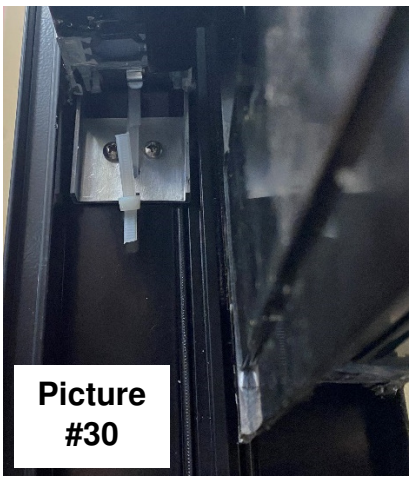
E. Do not try to operate the sash. The bottom sash carriers are holding the weight of the top sash. Load the bottom sash by repeating steps B and C (See Picture #28).

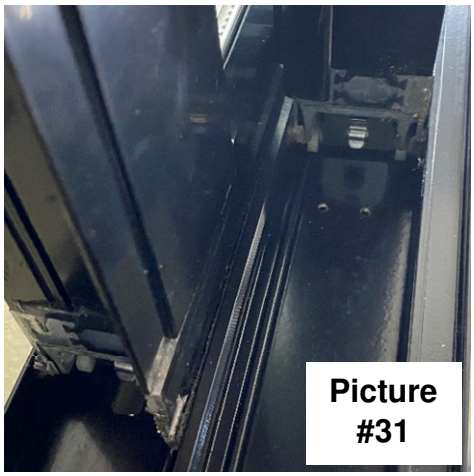
F. Once the sash brackets are firmly engaged in the sash carriers, rotate the carrier latches away from the jamb, and up until they snap into the bottom of the carrier assembly (See Picture #29).

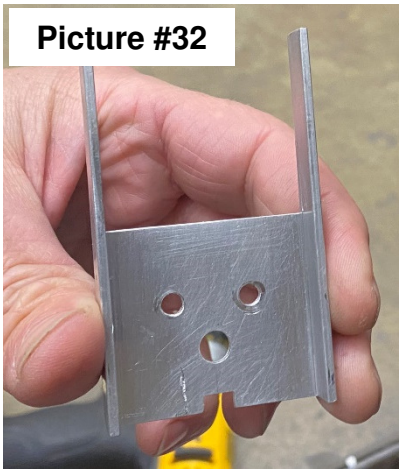

Picture #28


Picture #29

G. Once both sash are loaded, the zip ties can be cut and the Overhead Balance Carrier Guide can be removed (See Pictures #30 - #32).


Picture #30


Picture #31


Picture #32

Single and Double Hung Windows

H. Center the sash in the frame. Install the top sash guides (See Picture #33).

I. After loading the sash, check the cable length. Slowly begin to close the sash. If the bottom sash will not seat completely in the sill; (DO NOT FORCE) the cable assembly is short, and needs lengthened. If, when the sash is closed, the top sash is not seated in the head, or the meeting rails are separated as shown in Figure #34, the cable assembly is long, so it will need shortened.

J. Remove both sash by reversing steps A through H of this procedure.

L. Loosen the hex nut above the sash carrier (See Figure #35).

L. Disengage the Connection Assembly from the sash carrier.

M. Rotate the Connection Assembly. Rotate clockwise to lengthen the assembly. Rotate counterclockwise to shorten the assembly. Remember the amount of turns for adjusting the Connection Assembly on the opposite jamb (See Figure #36).

Note: *One rotation equals approximately 1/16" of sash movement.*

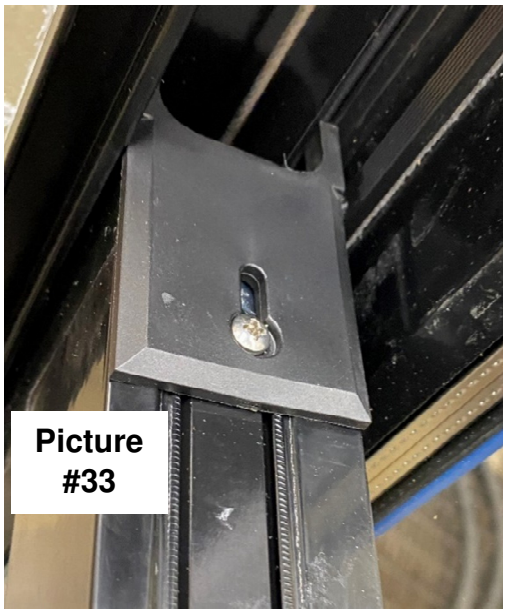
N. Reattach the Connection Assembly to the sash carrier and tighten the hex nut (See Figure #35).

O. Repeat this process on the Connection Assembly on the opposite jamb. Rotate that Connection Assembly the same number of turns as the previous jamb.

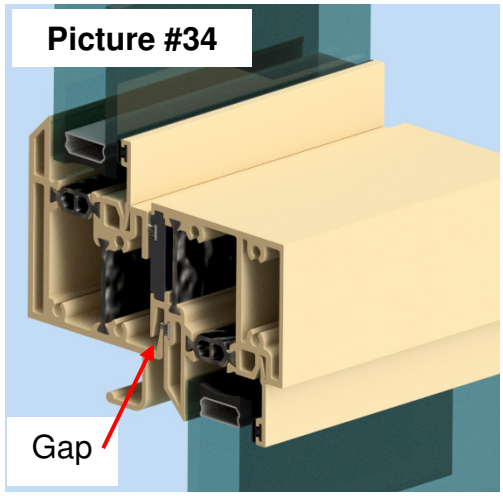
P. Reinstall the Overhead Balance Carrier Guide and attach a zip-tie to the exterior carrier latch before attempting to re-install the sash.

Q. Re-install the sash, and re-check the sash alignment.

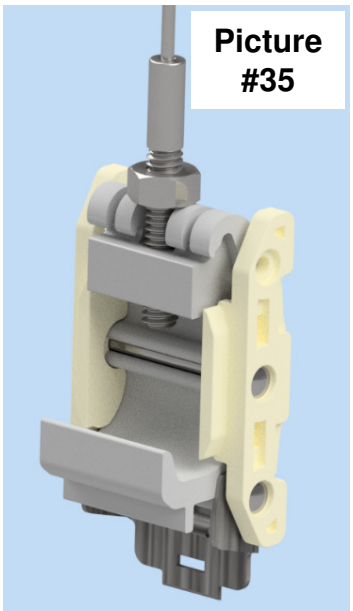
R. Repeat this process if necessary.



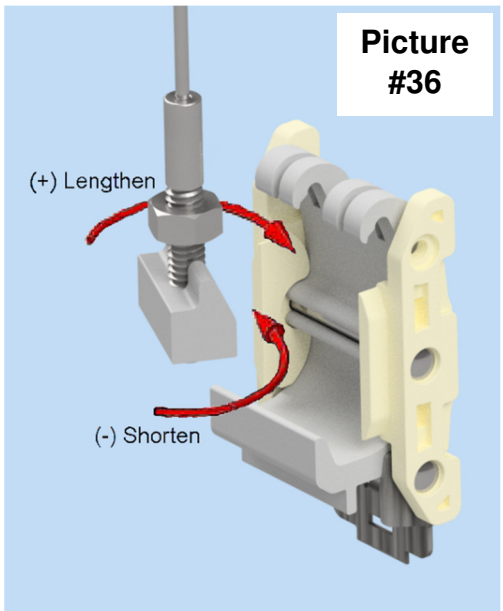
Picture #33



Picture #34



Picture #35

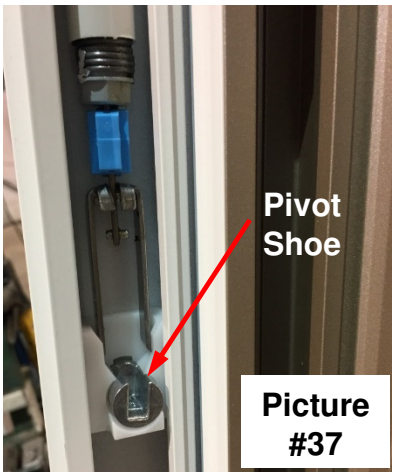


Picture #36

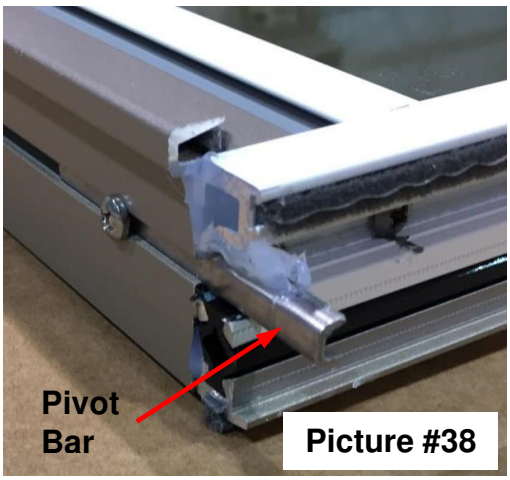
Single and Double Hung Windows

Tilt Load Sash

A. There are pivot shoes in the jambs (See Picture #37). At the bottom corners of each sash are pivot bars (See Picture #38), and at the top of each sash are tilt latches (See Picture #40). The gasket on the bottom rail of the bottom sash is left long, so it can be trimmed after the sash is installed (See Picture #39).



Picture #37

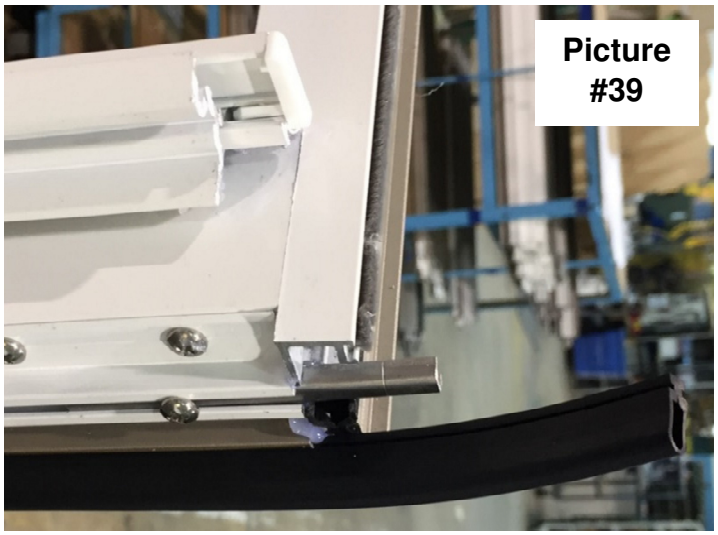


Picture #38

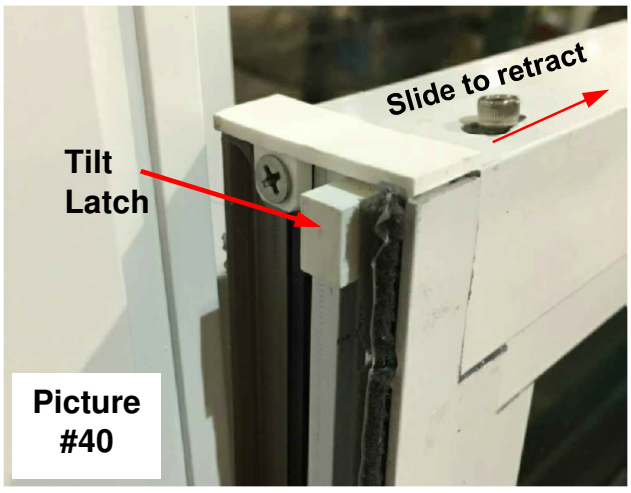
B. Install the top sash first, and then the bottom sash.

C. Hold the sash slightly lower than 90 degrees to the jamb and raise one side of the sash to permit the pivot bar on the opposite side to slide into the pivot shoe (See Picture #41).

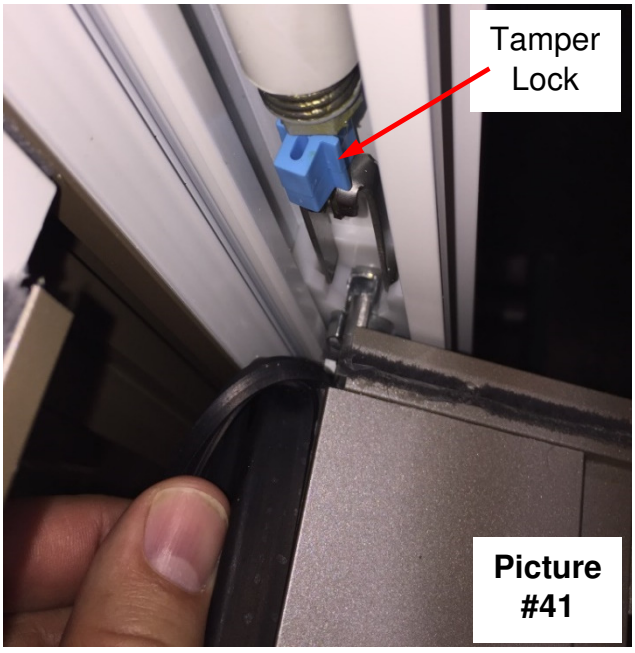
D. With one pivot bar engaged, gently lower the higher side of the sash until that pivot bar is also fully seated in the pivot shoe. Double check that both pivot bars are fully seated in the pivot shoes before rotating the sash.


Picture #39

E. Rotate the sash into place. The tilt latches will need retracted to complete the rotation (See Picture #40).



Picture #40



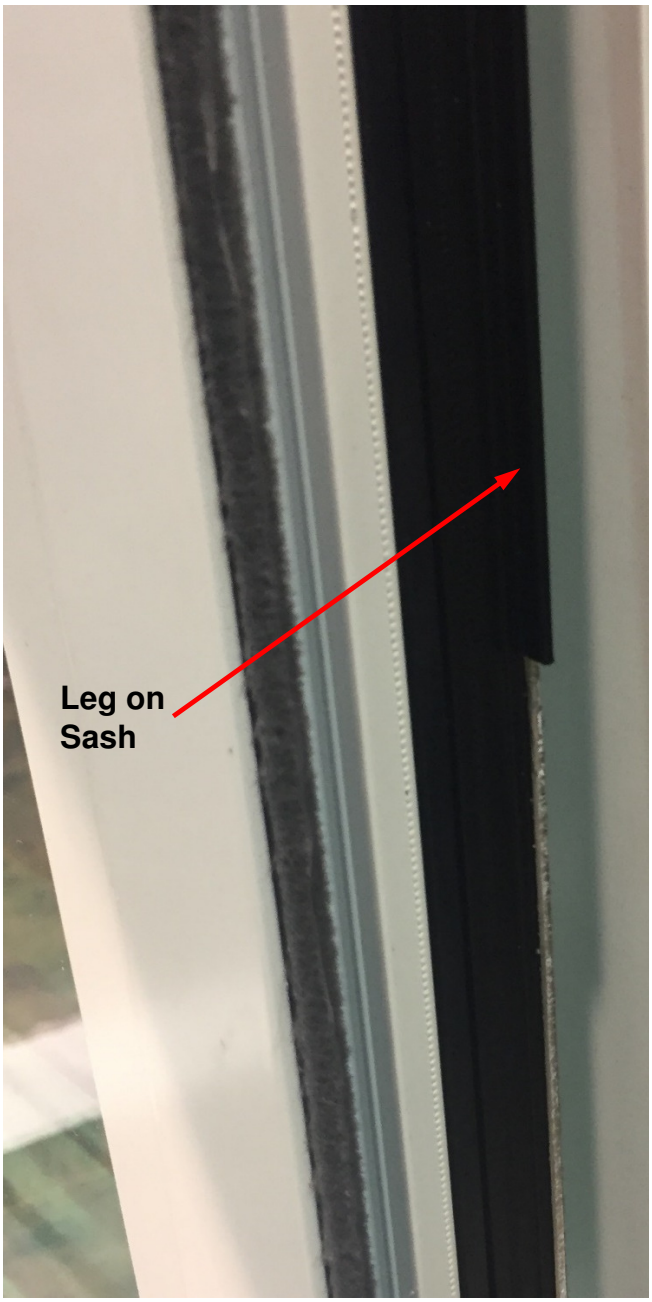
Picture #41

Single and Double Hung Windows

Tilt Load Sash (Continued)

F. If the window uses anti-bow clips, the sash will have a leg on the top half of the sash (See Picture #42) and the jambs will have the anti-bow clips (See Picture #43).

G. When installing the sash, the leg on the sash will have to rotate into the jamb above the anti-bow clip. When the sash is lowered, the leg on the sash has to be between the anti-bow clip and the center leg of the jamb. If the sash doesn't operate correctly, remove the sash and re-install.



Picture #42

Picture #43

Single and Double Hung Windows

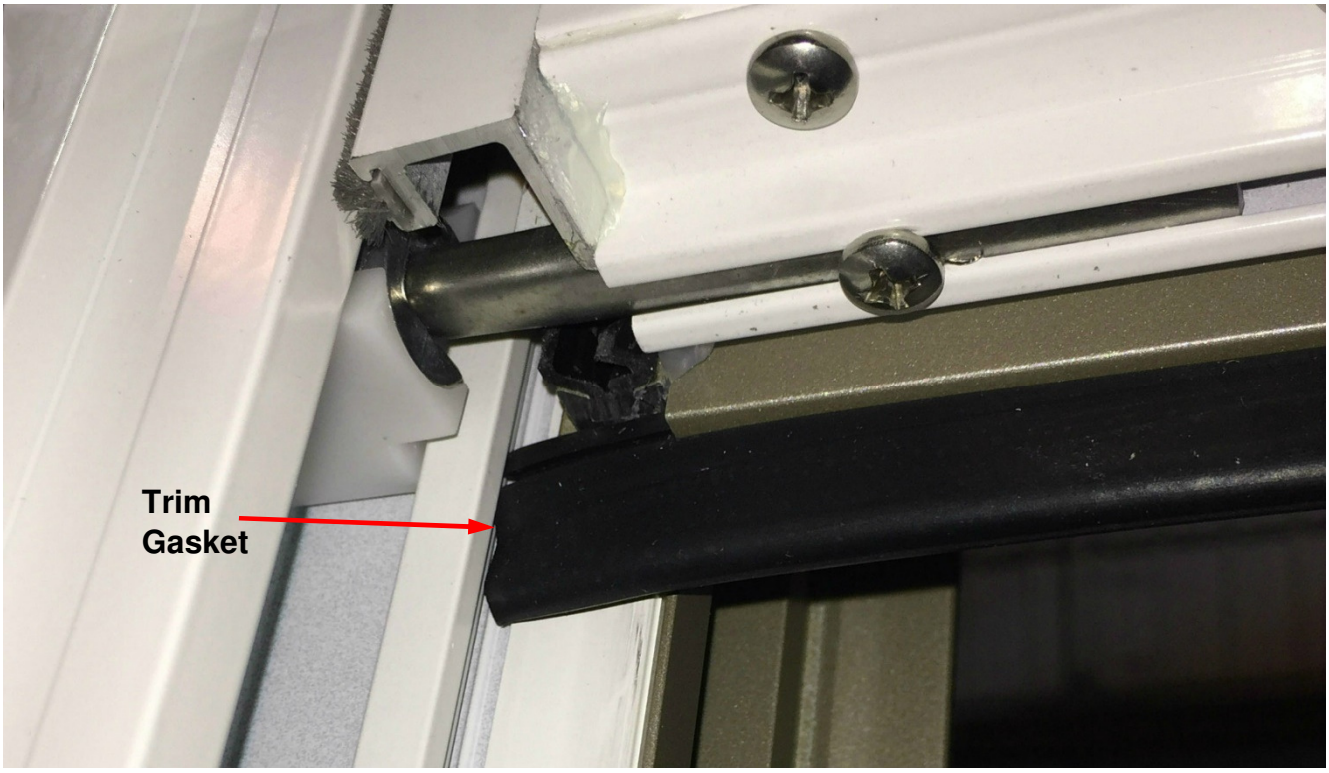
Tilt Load Sash (Continued)

H. Once the sash is fully seated in the window frame, slide the tilt latches until they are fully engaged in the jambs, and hand tighten the tilt latch set screws (Do not use power tools) (See Picture #44).

I. Check the operation of the sash.

J. After installing the bottom sash, the gasket on the bottom rail will need trimmed so it is just touching the edge of the jamb (See Picture #45).

Picture #44



Picture #45

Single and Double Hung Windows

Balance Replacement For Side Load Sash

WARNING: *Balances are under tension. Use caution when handling them.*

Block and Tackle Balances

A. Remove the sash by reversing the process on pages 11 and 12.

B. Firmly hold the balance and pull it down, so it disengages from the balance clip. Then slowly, allow the balance to release its tension. There is a hook that goes through the frame at the bottom of the balance. Release the hook from the jamb.

C. Install the new balance by reversing the process in step B (above).

D. Re-install the sash by following the process on pages 11 and 12.

Class V Balances

A. Remove the sash by reversing the process on pages 13 and 14.

B. Use pliers to remove the Tamper Lock (See Picture #20) from the balance.

C. Using a balance tool (See Picture #46), hook the pins on the balance rod that engage the sash carrier (See Picture #47). While firmly holding the balance tool (The balance will try to unwind), pull the balance rod down and out of the sash carrier.

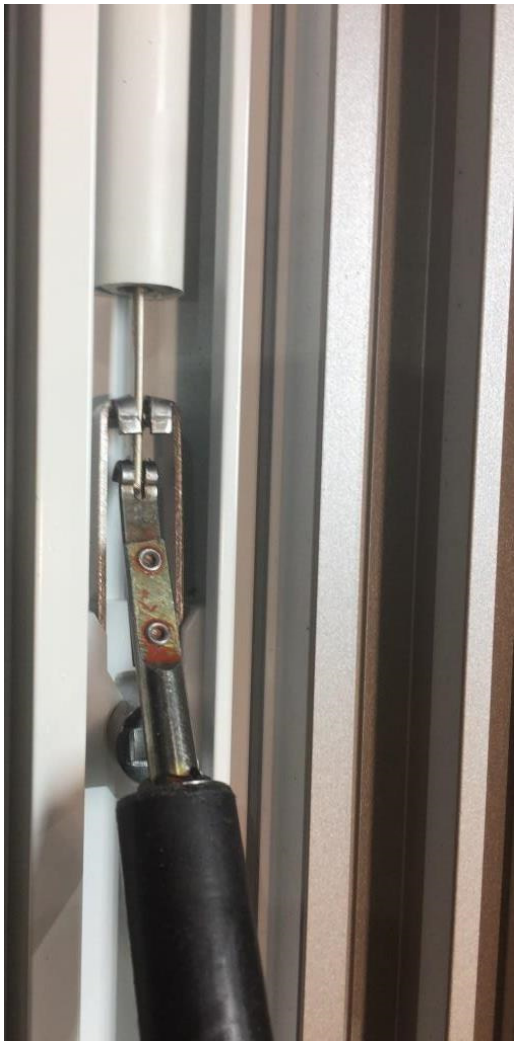
D. While preventing the balance from unwinding, allow the balance rod to retract into the balance. The balance rod should lock into the balance without unwinding. Once the balance rod is locked in place, the balance tool can be removed.

E. Remove the screw at the top of the balance and remove the balance.

F. New Class V balances come pre-tensioned. Once attached to the jamb, and the balance rod is unlocked from the balance, DO NOT ALLOW THE BALANCE TO UNWIND.

G. Attach the balance rod to the sash carrier and re-install the sash by following the process on pages 13 and 14.

Picture #46



Picture #47

Single and Double Hung Windows

Balance Replacement Tilt Sash

WARNING: *Balances are under tension. Use caution when handling them.*

Block and Tackle Balances

A. Remove the sash by reversing the process on pages 18 through 20.

B. Using needle nose pliers, unhook the balance from the pivot shoe assembly. Grasp the balance cord and pull a small amount of slack. Disengage the hook from the shoe using a flathead screwdriver. Slowly allow the cord to retract into the balance housing.

C. Remove the screw at the top of the balance housing to remove the balance from the jamb.

D. Reverse the steps in B and C to reinstall the new balance.

E. Re-install the sash by following the process on pages 18 through 20.

Class V Balances

A. Remove the sash by reversing the process on pages 18 through 20.

B. Use pliers to remove the Tamper Lock (See Picture #41) from the balance.

C. Using a balance tool (See Picture #48), hook the pins on the balance rod that engage the sash carrier (See Picture #49). While firmly holding the balance tool (The balance will try to unwind), pull the balance rod down and out of the sash carrier.

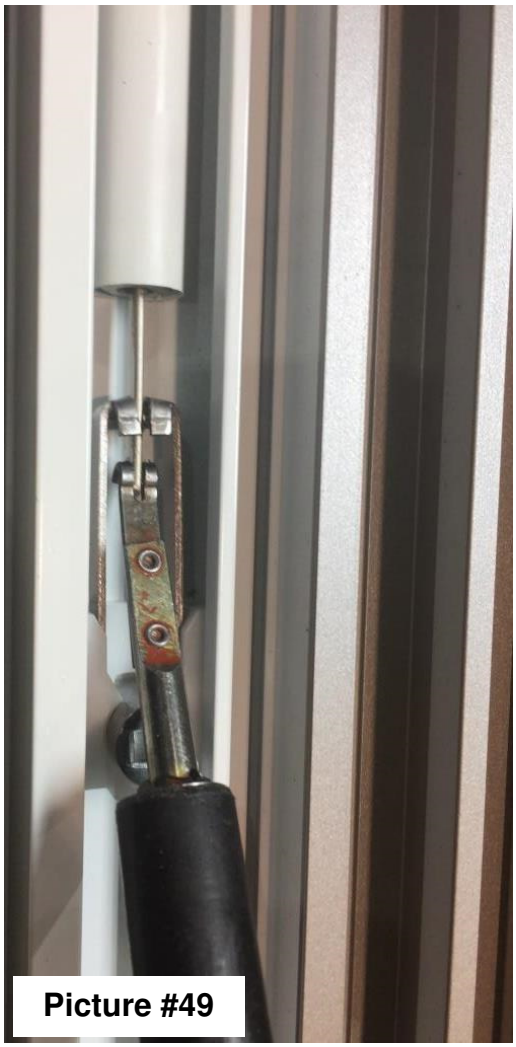
D. While preventing the balance from unwinding, allow the balance rod to retract into the balance. The balance rod should lock into the balance without unwinding. Once the balance rod is locked in place, the balance tool can be removed.

E. Remove the screw at the top of the balance and remove the balance.

F. New Class V balances come pre-tensioned. Once attached to the jamb, and the balance rod is unlocked from the balance, DO NOT ALLOW THE BALANCE TO UNWIND.

G. Re-install the sash by following the process on pages 18 through 20.

Picture #48



Picture #49

Single and Double Hung Windows

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 sash 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 off 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. Check the operation of the sash. If the operation is difficult, lubricate the jambs with a non-petroleum-based lubricant, such as spray silicone.

Screen Installation

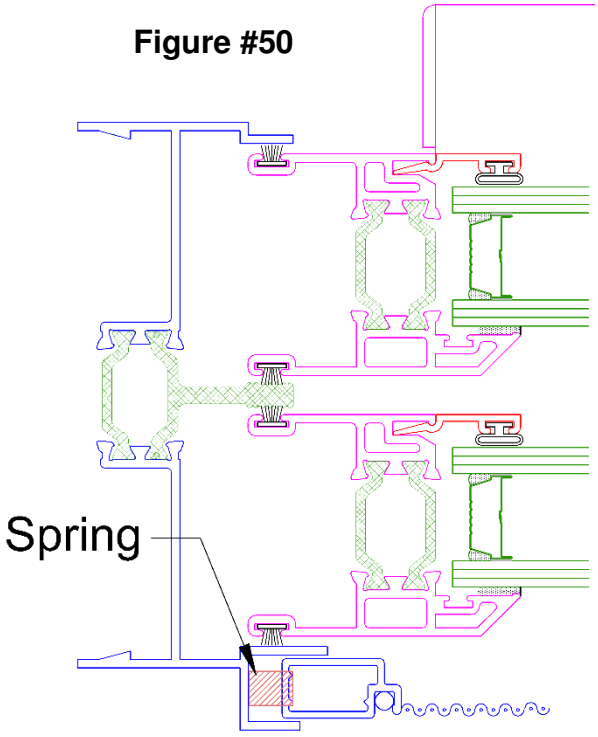
Graham offers two different screen options for the hung windows. The following are basic instructions for each type.

Spring Clip Screen - These screens have spring clips on one side of the screen frame. Side load the screen member with the spring clips first, and then rotate the screen while holding pressure on the screen clips.

Single Hung Screens - Some single hung screens have a screen track at the meeting rail. Push the top of the screen up into the screen track at the meeting rail and rotate the bottom into the track on the sill.

Security screens are usually attached at the factory; therefore, these instructions do not include the installation of those products.

Figure #50



Single and Double Hung Windows

Guardian Panels

Graham offers guardian panels on the hung windows, which are glazed panels that are installed into the interior glazing bead. They can have blinds in between the guardian panel and the window glazing. The blinds can be pivoted but cannot be raised or lowered once the guardian panel is closed. The blinds have to be lowered by the installer before the panel is closed. These are the instructions for dealing with these panels and the blinds.

A. NEVER lift the window or sash with suctions cups on the guardian panel.

B. If the window has blinds, the blinds will be secured in the raised position with either rubber bands or zip-ties. DO NOT remove the rubber bands or zip-ties until the windows and sash are installed (See Pictures #51 and #52)

C. The guardians are sometimes shipped separately from the window. If it is installed in the window, the panel will have to be removed to lower the blind.

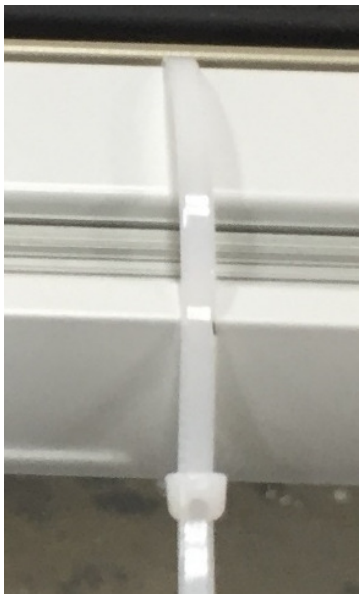
D. If there are blinds, they will be attached to the windows frame or sash. Hold onto the pull string, and then remove the rubber bands or zip-ties and carefully lower the blind until it is at the bottom of the windows frame or sash.

E. Make sure there are setting blocks in the bottom channel that the guardian sits in.

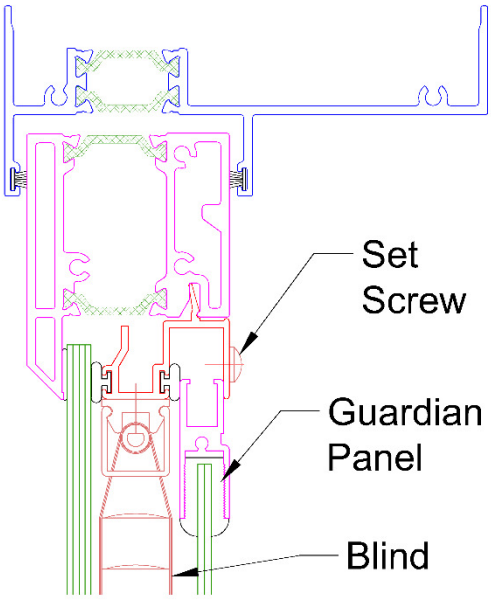
F. Lift the top of the panel into the top channel and rotate the guardian panel into the frame or vent.

G. Lower the panel into the bottom channel and install the set screw into the top channel (See Picture #53).

Picture #51



Picture #52



Picture #53