GRAHAM
ARCHITECTURAL PRODUCTS

1551 MT. ROSE AVENUE
YORK PA 17403-2909

(717) 849-8100

GENERAL INSTALLATION GUIDELINES

For

Receptor Systems

Approved 08/31/2018

Installation Guideline Disclaimer

This document contains general installation guidelines of the Graham products and does not address each particular condition or installation. Shop drawings installation details may vary from these Guidelines as these Guidelines do not address every possible 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. Also sealant compatibilities should be addressed by the sealant manufacturers. Sealant application details should be reviewed by the sealant manufacturer. This document does not address the connection between the window system and the building weather barrier system and should be reviewed by the waterproofing consultant. It is generally recommended that insulation be installed in all voids of a thermally improved systems, 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.

INSTALLATION INSTRUCTIONS – RECEPTORS

A. HANDLING – SORTING – PROTECTING ALUMINUM WINDOWS

Windows are finished products and must be protected against damage. The following precautions are recommended to assure early acceptance of your products and workmanship:

1. HANDLE CAREFULLY – DO NOT DROP. Stack with adequate separation so windows will not rub together, including any protruding hardware such as handles and butt hinges. Do not use the hardware or grids for lifting or manipulating the window. Do not install the screens until after the windows are installed.

2. Protect windows from moisture and dirt prior to installation. It is important that all windows not installed, are protected from direct contact with rain, snow, or ice so as to protect the finish of the product.

3. Protect from construction debris, cement, plaster, terrazzo, and other construction materials containing alkali which, when mixed with moisture, can be deposited on aluminum or glass surfaces. This must be removed immediately to prevent damage to the finish of the aluminum or to the clarity of the glass. Construction debris in hinges and operators can affect the operation of the window.

4. CAUTION – Windows are not to be used as ladders, scaffolds, or supports. Operable windows must be closed and locked at all times to prevent damage to windows. Under no circumstances are installed window or door openings to be used as construction entrances.

B. THE BASICS

The following practices are recommended for all window installations:

1. All materials are to be installed square, plumb, true, and level; within the maximum tolerances listed below: (Reference AAMA IPCB-08, chapter 11.3)

Unit Shimming Tolerance (+/-) Nominal			
	Inches / Foot	Inches Maximum	Method of Measurement
Level (Horizontal Measurement)	1/32"	1/8"	Level and steel rule or tape
Plumb (Vertical Measurement)	1/32"	1/8"	Level or plumb-line and steel rule or tape
True (In Plane Measurement)	1/32"	1/8"	Using strings across corners
Straight/True (Measure of Straightness)	1/64"	1/16"	Level or plumb-line and steel rule or tape
Square (Diagonal Measurement)	NA	1/8" * 1/4" **	Steel rule or tape

* Openings up to 20 square feet

** Openings over 20 square feet

Square: 1/8” for products less than or equal to 20 square feet; 1/4” for products greater than 20 square feet.

Plumb: 1/8” from vertical

Level: 1/32” per foot of unit width. 1/8” maximum

True (twist from in-plane): 1/8” maximum

Straight/True (Measure of Straightness): 1/16” maximum

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

3. Become thoroughly familiar with and install windows in strict accordance with APPROVED SHOP DRAWINGS, APPLICABLE STRUCTURAL CALCULATIONS, and INSTALLATION INSTRUCTIONS.

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

5. Make certain that all openings and the surrounding construction is in accordance with shop drawings. If any deviation is noticed in either dimension or construction (beyond acceptable construction tolerances) notify the general contractor IN WRITING, and resolve any differences BEFORE proceeding.

6. 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 instructions for proper usage.

7. All metal to metal, non-operating joints should be sealed by the installer with an approved sealant.

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

9. It is recommended that insulation be used between all perimeter frame members and the rough opening.

C. RECEPTOR INSTALLATION

1. General Instructions:

a. Measure and check the square of the window opening, and the level of the sill. If the opening is not square or level, the opening shall need modified. (Refer to section B.1 for tolerances).

b. Field cut all members true and square.

c. The standard install sequence shall be sill, head, and then jambs.

d. These instructions show the most common type of receptor installation. If the receptor is installed in an exterior set/install configuration (receptor clip on the exterior), some sealant details may differ.

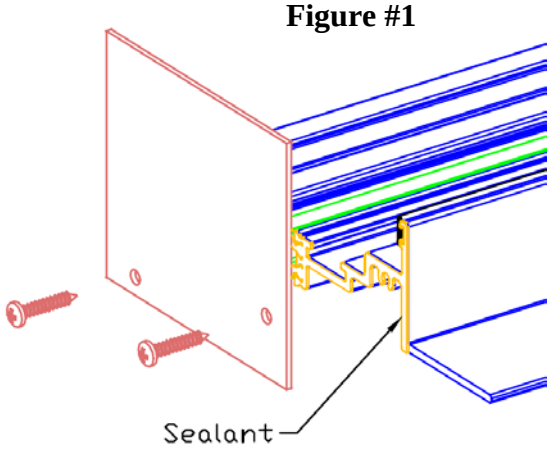
2. Sill Starter (Receptor) Installation:

a. The sill starter is the most important member of the receptor system. It must be set true and level with adequate support and properly sealed.

b. Cut sill starter extrusion smaller than the openings width, but not smaller than the window width. This gap (typically ½") is intended to accommodate the end dams, screw heads, and allow for expansion and contraction of the sill starter.

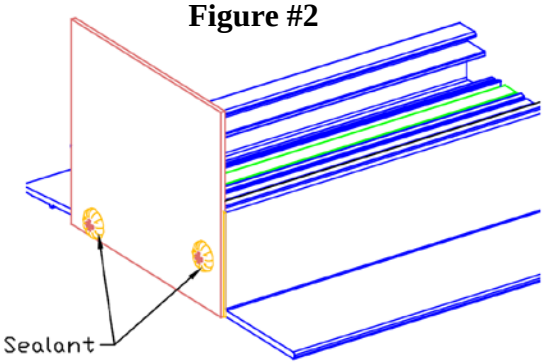
Note: If no jamb receptors are used; receptor system must be sized such that window openings (single or multiple) fit properly

Figure #1



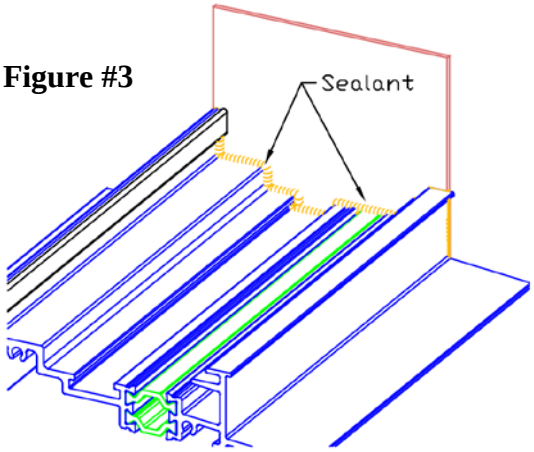
c. Butter the end of the sill starter with sealant and install end dams (see Figures #1 and # 2) with the fasteners provided.

Figure #2



d. Tool squeeze out, or add sealant to create a fillet bead between the end dam and the sill starter. (see Figure #3)

Figure #3



e. Install sill starter by method shown on shop drawings. Note the following:

1) Non-metal shims must be placed directly under each fastener to prevent sagging (continuous blocking is recommended).

2) Drill holes which are required for proper installation. Any holes that do not receive fasteners must be carefully sealed to prevent leakage. Recommended 18" on center minimum, or as per applicable structural calculations and approved shop drawings.

3) Thoroughly clean each fastener area per sealant manufacturer's recommendations then set all fasteners in sealant that penetrate sill starter. All fastener heads penetrating sill starter must be thoroughly sealed to prevent water penetration (see Figure # 4).

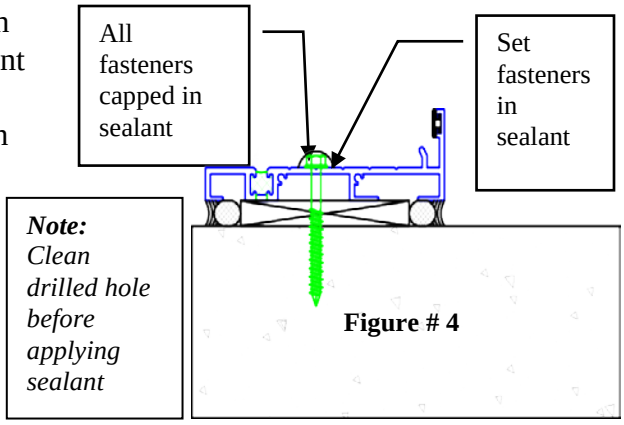


Figure # 4

4) If there is no jamb receptor, seal the top and front edge of the end dam to the rough opening. This sealant bead must tie into the sealant at the sill. (see Figure #5)

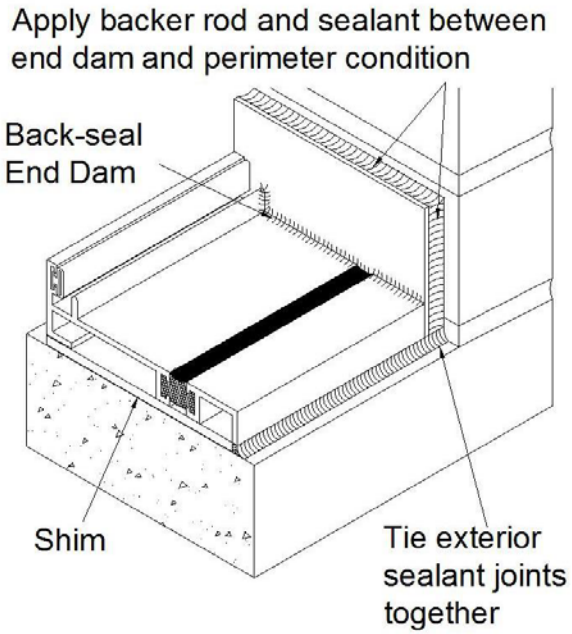


Figure #5

3. Head Receptor Installation:

a. If end dams are used at the head, cut extrusions smaller than the opening width (see section 2b); or as directed in the approved shop drawings to accommodate the end dams, screw heads, and allow for expansion and contraction.

Note: *Head receptor end dam is optional (if required per shop or contract drawings) special order part. Step b below is only if head receptor end dams are used.*

b. If head receptor end dams are required, butter the end of the head receptor with sealant and install end dams, if required, (see Figure # 6) with fasteners provided. Back seal the interior joint between the end dam and the head receptor.

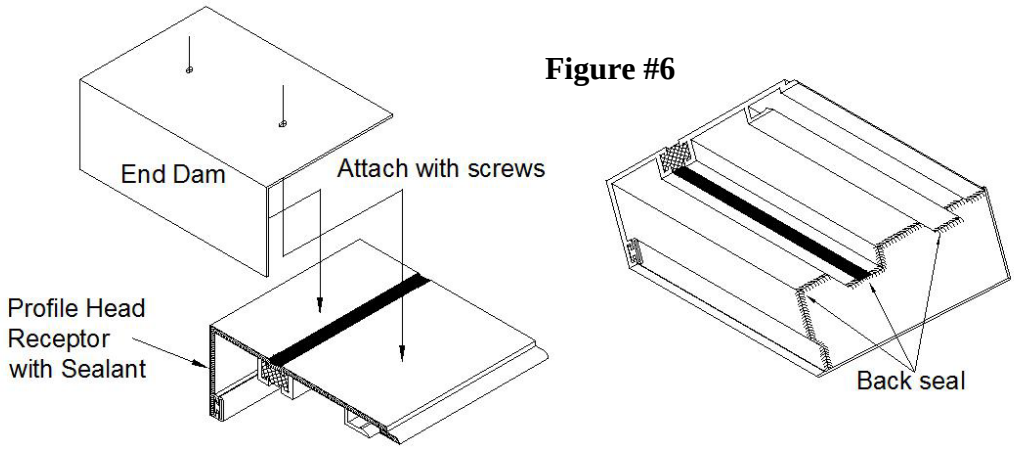


Figure #6

c. Install the head receptor by method shown on approved shop drawings. Note the following:

1) Drill fastener holes which are required for proper installation. Any holes that do not receive fasteners must be carefully sealed to prevent leakage. Recommended 18" on center minimum or as per applicable structural calculations and approved shop drawings.

2) Be careful when drilling or shooting an anchor not to pierce the building flashing system as this will cause water to penetrate the receptor system.

3) Shims must be properly placed under each fastener. Note: Shim head receptor sufficiently to maintain the proper penetration of the frame as shown on approved shop drawings.

4) Thoroughly clean area per sealant manufacturer's recommendations, then set all fasteners in sealant that penetrate head receptor.

5) The head receptor should be installed level and plumb to the sill starter (refer to section B.1 for tolerances). ***Note:*** *use plumb bob, laser, or equivalent, to properly position head member in relation to sill.* (See Figure #7)

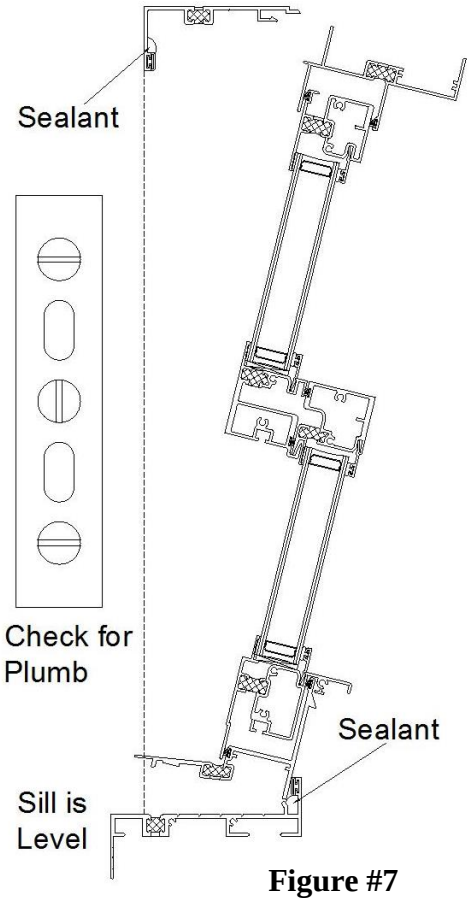
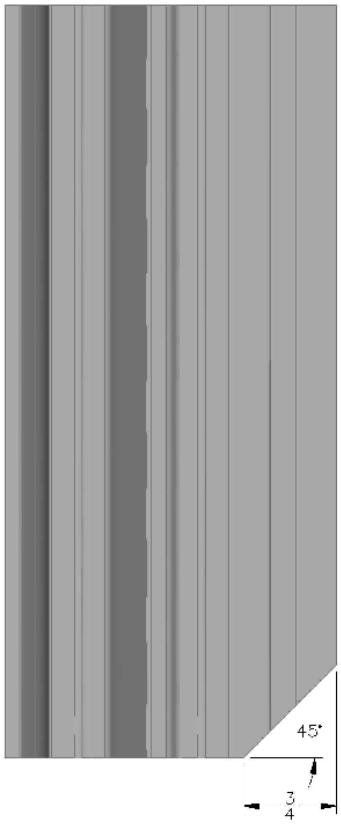


Figure #7

4. Jamb Receptor Installation:

Figure # 8



a. Cut jamb receptor to correct length.

b. Field notch bottom of jamb receptor as delineated in figure #8

c. Install jambs by method shown on shop drawings. Note the following:

1) Drill only holes which are required.

2) Shim jamb receptor at each fastener location to be plumb and true with head and sill members.

3) Butter the top edge of the end dam where it will make contact with the jamb receptor.

4) Seal ends of jamb receptor to sill starter and end dams (see Figures #9 and # 10).

5) Seal ends of jamb receptor to head receptor end dams, if applicable (see Figure # 11).

6) All fastener heads must be thoroughly sealed to prevent water leakage.

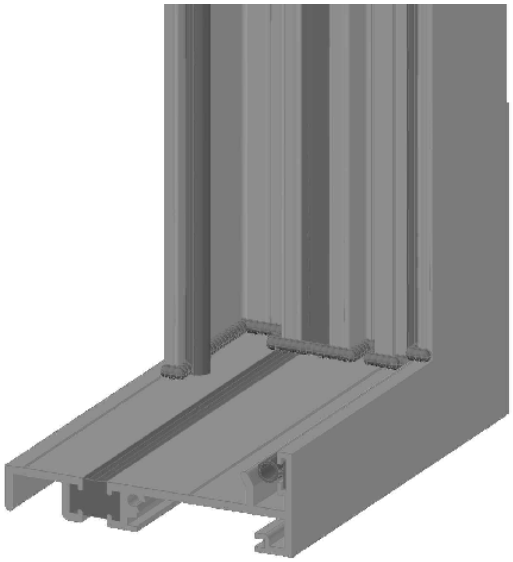


Figure #9

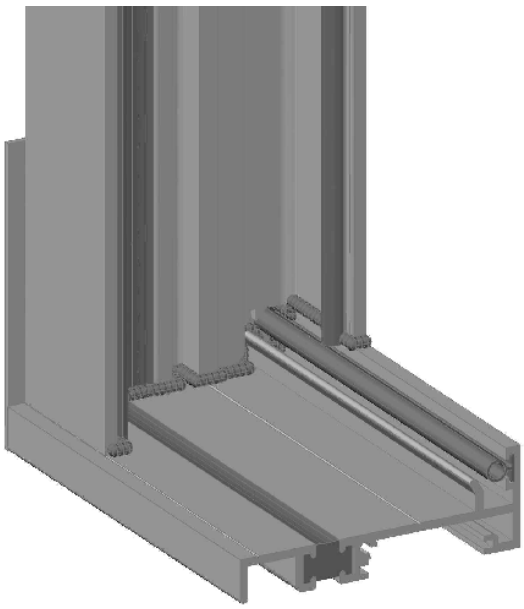


Figure #10

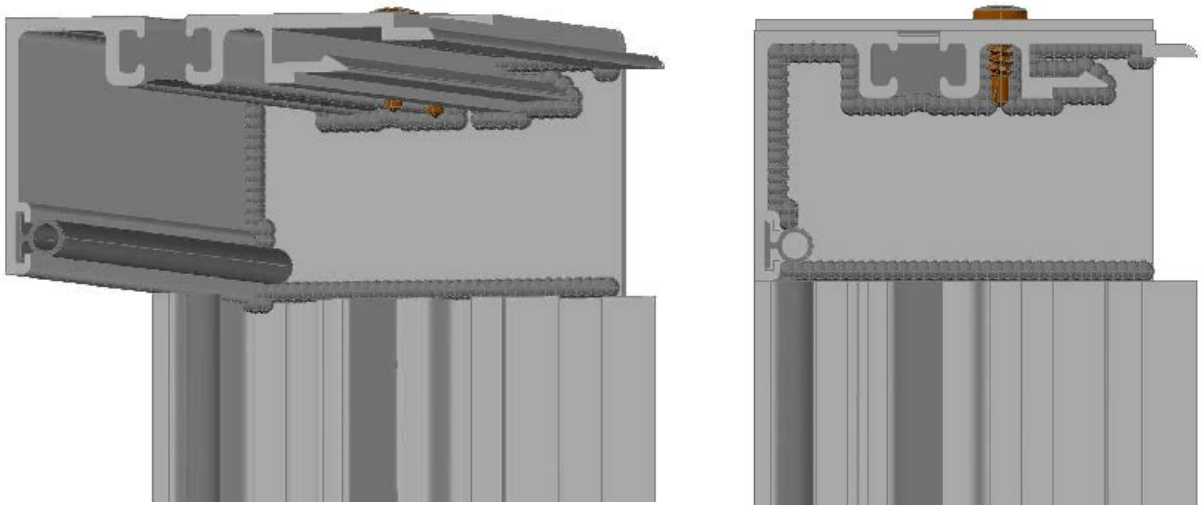


Figure #11

5. Splice Plates

General Instructions: Splice plates may be required when more than one length of receptor is required. Several options are available, detailed below is the GAP recommendation.

Sill Starter Splice Plates (Non-weeped)

a. Place the sill starter interior splice plate where the splice will occur, and seal the plate to the rough opening.

b. Install the sill starters, allowing ¼" space between extrusions for expansion and contraction.

c. Place backer rod in the joint between the sill starters and apply a sealant joint.

d. Apply a bead of sealant approximately 1" from each end of the sill starters, and install the sill starter exterior splice plate.

e. Splices should not occur directly under a mullion.

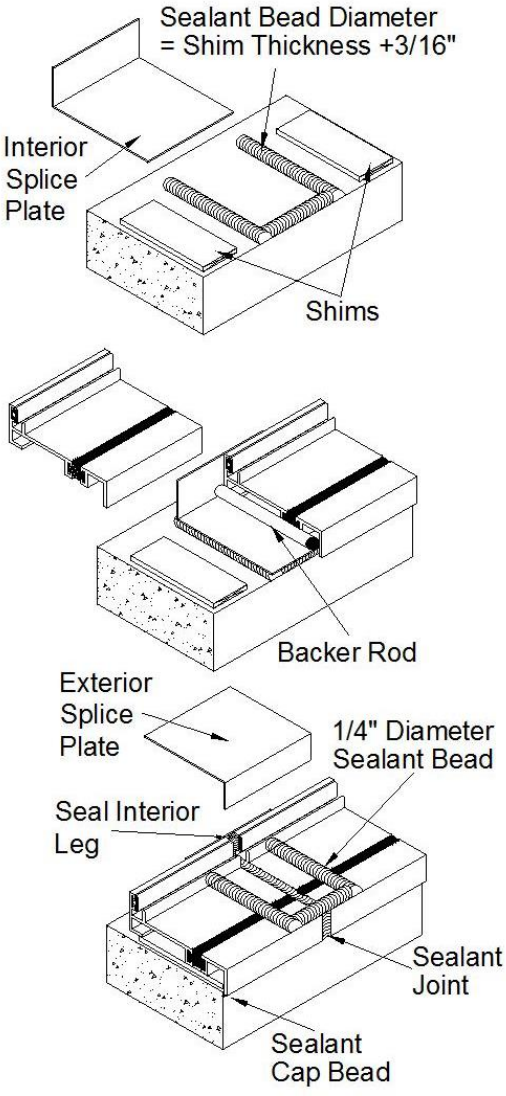


Figure #12

Sill Starter Joints (Tank type sill starter)

Note: *Although slice plates can be made for weeped sill starters, it is not recommended. The procedure below is the recommended method.*

a. Cut two sill end plates to allow the sill of the window to be installed over it.

b. End one receptor and apply sill end plates as described in section C.2 above.

c. Leaving ½" gap between the sill starters, start another sill starter using the sill end plates as described in section C.2 above.

d. Using backer rod, seal the end plates to each other.

e. Back-seal the end dams. After the windows are installed, seal the interior legs of the sills together.

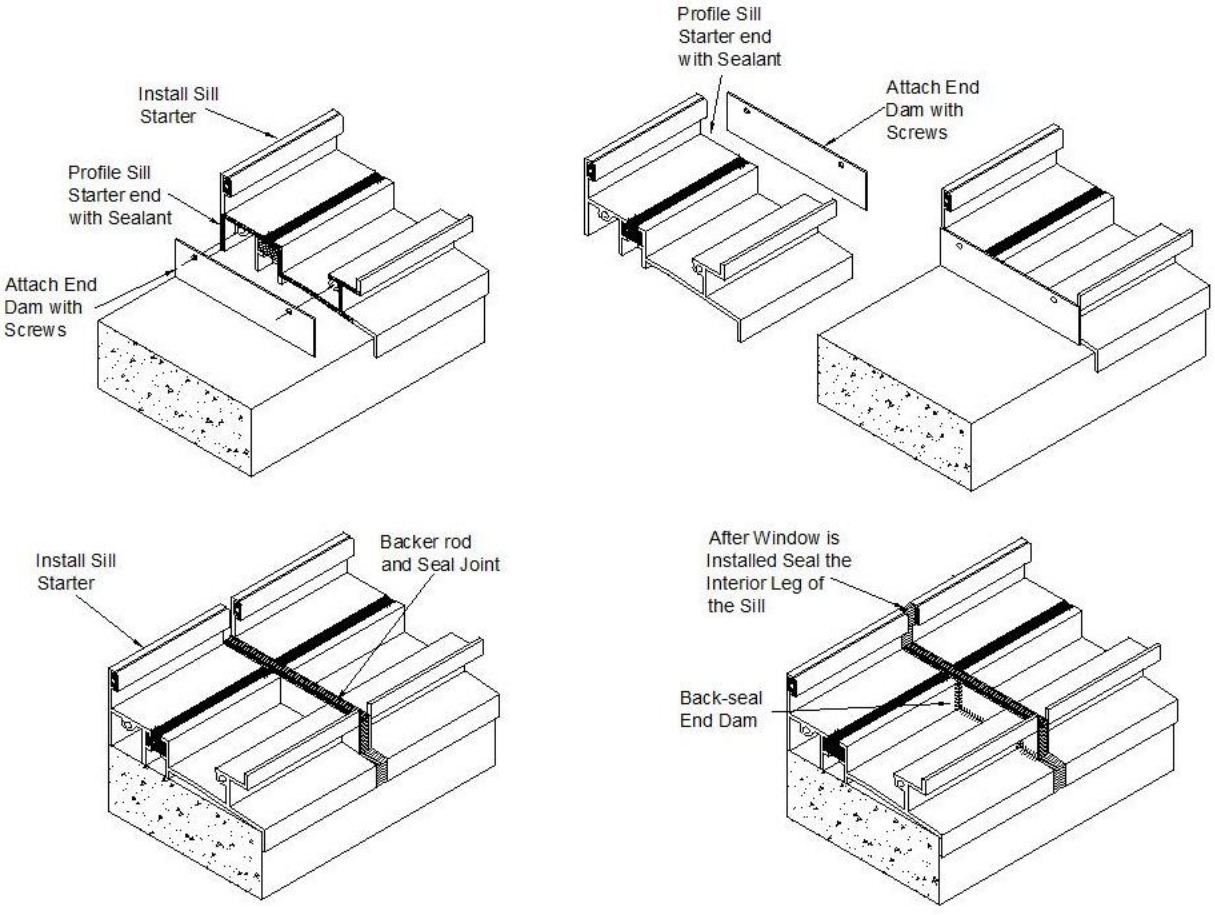
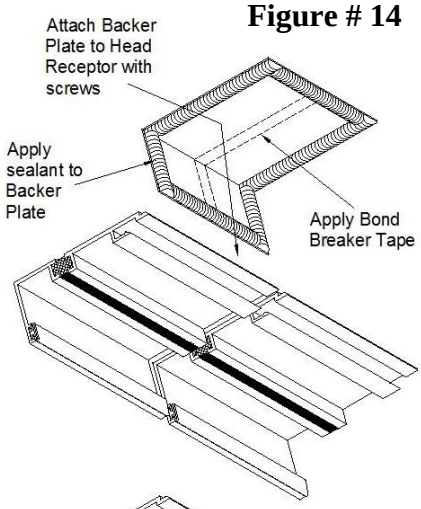


Figure #13

Figure # 14



Head Receptor Splice Plates

a. The receptor clip splice should never occur at the same location as the splice for the head receptor. Receptor clips can be butted together and sealed.

b. Place sealant to the perimeter of the receptor splice plate, and bond breaker tape to the center of the splice plate as shown in figure #14

c. Allow ¼" space between the head receptors for expansion and contraction.

d. Seal the edges of the head receptors as shown in figure # 15.

e. Splices should not occur directly at a mullion.

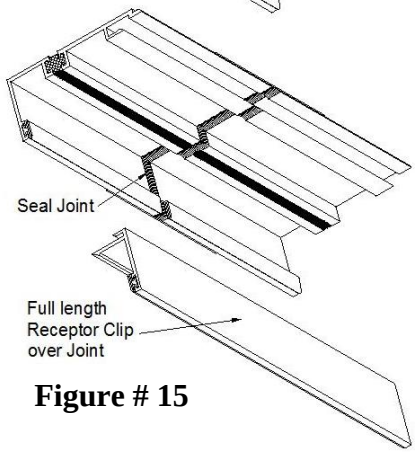


Figure # 15

6. Vertical Mullions

a. Locate mullions as required.

b. Cut mullion to correct length by cutting the top portion of the material. Notch bottom end if required so mullion fits squarely on sill starter.

c. Use anchor clip provided to secure head and sill, if required. Screws through sill must be thoroughly sealed. Place generous amount of sealant over and around pre-drilled holes prior to placing anchor clips. Cover screw threads and underside of the clip with sealant then fasten clip in place. Apply sealant around complete perimeter of clip at sill. Seal over screw (see Figure #16)

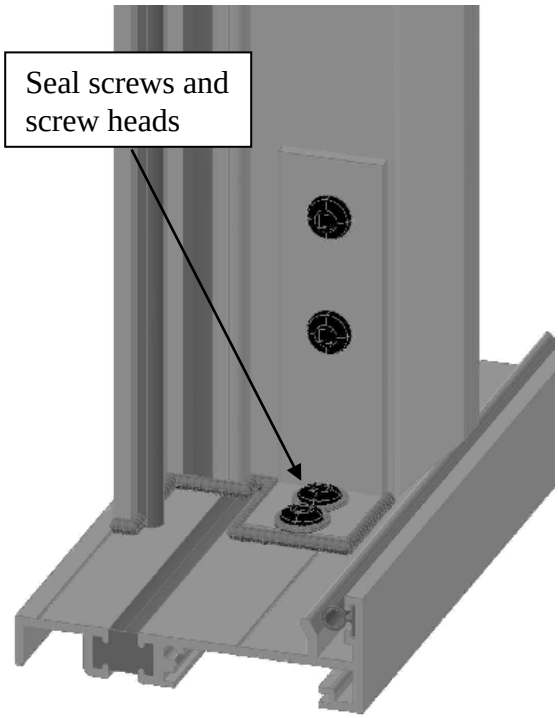


Figure #16

E. WINDOW INSTALLATION

Note: *See Details 1, 4, 6, and 7 on page 17 for sealant application options.*

1. The windows are now ready to be installed into the receptor system. Consult the "Maintenance Manual" for the window series specified on the shop drawings for any glazing or hardware instructions.

2. Most windows will need to have blocking or shims between the window frame and the receptor system. Vertically swinging products (casements, swing doors, tilt-turn, etc.) will need cross-blocking and anchoring, as a minimum, to prevent the windows from shifting out of square within the receptor system when they are opened. (See Figure #17)

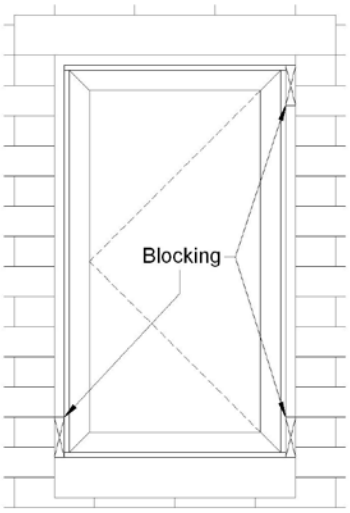


Figure #17

3. Install a bedding bead of sealant to the bulb gasket of the exterior leg of the receptor (head and jambs). (See Figure #18)

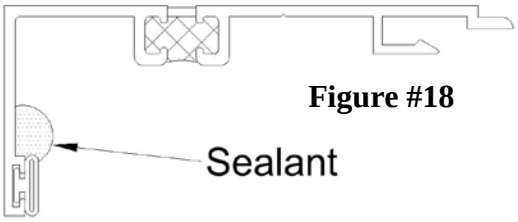


Figure #18

4. Install a bead of sealant on the sill starter where interior leg of window sets in the sill starter. Fill this trough continuously to the end dam. (See Figure #19)

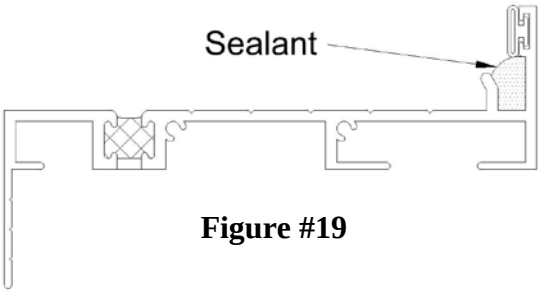


Figure #19

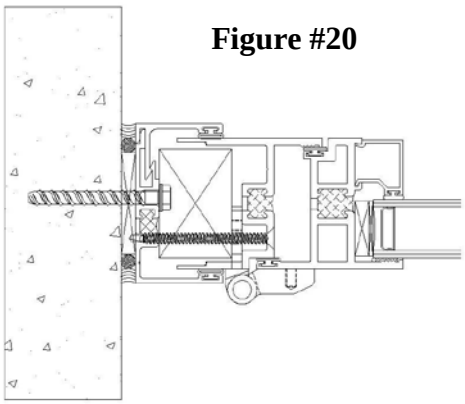
5. Set window frames into receptor as indicated on approved shop drawings.

Note: *Temporary clips 1" long can be used during window installation to prevent units from being blown in by wind gusts. These temporary clips must be removed prior to installing full receptor clips.*

6. Install windows square, level and plumb (refer to section B.1 for tolerances).

7. If the product uses butt hinges, fasteners must be applied close to the hinges and the lock points. Hung windows will need blocking at the ends of the meeting rails to prevent bowing of the jambs. Sliding windows and doors will need blocking at the jambs to prevent the product from shifting out of square. (See Figure #20)

Figure #20



F. MULLION INSTALLATION (If applicable) - When mullions are used these steps shall be followed.

1. If horizontal mullions are being used, set bottom window frames into receptor as indicated on approved shop drawings.

2. Depending on the project requirements, this mullion may have to be anchored to the jambs of the opening. Contact GAP Engineering for further information.

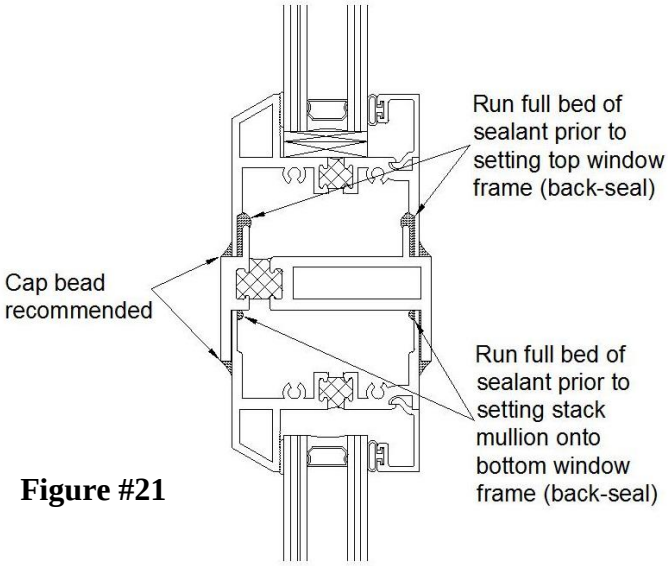


Figure #21

3. There will be a total of 4 lines of sealant used for this process as indicated in Figure #21.

4. Once the bottom frame is set in place locate the pre-cut stack mullion for the window mark.

5. Using compatible silicone sealant run two full, uninterrupted beads at areas indicated in Figure #22. The stack mullion has been turned upside down in this figure to make this sealing easier.

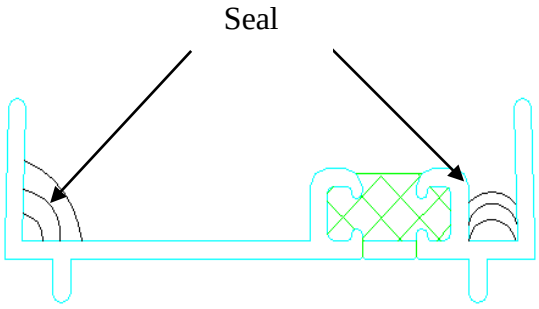


Figure # 22
Stack mullion turned upside down

6. Flip stack mullion to proper orientation such that seals just placed are facing downward.

7. Install stack mullion onto top of bottom window frame as show in Figure #24.

8. If required by the project requirements, install brackets to the ends of the mullion, and to the jambs of the opening.

9. Using compatible silicone sealant run two full, uninterrupted beads at areas indicated in Figure #23.

10. If indicated on approved shop drawings, using same sealant as above, seal any voids at ends of stack mullion.

11. Set top window frame onto stack mullion as shown in Figure #24.

12. Tool and wipe any excess sealant from stack joints.

13. If vertical mullions are being used, install the pressure plate at this time. Fasteners are to be no more than 16” apart, or as per applicable structural calculations and approved shop drawings. Care must be taken to insure butt joint between sill starter and pressure plate is thoroughly sealed and at least up 3” of the window to pressure plate joint. (See Figure #25).

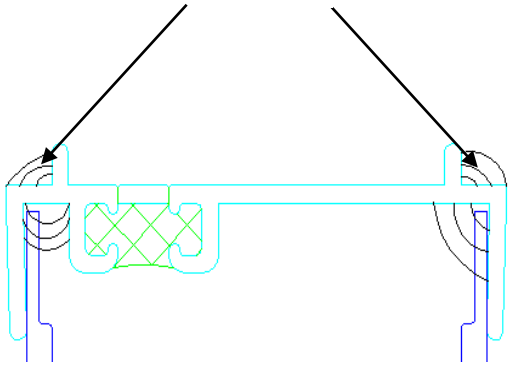


Figure # 23
Stack mullion on bottom window frame

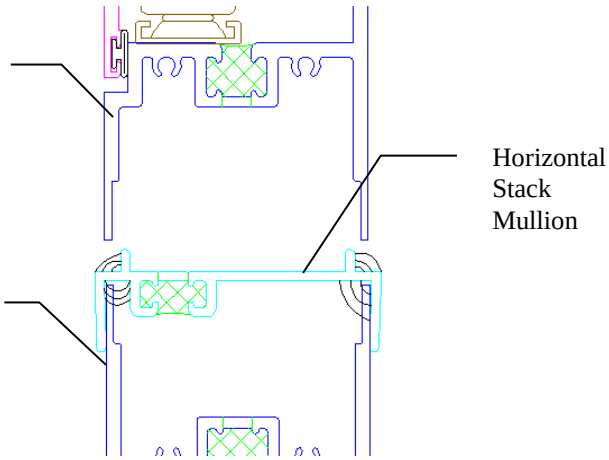


Figure # 24
Top Window frame set in place

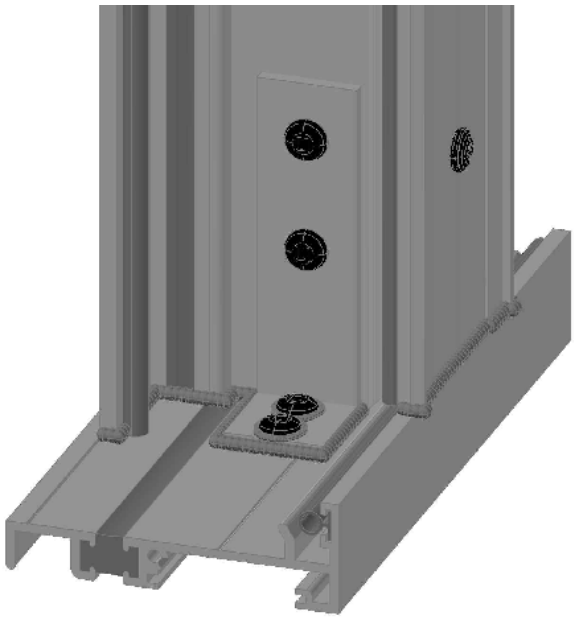


Figure #25

G. WINDOW SEALING

1. Apply sealant at lower 6” (min.) of jamb receptor at area that receives the receptor clip (see Figure #26 – arrow #1). Fill the clip receiver gap and apply sealant between receptor and end dam (see Figure #26 – arrow #2). ***Note:*** *This step is not necessary if the receptor is installed in an exterior set/install configuration (receptor clip on the exterior).*

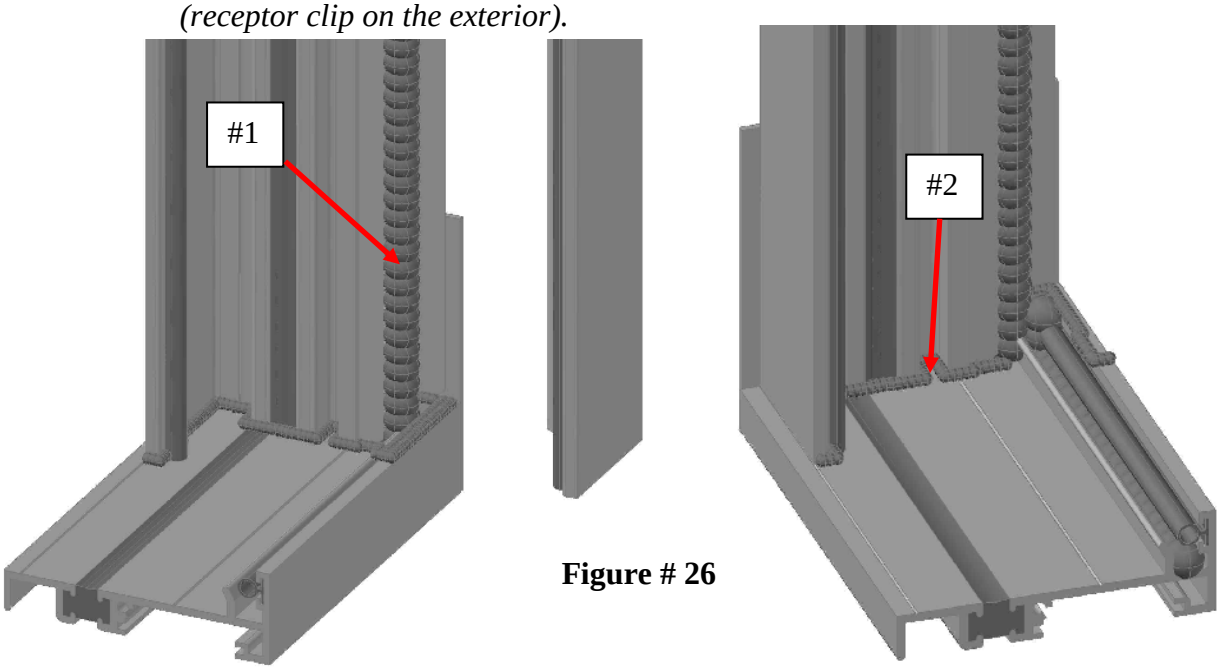


Figure # 26

2. Depending on project requirements a sill dam may be necessary at the bottom of the jambs, apply sealant as follows:

   a. Build a dam with sealant approximately 1” high bridging the gap from window to receptor base. Be certain to overlap window frame and top of the sill starter interior leg as well as to the receptor (See Figure #27).

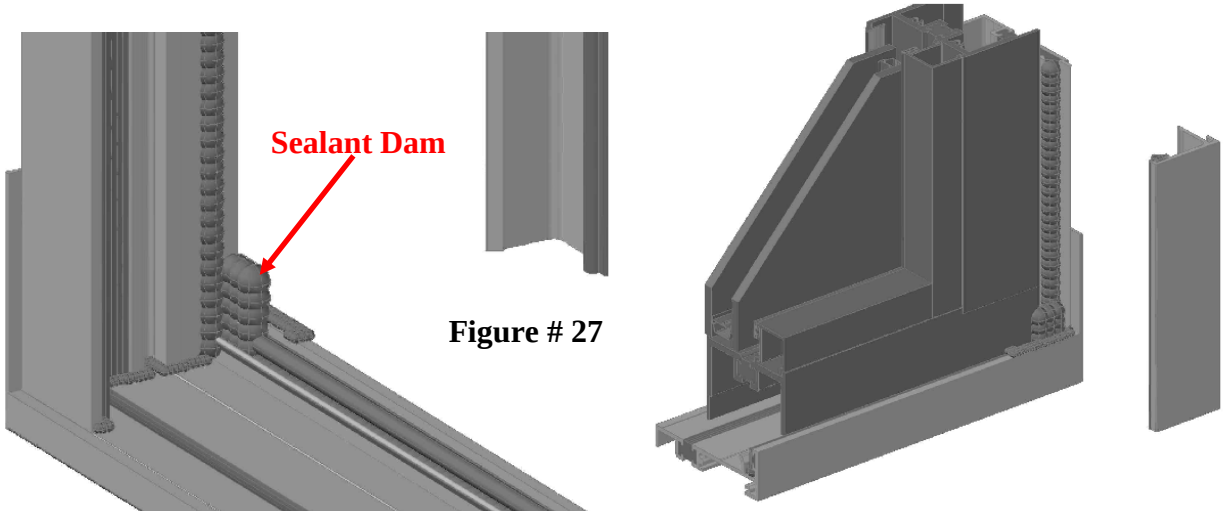


Figure # 27

3. Insert the receptor clips at a slight angle and drive on using a wood block until snapped-in-place (See Figure #28). The butt joint where the clip meets the sill starter must be sealed and at least 3” up the clip to the window joint.

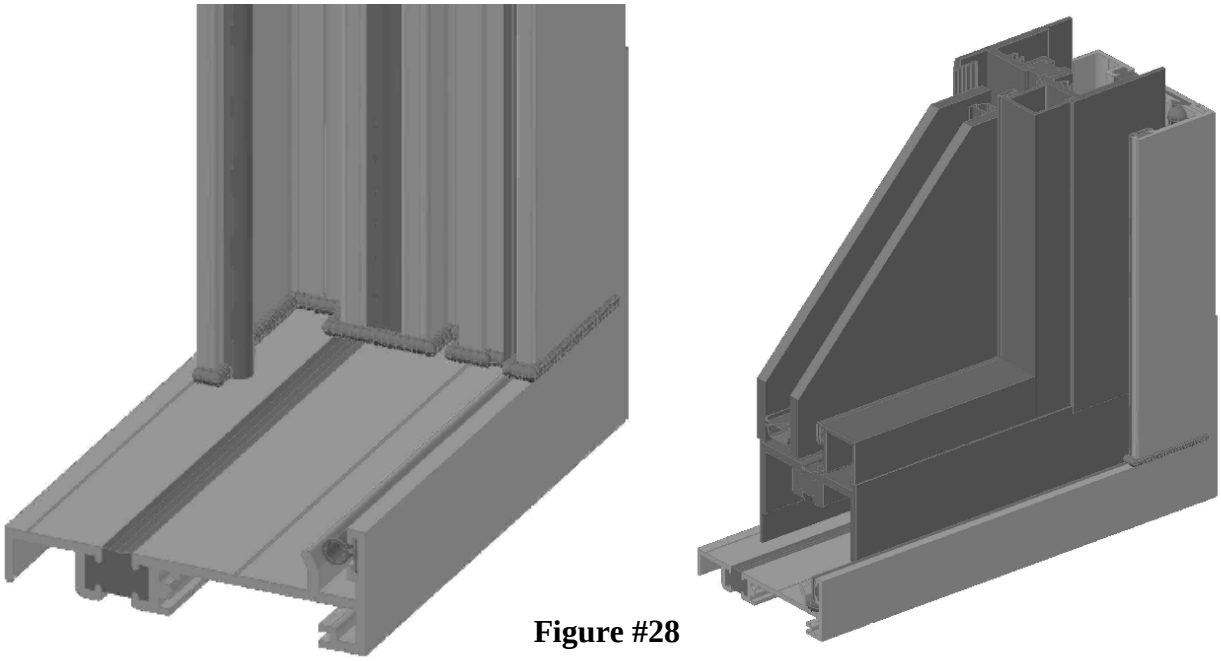


Figure #28

4. Apply all interior perimeter sealant as required and shown on the approved shop drawings.

5. Apply a cap bead to the joint between the exterior leg of the receptor and the window (or door) frame at the head and jambs (See Figure #29).

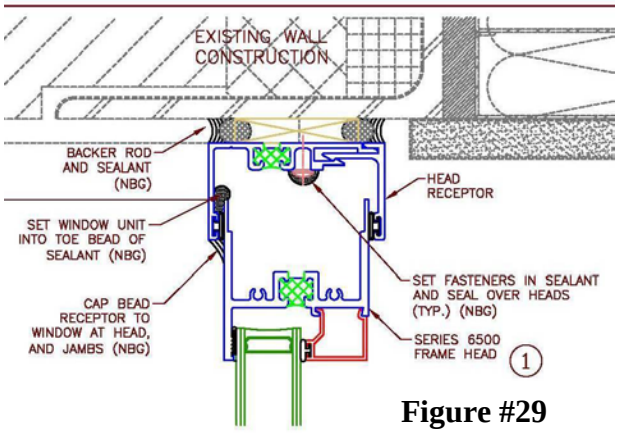
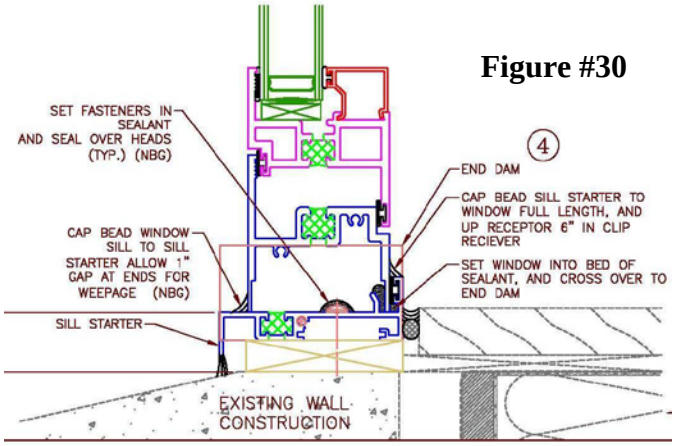


Figure #29

6. Also apply a cap bead to the joint between the interior leg of the sill starter and the sill of the window (See Figure #30).

7. Apply a cap bead between the sill starter and the exterior leg of the sill, leaving 1” weeps at each end, for drainage from the sill starter. (See Figure #30)

Figure #30

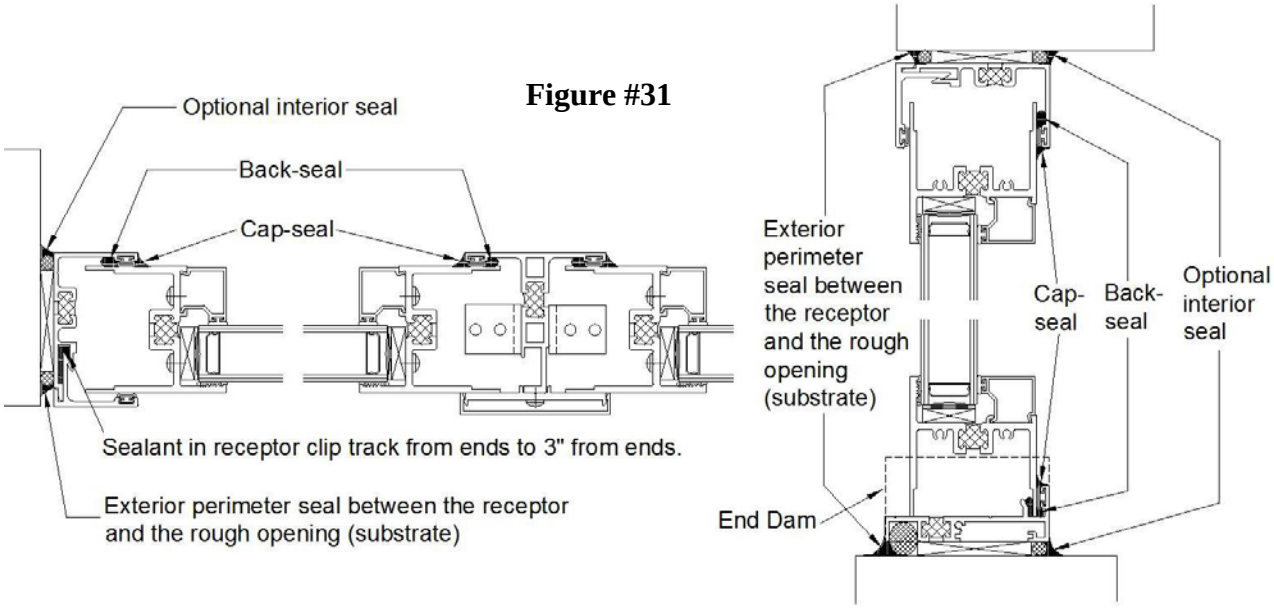


H. WINDOW SEALING FOR EXTERIOR SET RECEPTORS

Note: *If the receptor is being installed so that windows will be installed from the exterior (With receptor clip on the exterior), that installation of the receptor is similar to the installation described previously, with a few exceptions listed below. (See #3 below).*

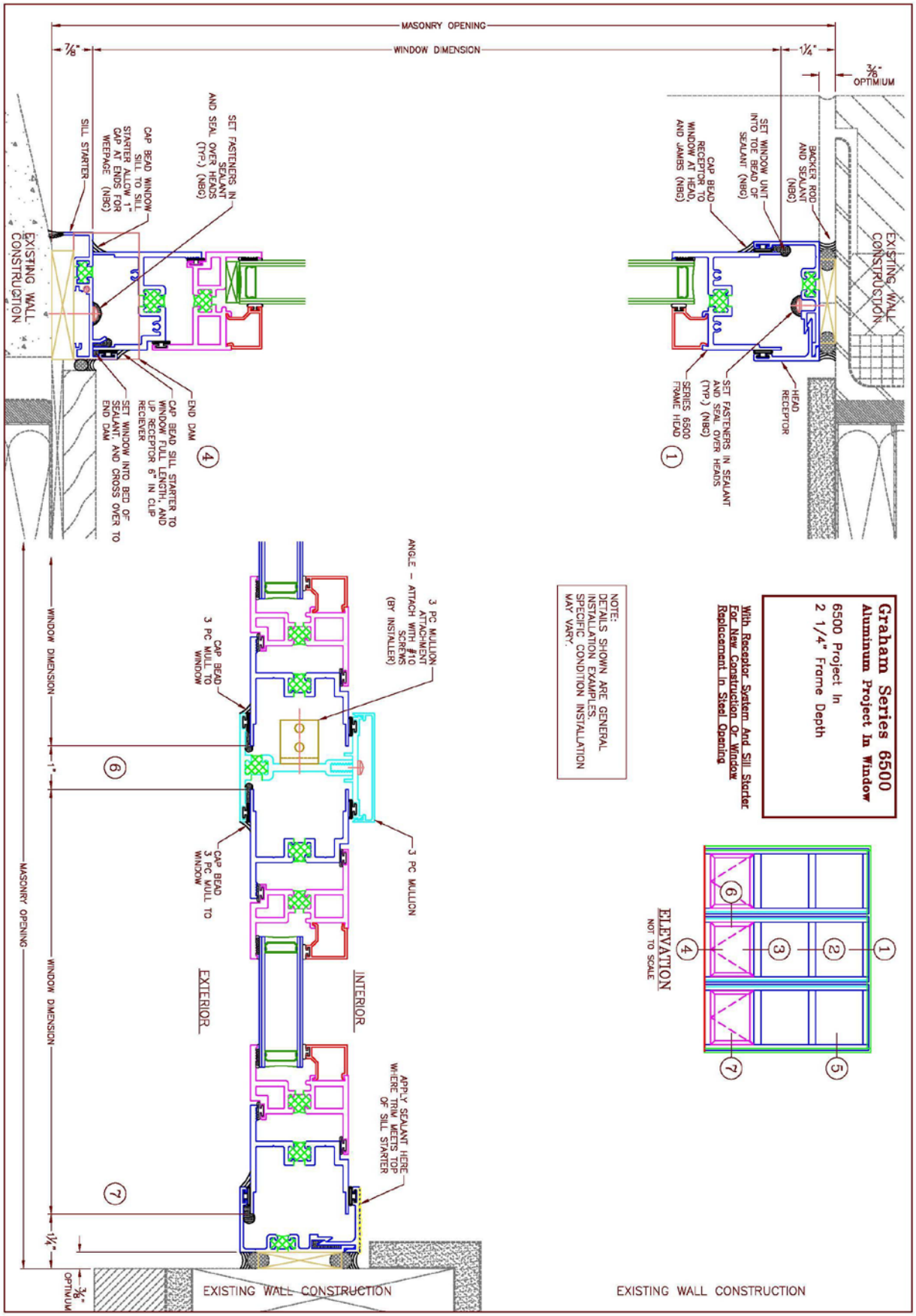
1. The exterior perimeter seal between the receptor and the rough opening must be to the receptor, and not to the receptor clip. An interior perimeter seal is optional. (See Figure #31)
2. If the wall is a cavity wall (double wall), in addition to the sill end dams, end dams at the head receptor will be needed.
3. The interior leg of the receptors, mullions and the sill starter are back-sealed to the interior leg of the window frame. Apply these full length seals to the receptor, prior to setting the window. This joint should also be cap-sealed on the interior. (See Figure #31)
4. The exterior legs of the window do not need sealed to the receptor, mullions, or sill starter.
5. Sealant is recommended in the receptor clip track at each end, starting at the end of the receptor clip and continuing 3” along the clip (See Figure #31).

Figure #31



Project conditions may vary from information foreseen in the writing of this document.

The following page (page 18) delineates a typical sill and jamb receptor with 3-piece vertical mullion installation.


Graham Series 6500
Aluminum Project In Window
6500 Project In
2 1/4" Frame Depth
With Receptor System And Sill Starter
For New Construction Or Window
Replacement In Steel Opening
NOTE:
DETAILS SHOWN ARE GENERAL
INSTALLATION EXAMPLES.
SPECIFIC CONDITION INSTALLATION
MAY VARY.
ELEVATION
NOT TO SCALE
MASONRY OPENING
WINDOW DIMENSION
7/8"
1/4"
3/8" OPTIMUM
SILL STARTER
CAP BEAD WINDOW SILL TO SILL STARTER ALLOW 1" GAP AT ENDS FOR WEEPAGE (NBG)
SET FASTENERS IN SEALANT AND SEAL OVER HEADS (TYP.) (NBG)
EXISTING WALL CONSTRUCTION
END DAM
CAP BEAD SILL STARTER TO WINDOW FULL LENGTH, AND UP RECEPTOR 6" IN CLIP RECIEVER
SET WINDOW INTO BED OF SEALANT, AND CROSS OVER TO END DAM
CAP BEAD RECEPTOR TO WINDOW AT HEAD, AND JAMBS (NBG)
SET WINDOW UNIT INTO TOE BEAD OF SEALANT (NBG)
BACKER ROD AND SEALANT (NBG)
SERIES 6500 FRAME HEAD
SET FASTENERS IN SEALANT AND SEAL OVER HEADS (TYP.) (NBG)
HEAD RECEPTOR
3 PC MULLION ATTACH WITH #10 SCREWS (BY INSTALLER)
CAP BEAD 3 PC MULL TO WINDOW
3 PC MULLION
INTERIOR
EXTERIOR
APPLY SEALANT HERE WHERE TRIM MEETS TOP OF SILL STARTER
1"
1 1/4"
EXISTING WALL CONSTRUCTION
EXISTING WALL CONSTRUCTION