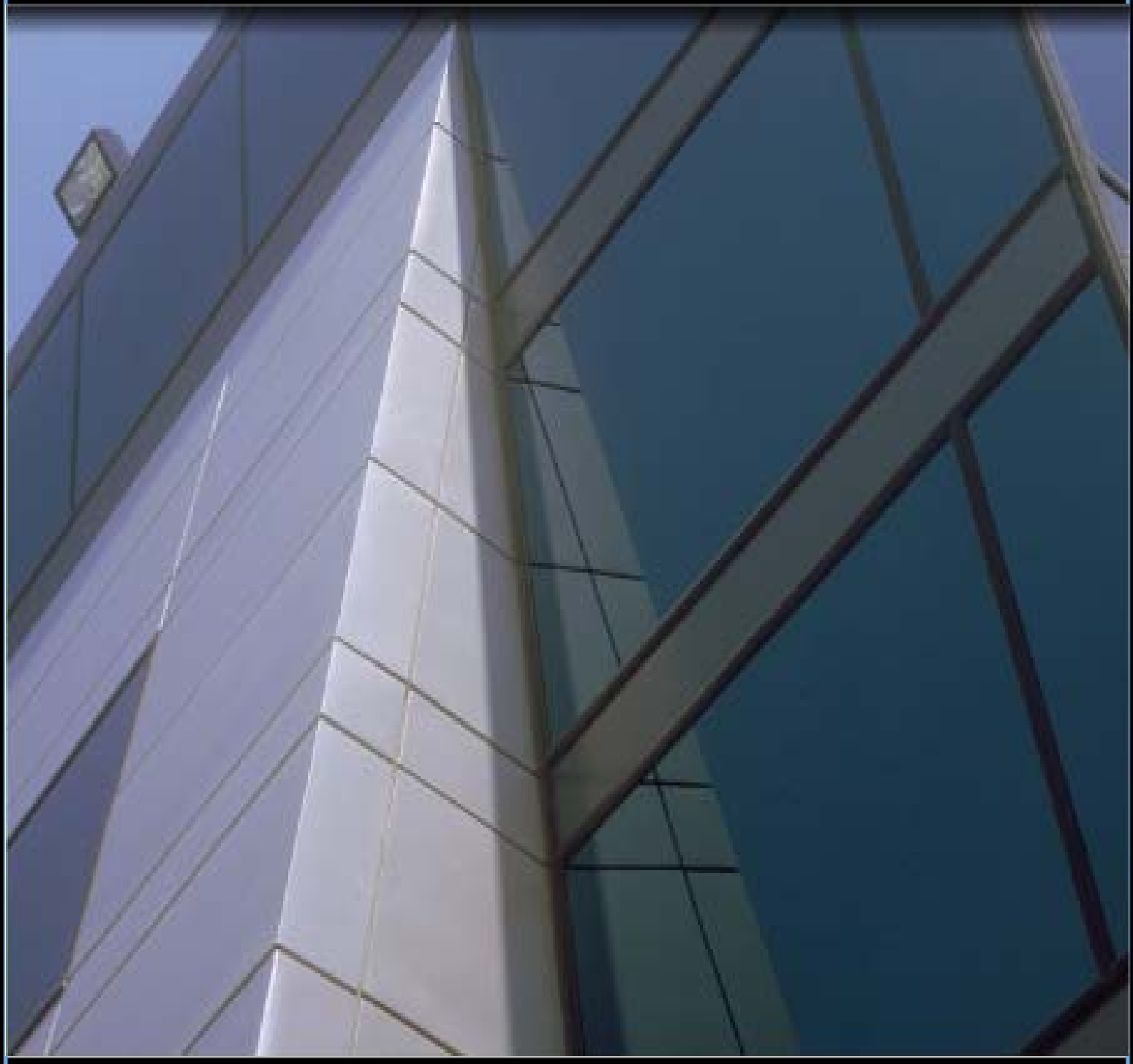
WINDOWS • CURTAIN WALLS • ENTRANCES • STOREFRONTS

SERIES 5900

SILICONE STRUCTURAL GLAZED CURTAIN WALL

INSTALLATION INSTRUCTIONS



Part NO. Y354

APRIL 12, 2019

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Minimizing Condensation

Note: Please reference EFCO's "Understanding Condensation" brochure which can be obtained through your EFCO representative.

Condensation will form on any surface when unfavorable conditions (interior temperature and relative humidity and exterior temperature) are present. When the formation of excessive condensation is a concern, it is highly recommended that a design professional is utilized to perform an analysis of the shop drawings to recommend the best possible installation methods. Please contact your EFCO representative for information on EFCO's Thermal Analysis Services.

Many current installation practices lead to an increase in the possibility of the formation of condensation. Though not all inclusive, the list of examples below illustrates conditions under which condensation is likely to occur:

1. Bridging system thermal break with non-thermally broken metal flashing or lintels that are exposed to the exterior
2. System exposure to cold air cavities
3. Interior relative humidity levels not maintained at recommended levels, see EFCO's "Understanding Condensation" brochure
4. Inadequate separation between system and surrounding condition at perimeter
5. Product combinations during the shop drawing stage that result in bridging thermal breaks of one or all products involved

Section I: General Notes & Guidelines

I. HANDLING / STORING / PROTECTING ALUMINUM - The following precautions are recommended to assure early acceptance of your products and workmanship.

A. HANDLE CAREFULLY - Store with adequate separation between components so the material will not rub together. Store material off the ground. Protect materials against weather elements and other construction trades.

B. KEEP MATERIAL AWAY FROM WATER, MUD, AND SPRAY - Prevent cement, plaster, and other materials from contacting with and damaging the finish. Do not allow moisture to be trapped between the finished surface and the wrapping material.

C. PROTECT MATERIALS AFTER ERECTION - Wrap or erect screens with plastic sheeting over material. Cement, plaster, terrazzo, and other alkaline materials are very harmful to the finish and are to be removed with soap and water before hardening. Under no circumstances should these materials be allowed to dry or permanent staining will occur.

II. GENERAL GUIDELINES - The following practices are recommended for all installations:

A. REVIEW APPROVED SHOP DRAWINGS – Become thoroughly familiar with the project. Shop drawings govern when conflicting information exists in these installation instructions.

B. INSTALL ALL FRAMING MATERIAL PLUMB, LEVEL, AND TRUE – Proper alignment and relationships to benchmarks and column centerlines, as established by the architectural drawings and the general contractor, must be maintained.

C. The sequence of erection should be coordinated with the project superintendent to prevent delays and minimize the risk of material damage. **Note: If preset anchors are required, coordinate and supervise anchor placement with the general contractor.**

D. Verify that all job site conditions and accompanying substrates receiving the installation are in accordance with the contract documents. If deviations occur, notification must be given **IN WRITING** to the general contractor and differences resolved before proceeding further with the installation in the questionable area.

E. Prevent all aluminum from coming in direct contact with masonry or dissimilar materials by means of an appropriate primer.

Section I: General Notes & Guidelines

F. Follow EFCO framing installation and glazing instructions.

G. Verify contents of all material shipments received upon arrival. Verify quantity and correct finishes. **NOTIFY EFCO IMMEDIATELY OF ANY DISCREPANCIES OR DAMAGE, THAT MAY HAVE OCCURRED.**

H. Throughout these instructions the term "**SEALANT**" will appear. For the purposes of these instructions, sealant is to be defined as the following:

SEALANT - A weather resistant, gunnable liquid filler which when cured provides a resilient, flexible (± 50% movement capability) air and water seal between similar and dissimilar materials.
All sealant must meet **ASTM C 920, CLASS 50.**

BUTYL SEALANT- A non-skinning, non-hardening material **(NAAMM Reference Standard 5C-1)**

NOTE: All sealant must be compatible with all surfaces where adhesion is required, including other sealant surfaces. All frame surfaces should be clean, dry, dust, and frost free. If a primer is required, it must be applied to clean surfaces. All perimeter substrates shall be clean and properly treated to receive sealant.

This system is designed and has been tested to utilize butyl or silicone sealants at all internal joineries, i.e., joint plugs, gasket intersections, etc.

Regardless of the sealant used, the customer should contact the sealant manufacturer to determine compatibility and adhesion. Follow sealant manufacturer's proper application procedures and quality assurance programs for weather sealing.

Maintain caulk joints as shown in the approved shop drawings. Unless specified otherwise, most sealant manufacturers recommend a 3/8" minimum perimeter caulk joint. A 3/4" minimum joint is recommended at the head condition to accommodate thermal expansion and contraction.

Anchoring surfaces of perimeter construction must be level and plumb within the adjustable limits of the head, jamb, and sill framing.

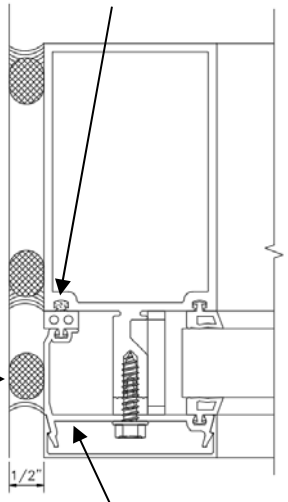
Section II: Perimeter Application

Perimeter Application

A.) For anchoring to perimeter and providing a spacer for glazing pockets at head, jamb, and sill.

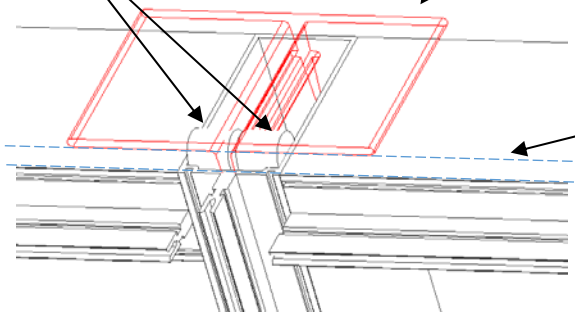
Note: Anchoring surfaces of perimeter constructions must be level and plumb within the adjustments of the head, jamb, or sill. See "APPROVED" shop drawings for adjustment limits.

Fill gasket race w/ sealant in top and bottom of each vertical mullion and marry with perimeter sealant



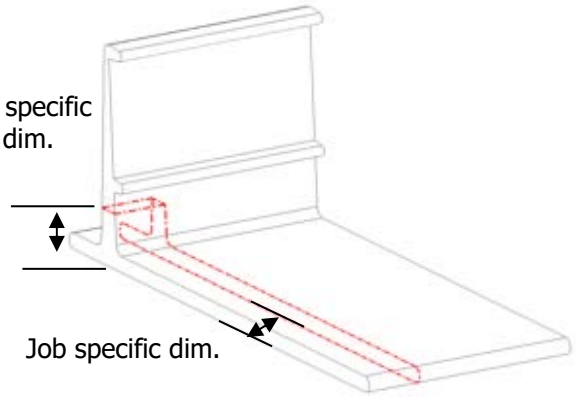
Plug open end of vertical each side of anchor stem to assist with carrying perimeter seal across the verticals. Head shown, sill similar. Plug material not by EFCO

"T" anchor at intermediate mullion. See approved drawings for fastener requirements

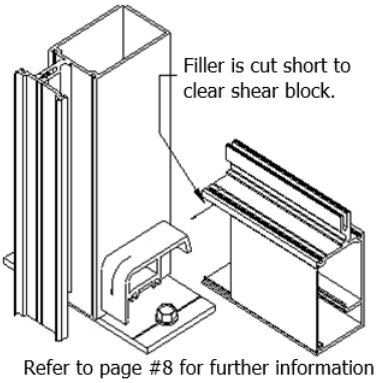


The erector must supply and apply bond breaker tape across the face of the anchor to prevent three-sided adhesion

Critical perimeter sealant is shown with two dotted lines.



Custom notch of F and T anchors for aiding sealant application shown with dashed line above is available (by request only) and subject to additional fabrication charge. Notch dimensions are not standard and job specific dimensions must be supplied.



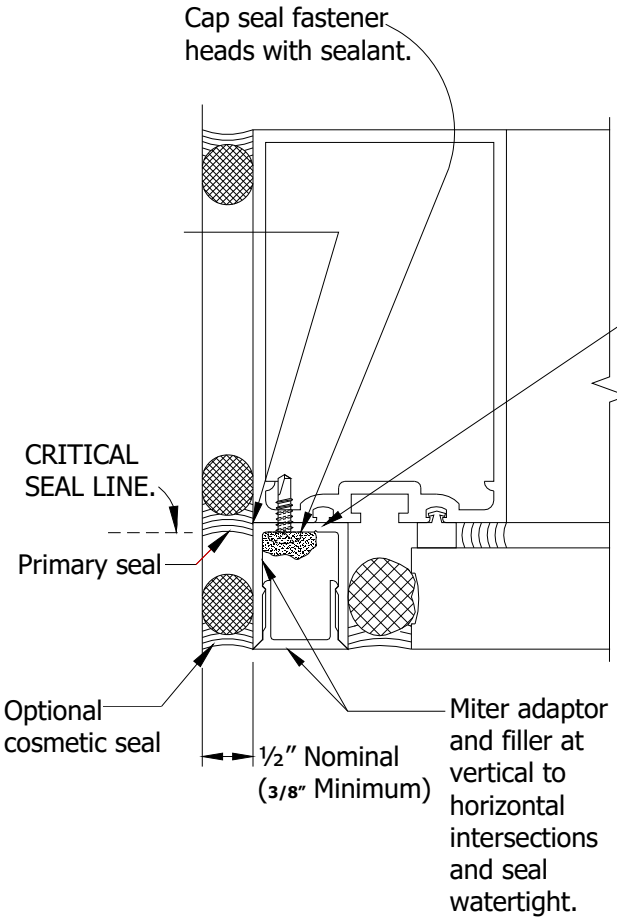
Refer to page #8 for further information on horizontal installation and sealant methods.

Note: The perimeter caulking must be done prior to glazing. Reference the "APPROVED" shop drawings for caulk joint size unless otherwise specified. Most sealant manufacturers recommend a 3/8" minimum joint width.

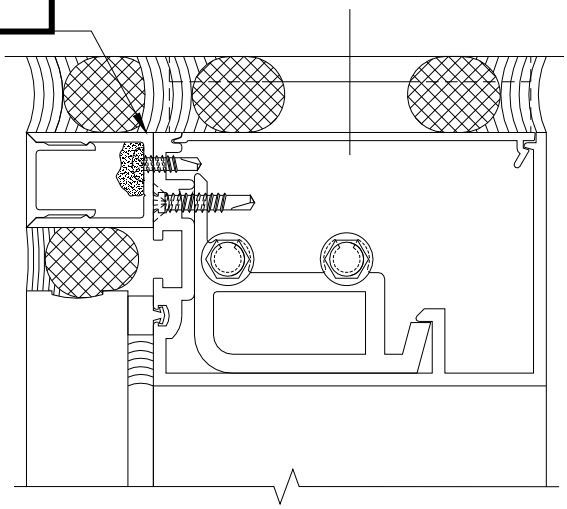
Section II: Perimeter Application

Optional Perimeter Mullions

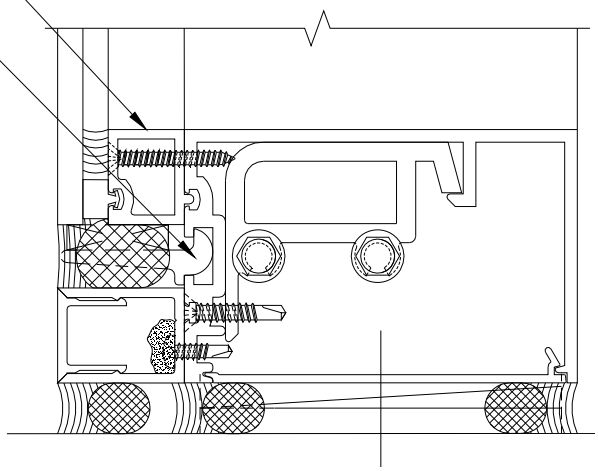
Note: The caulking must overlap the metal to metal joint at the critical seal line.



Note: Setting chair must be rolled into position before glazing adaptors.



Optional Perimeter Head Mullion



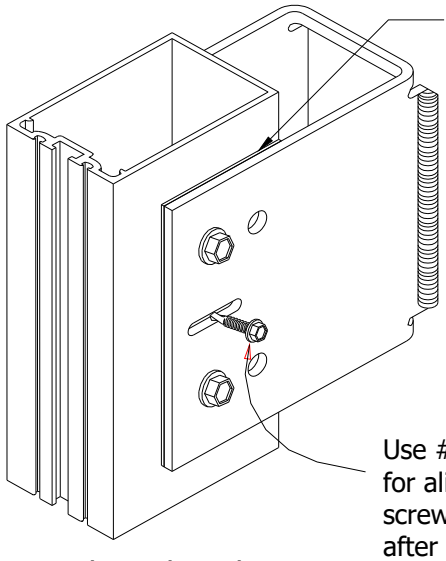
Optional Perimeter Jamb Mullion
Perimeter With Channel Adaptor Reveal

Optional Perimeter Sill Mullion

Section III: Anchor Installation

Anchor Installation

A.) Attach anchors to mullions with temporary alignment screws as shown below.
B.) Install the vertical mullions in position and attach anchors to the building structure per the "APPROVED" shop drawings.

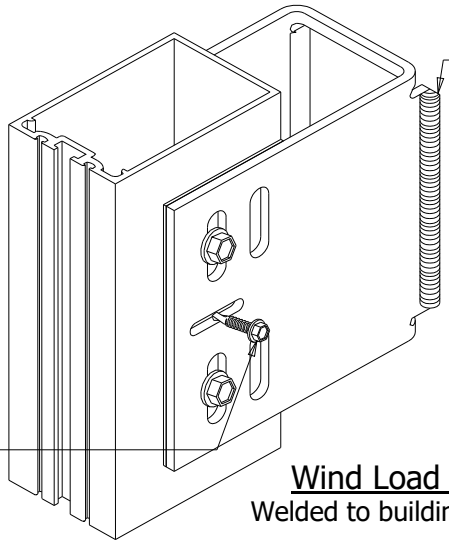


High impact polystyrene horseshoe shim

After final alignment of mullion, align drill mullion in best hole location. Note that the hole must be a minimum of 1 1/2" from the back of the mullion to clear the back flange of any steel reinforcement required for the job.

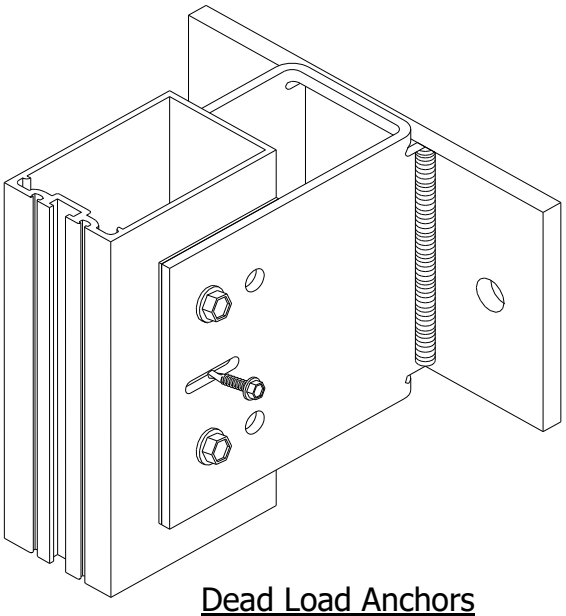
Use #12 X 1" Tek screw for alignment only. The screw must be removed after installation of the thru bolt at the wind load anchor to allow for thermal expansion and contraction.

Dead Load Anchors
Welded to building structure

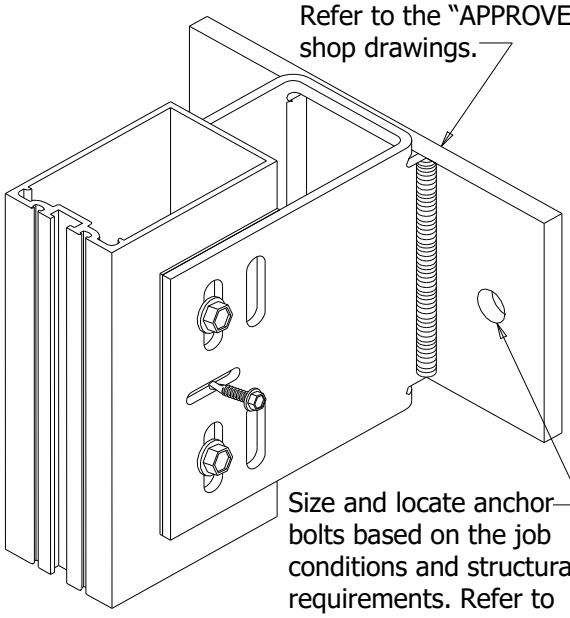


Weld to building structure per "APPROVED" shop drawings.

Wind Load Anchors
Welded to building structure



Dead Load Anchors
Bolted to building structure



A steel plate is factory welded to the channel anchor and is sized per the job requirements. Refer to the "APPROVED" shop drawings.

Size and locate anchor bolts based on the job conditions and structural requirements. Refer to the "APPROVED" shop drawings.

Wind Load Anchors
Bolted to building structure

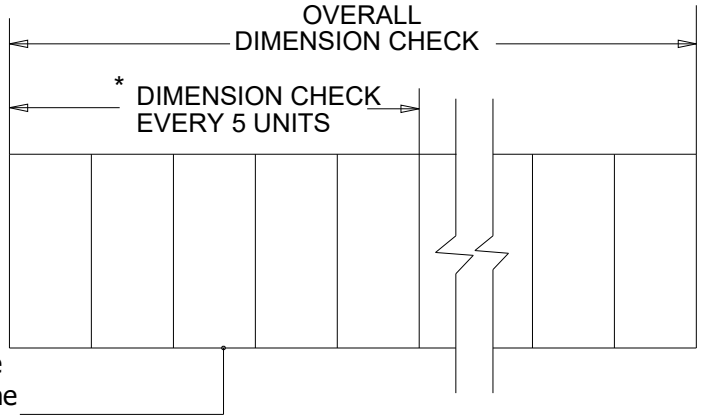
Note: Elevation of slabs must be within adjustment limits of the anchorage system. See "APPROVED" shop drawings for allowable adjustment.

Section IV: Frame Assembly

Frame Assembly – Captured Horizontals

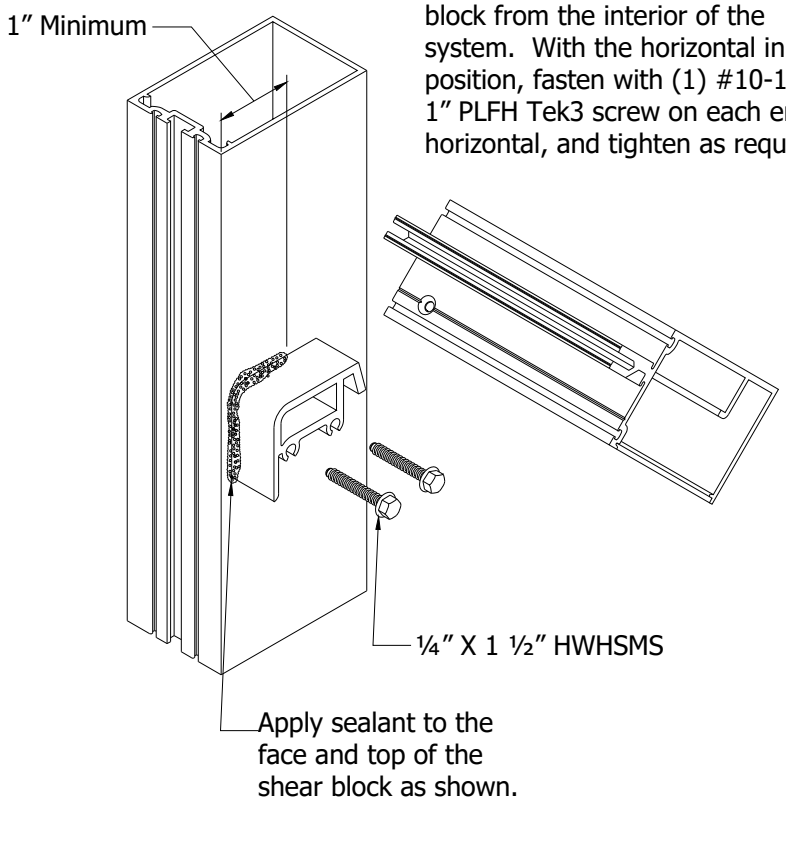
A.) Assemble shear blocks, splices, anchors, etc., to mullions as required.
B.) Install and anchor vertical mullions to form the vertical sections per "APPROVED" shop drawings

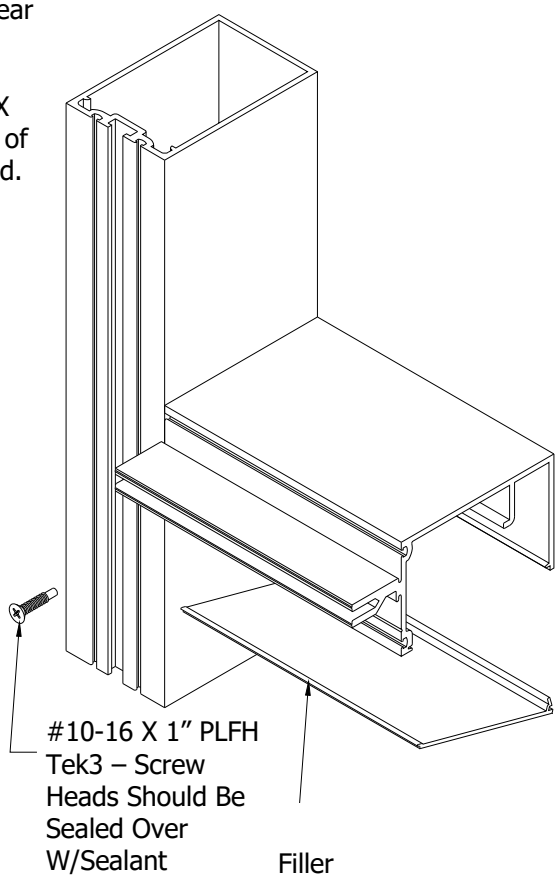
Note: Check overall frame dimensions on every 5 openings on long runs to avoid dimensional build-up.



Interior horizontals are cut D.L.O. – 1/32". The erector is to split the difference on both sides.

Rotate the horizontal over the shear block from the interior of the system. With the horizontal in position, fasten with (1) #10-16 X 1" PLFH Tek3 screw on each end of horizontal, and tighten as required.





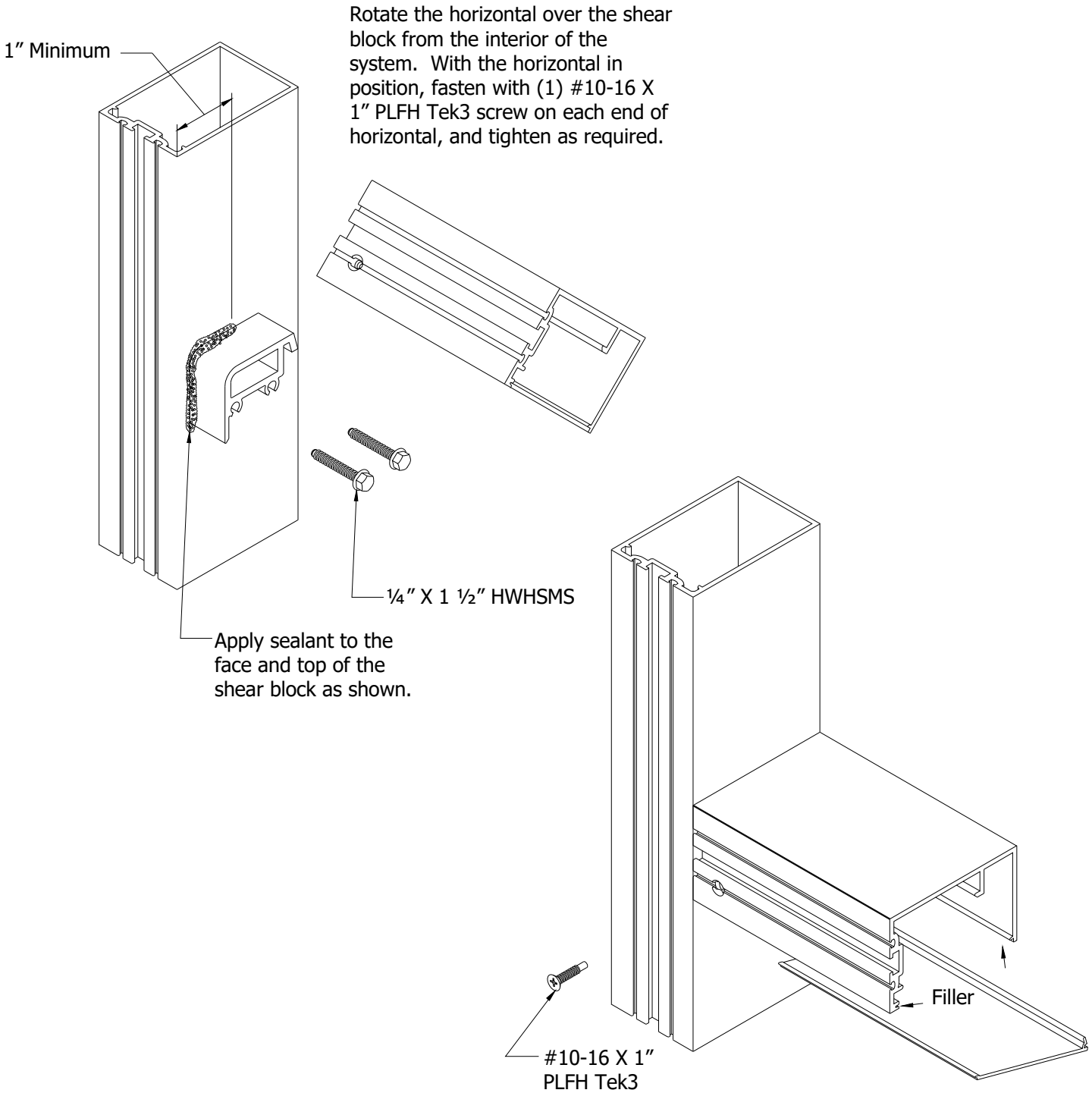
Insert front edge of filler into front race in horizontal. Rotate trailing edge up and engage into snap.

Note: The commercial cut to length tolerance is +- 1/16". It is critical to check every 5th "UNIT" for location.

Section IV: Frame Assembly

Frame Assembly – Silicone Structural Glazed Horizontals

A.) Assemble shear blocks, splices, anchors, etc., to mullions as required.
B.) Install and anchor vertical mullions to form the vertical sections per "APPROVED" shop drawings.



Note: The commercial cut to length tolerance is +- 1/16". It is critical to check every 5th "UNIT" for location.

V: Vertical Splice Applications

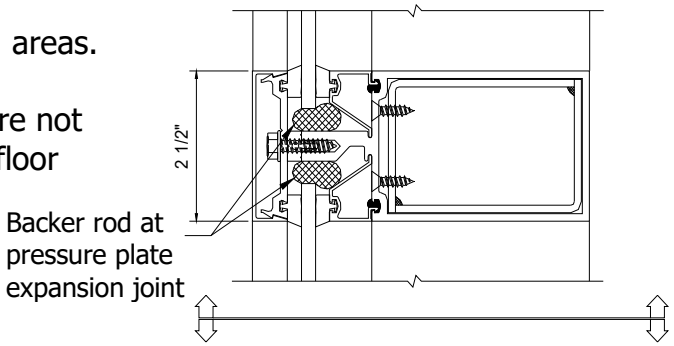
Vertical Splice Joints

A.) Space vertical mullion expansion joints per "APPROVED" shop drawings and in conjunction with SSG splice locations.

B.) Keep in mind that spacing may vary with job site temperature. On multiple stacked applications, key horizontals must be installed to establish grades regardless of expansion joint dimension.

C.) Splice joints should occur at spandrel areas.

D.) Mullion splice joints for this system are not designed to compensate for varying floor levels. (Reference "APPROVED" shop drawings for allowable adjustment, i.e., anchors.)

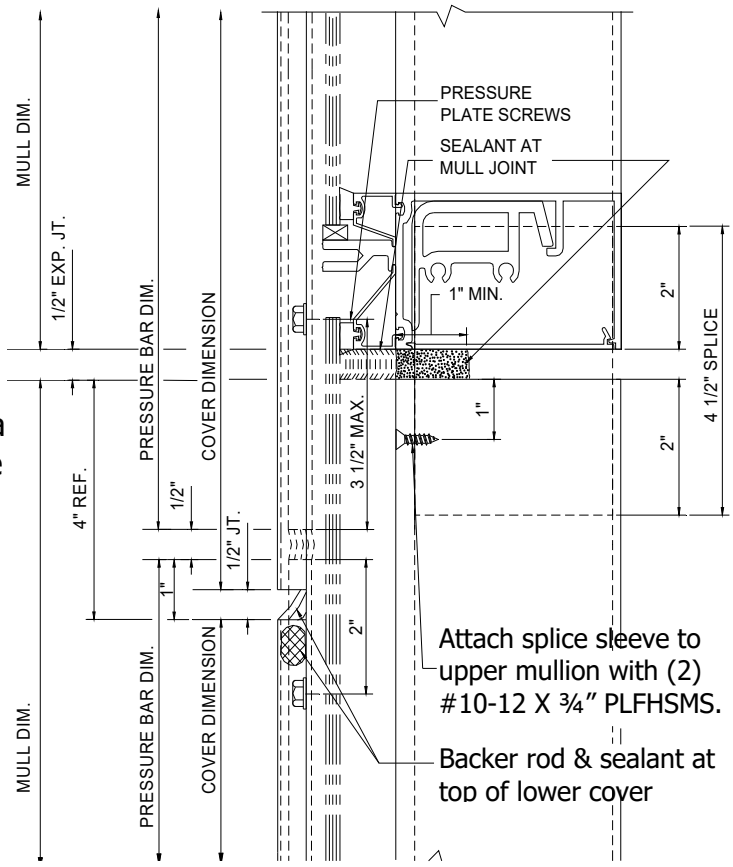


E.) The splice joint width should be based on sealant movement capabilities and the following formula.

Linear expansion for aluminum in inches = Length X F (temperature degrees difference in Fahrenheit) X .0000129.

F.) Where head clearance is insufficient to allow top mullions to be lifted over the splice sleeve, a retractable sleeve will be used. The sleeve is taped in the top mullion and dropped to the stop screw in the mullion below.

G.) Do not match drill anchors until a check of expansion joints and wall installation is performed.



Note: All anchors must be fixed before glazing begins.

Note: When the mullion splice is shop installed in the lower mullion, screws will be used in the standard location as shown.

Erector Note: Apply no screws below splice in the upper pressure plate.

Note: SSG Vertical Splice Locations EFCO recommends that Vertical Splice Line should be below the Intermediate Horizontal Member. This will Minimize Shear Stress at the Structural Seal Line.

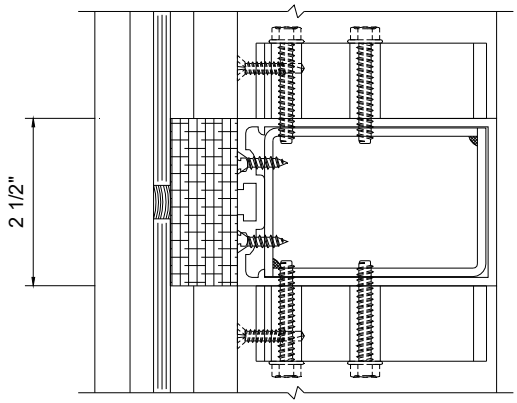
V: Vertical Splice Applications

Vertical Splice Joints at SSG Verticals and Captured Horizontals

A.) Splice should occur at the spandrel areas.

B.) Fabrication Note: Match drill the splice for shear block attachment.

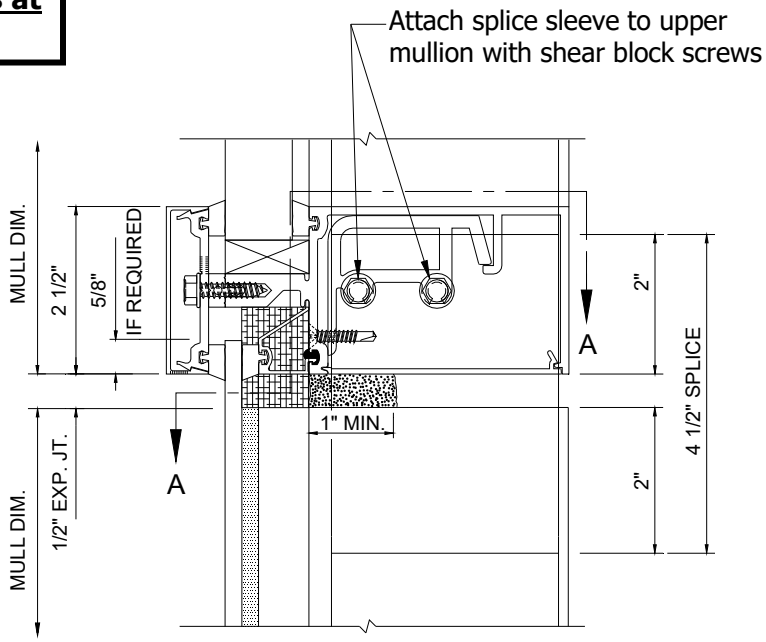
C.) Splice Note: The vertical mullions that are structurally glazed must be spliced at the horizontal locations. (All mullion splice locations must be reviewed by a factory engineer.)



"A-A" Section Above Splice

Note: SSG Vertical Splice Locations EFCO recommends that Vertical Splice Line should be below the Intermediate Horizontal Member. This will Minimize Shear Stress at the Structural Seal Line.

D.) Where the head clearance is insufficient to allow the top mullions to be lifted over the splice, a retractable splice will be used. The splice is taped into the top mullion and dropped to a stop screw in the mullion below. Don't match drill the anchors until a check of the expansion joints and wall installation is made.



Note: All anchors must be fixed before glazing begins.

Note: When the mullion splice is shop installed into the lower mullion, (2) fasteners will be used in the standard locations as shown.

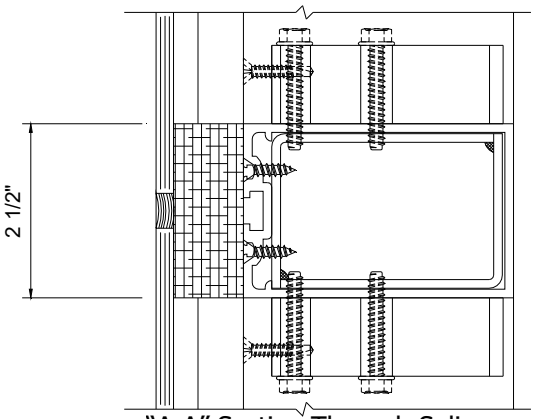
V: Vertical Splice Applications

Vertical Splice Joints at SSG Verticals and Horizontals

A.) Splice should occur at the spandrel areas.

B.) Fabrication Note: Match drill the splice for shear block attachment.

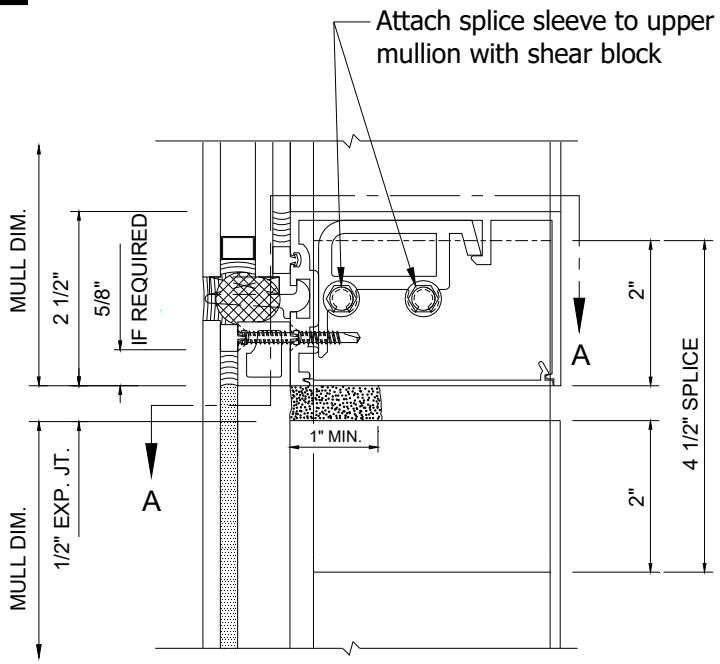
C.) Splice Note: The vertical mullions that are structurally glazed must be spliced at the horizontal locations. (All mullion splice locations must be reviewed by a factory engineer.)



"A-A" Section Through Splice

Note: SSG Vertical Splice Locations EFCO recommends that Vertical Splice Line should be below the Intermediate Horizontal Member, this will Minimize Shear Stress at the Structural Seal Line.

D.) Where the head clearance is insufficient to allow the top mullions to be lifted over the splice, a retractable splice will be used. The splice is taped into the top mullion and dropped to a stop screw in the mullion below. Don't match drill the anchors until a check of the expansion joints and wall installation is made.



Note: All anchors must be fixed before glazing begins.

Note: When the mullion splice is shop installed into the lower mullion, (2) fasteners will be used in the standard locations as shown.

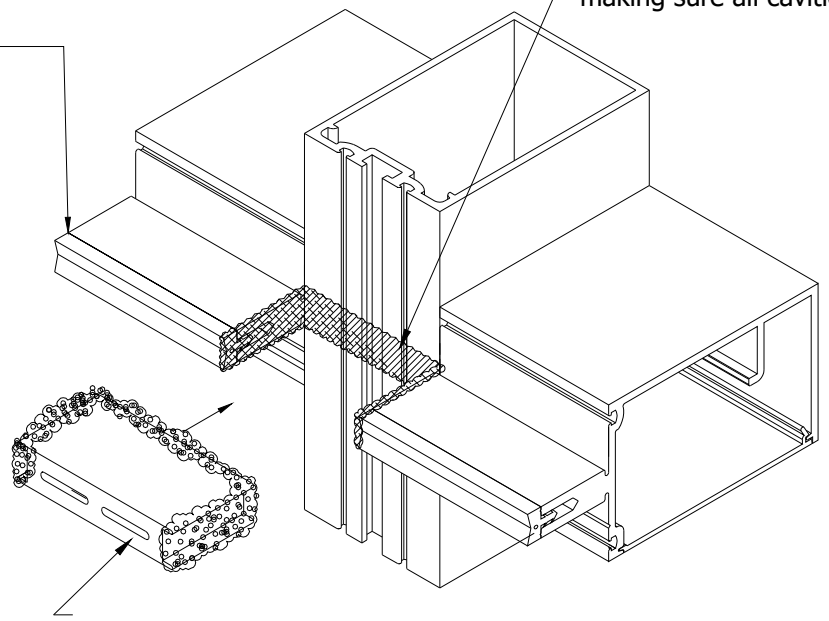
VI: Glazing Preparation

Glazing Preparation at Structural Glazed Mullions

Note: All thermal isolators should be removed from the reels and allowed to shrink prior to installation.

Prior to installing the mullion plugs, seal all three sides of the pocket, making sure all cavities are filled.

Install thermal isolator prior to installing the mullion plugs.



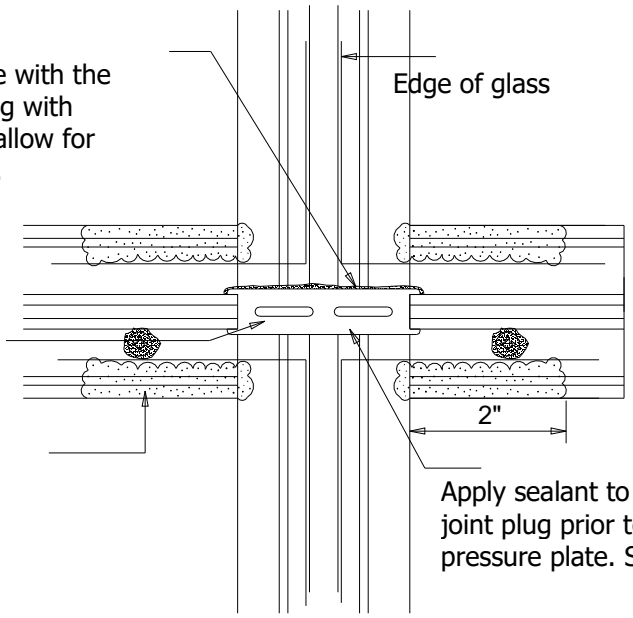
Prior to installing the mullion plugs, seal all three sides of the plug, making sure all cavities are filled. With sealant in place, the mullion plugs can be installed.

Provide a downward slope with the sealant, without interfering with the edge of the glass, to allow for drainage of condensation.

Edge of glass

Closed cell sponge joint plug

Seal the gasket race 2” in each direction at all corners with sealant, making sure that all fastener heads are sealed.



Apply sealant to the face of the joint plug prior to installation of the pressure plate. See page #19.

Elevation of Joinery at the S.S.G. Mullion Prior to Setting the Glass

VI: Glazing Preparation

Glazing Preparation At Captured Mullions

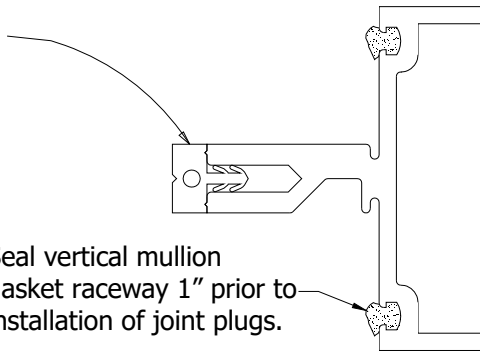
A.) Install the thermal isolator in the vertical mullion, run continuously, and butt joint as required.

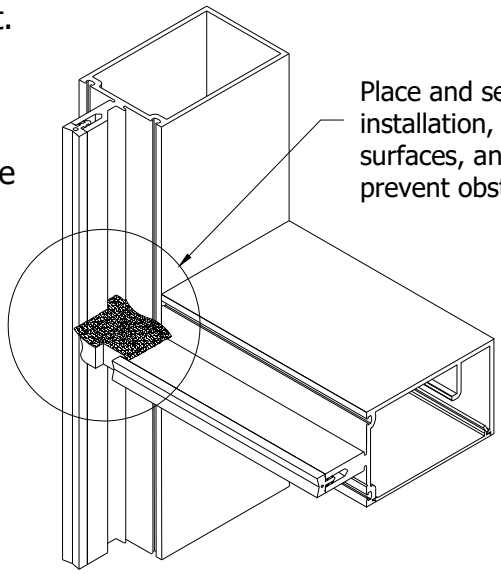
B.) Seal vertical mullion raceway 1" long prior to the installation of the joint plugs.

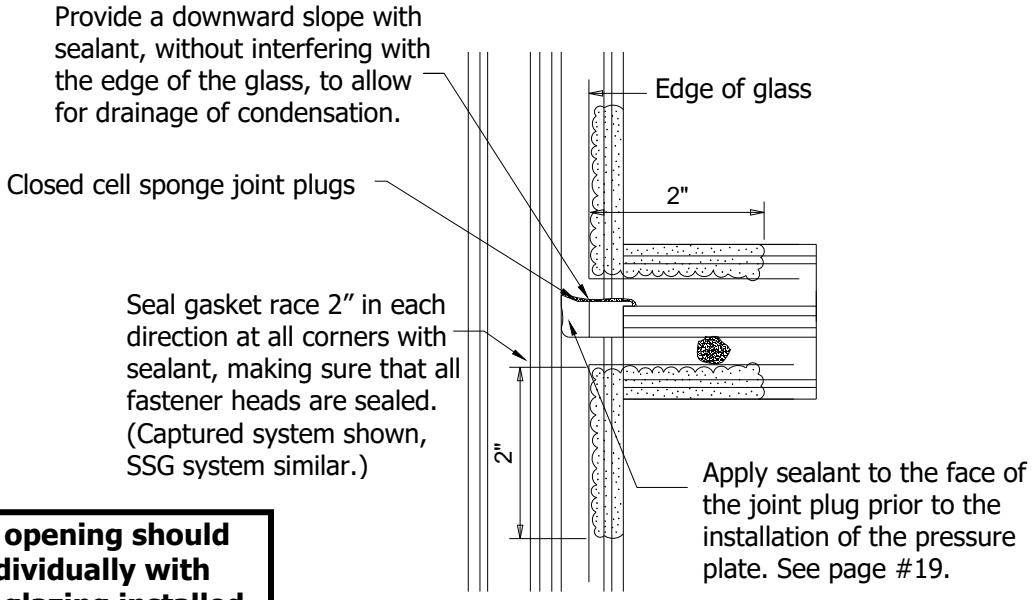
C.) Place and seal the joint plug.

D.) Tool off all excess sealant.

E.) Apply sealant to the face of the joint plug prior to installation of the pressure plate. See page #19.







Note: Each daylite opening should be sealed individually with gaskets and glazing installed immediately following with pressure at the corners.

Elevation of Joinery Prior to Setting the Glass

VII: Glazing Adaptors

Installation of Glazing Adaptors at Silicone Structural Glazed Mullions

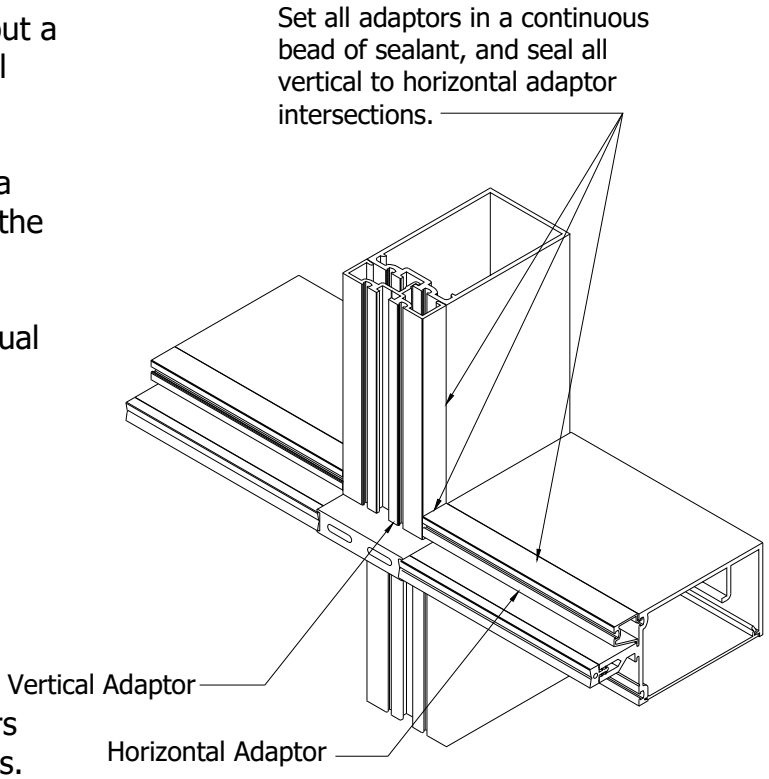
A.) Vertical adaptor length without a mullion expansion joint equal D.L.O. plus 1".

B.) Vertical adaptor length with a mullion expansion joint, see the "APPROVED" shop drawings.

C.) Horizontal adaptor length equal D.L.O. minus 1/16".

D.) Install the vertical adaptors first, and attach with #8 X 1 ¼" PLPH SMS at a minimum of 18" on center. (Seal fastener heads with sealant.)

E.) Install the horizontal adaptors between the vertical adaptors.



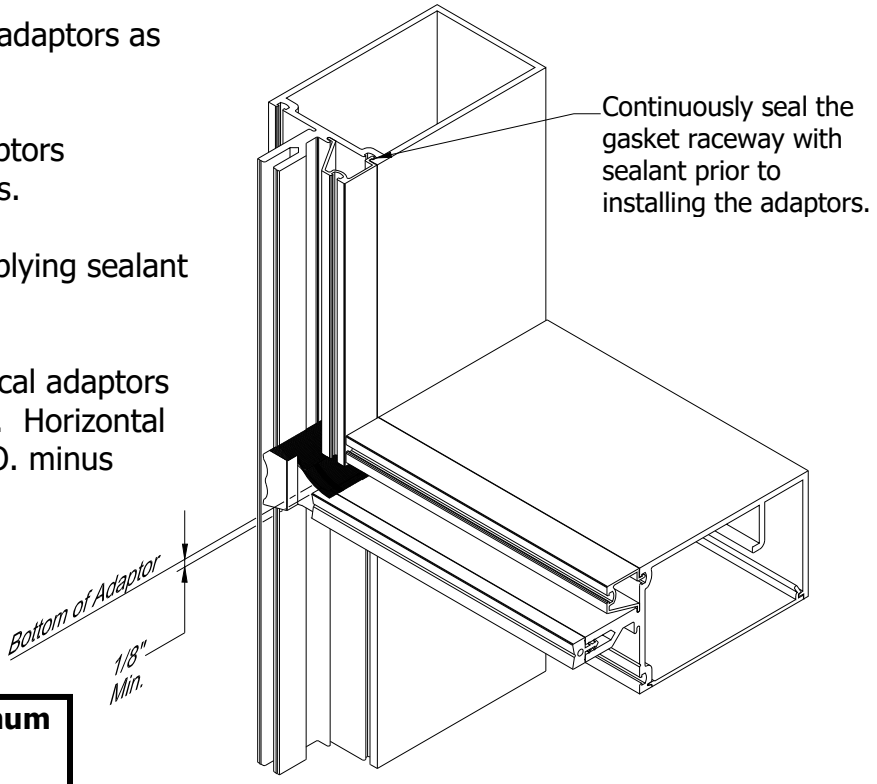
Installation of Glazing Adaptors at Captured Mullions

A.) Position the vertical adaptors as shown.

B.) Place horizontal adaptors between the verticals.

C.) Seat adaptors by applying sealant to all four corners.

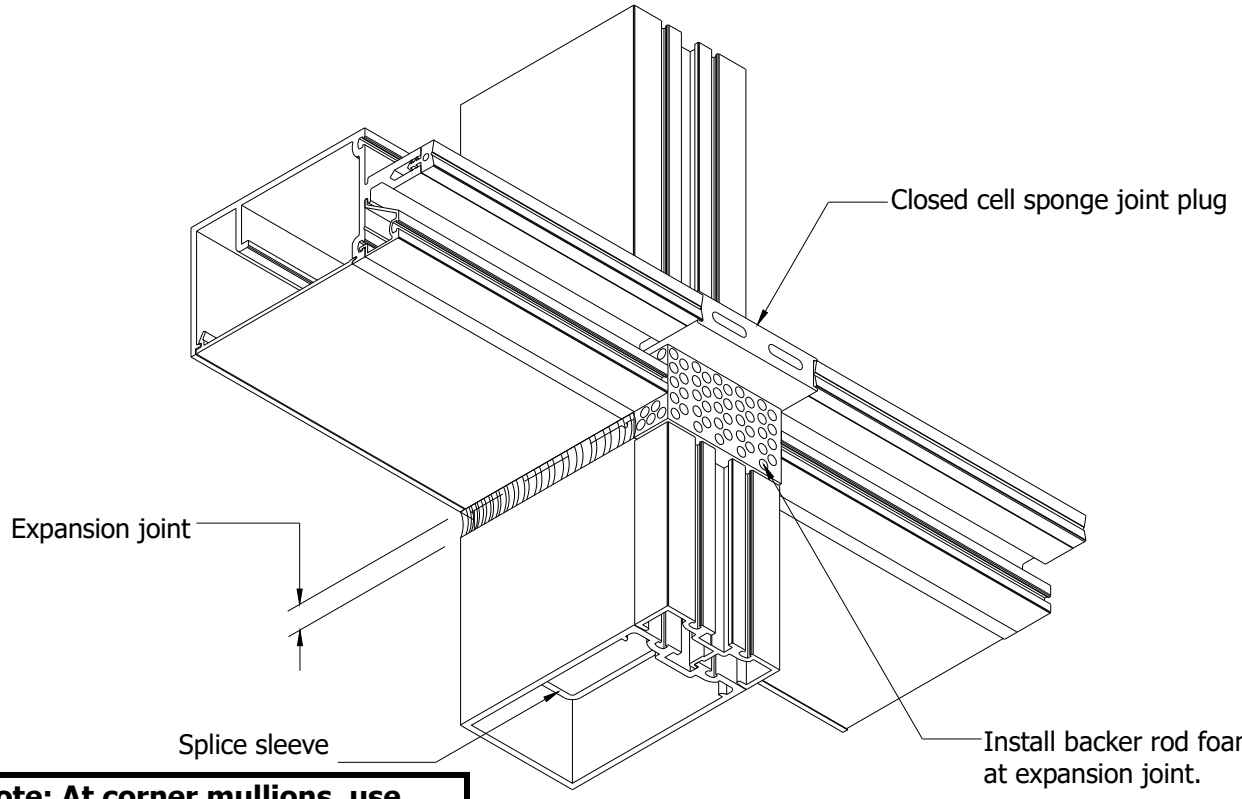
D.) Cut formula for vertical adaptors equal D.L.O. plus 1". Horizontal adaptors equal D.L.O. minus 1/16".



Note: Vertical adaptors need a minimum of 1/8" clearance above the mullion plug, free from sealant.

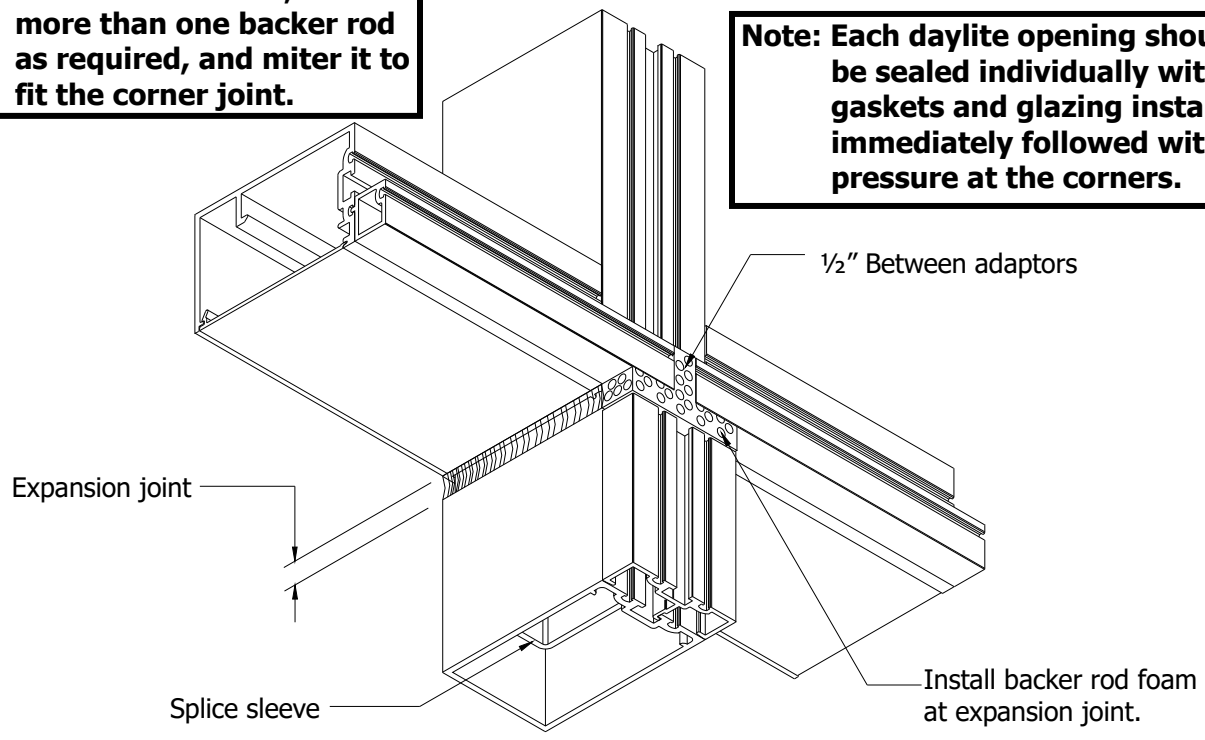
VIII: Sealant At Splice Joint

Installation of Backer Rods at Structurally Glazed Mullion Splices



Note: At corner mullions, use more than one backer rod as required, and miter it to fit the corner joint.

Note: Each daylite opening should be sealed individually with gaskets and glazing installed, immediately followed with pressure at the corners.



Reference pages 11 through 13 for mullion splice detail.

IX: Preset Gaskets

Apply Preset Glazing Gaskets to Mullions

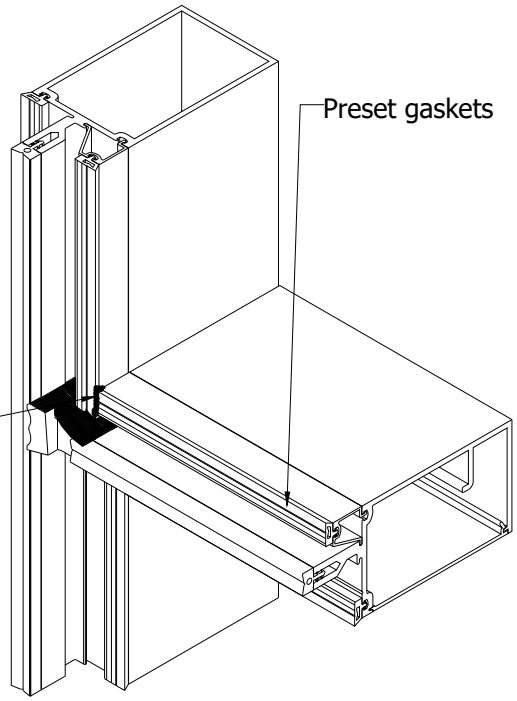
A.) Apply sealant into gasket race a minimum of 2" each direction at each corner.

B.) Remove glazing gaskets from the reel and allow to shrink.

C.) Cut vertical gaskets D.L.O. plus 1 ¾".

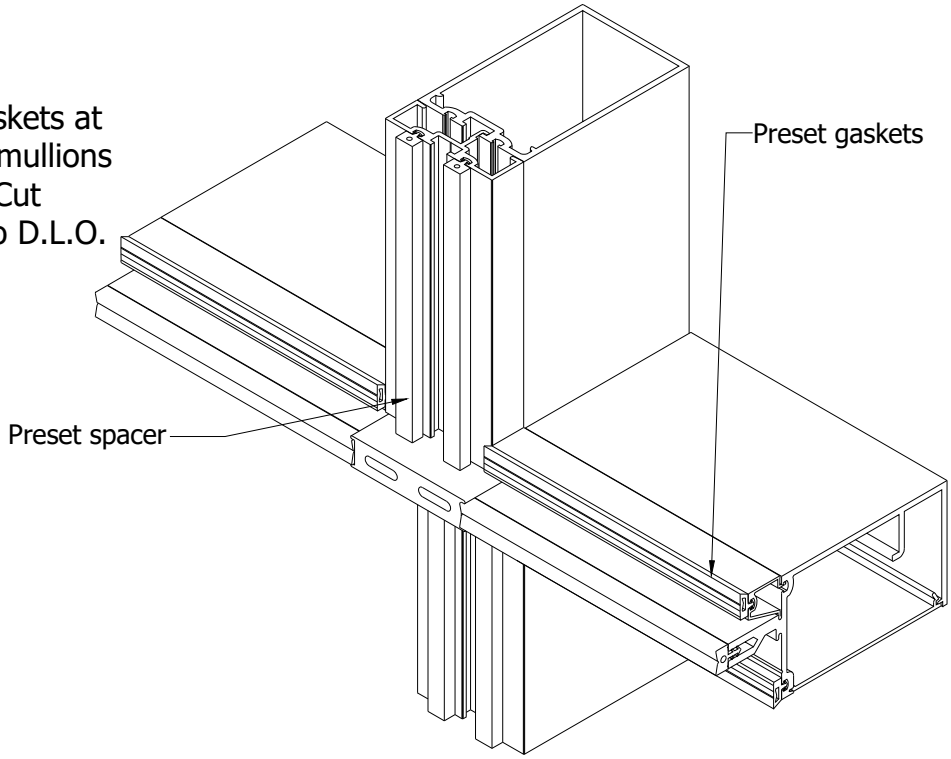
D.) Cut horizontal gaskets D.L.O. plus ½".

E.) Seal all gasket corners: Pull horizontal gaskets back, seal end, and compress into the vertical gasket to insure a snug fit.



Note: If the gaskets are difficult to insert into the gasket race, a light coat of mineral spirits can be applied to the gasket for lubrication.

F.) Cut horizontal gaskets at structural glazed mullions D.L.O. plus ½". Cut vertical spacers to D.L.O. plus 1 ¼".



X: Miscellaneous Applications

Clean

A.) Clean all metal and infill surfaces that will come in contact with the structural silicone sealant with the proper cleaner.

B.) Apply silicone primer as recommended by the silicone manufacturer.

Setting Blocks

A.) Position and install the setting blocks per the "APPROVED" shop drawings.

Position Glazing Infill

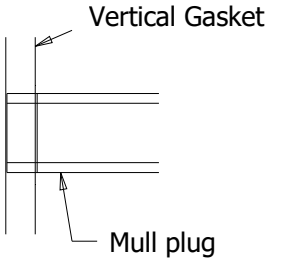
A.) Set the glazing infill into the framing opening tight against the interior gasket, and position squarely onto the setting blocks.

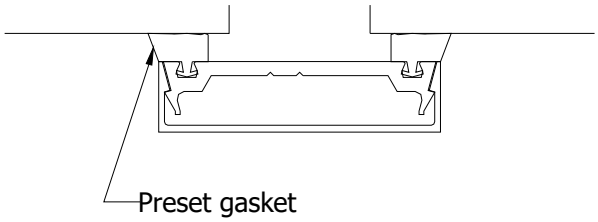
Gaskets to Pressure Plates

A.) Apply the glazing gasket to the pressure plates.

B.) The gaskets applied to the vertical pressure plates are to be cut flush at both ends, except in multi-story applications where gaskets are to extend 1" beyond the end at expansion joints.

C.) The gaskets applied to horizontal pressure plates are cut ¼" long, both ends maximum.





Note: The vertical gasket runs through the joint plug notch at the horizontal location. Seal all corners of the gaskets with sealant.

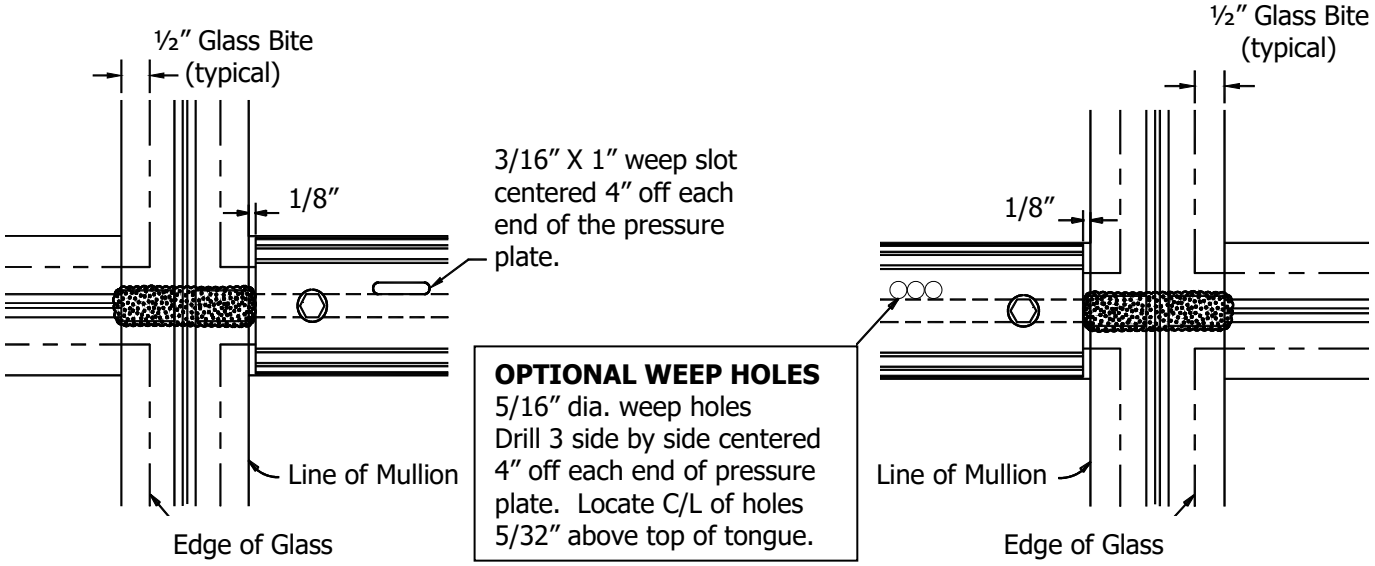
D.) Apply sealant to the face of the mullion plug prior to installing the vertical or horizontal pressure plate.

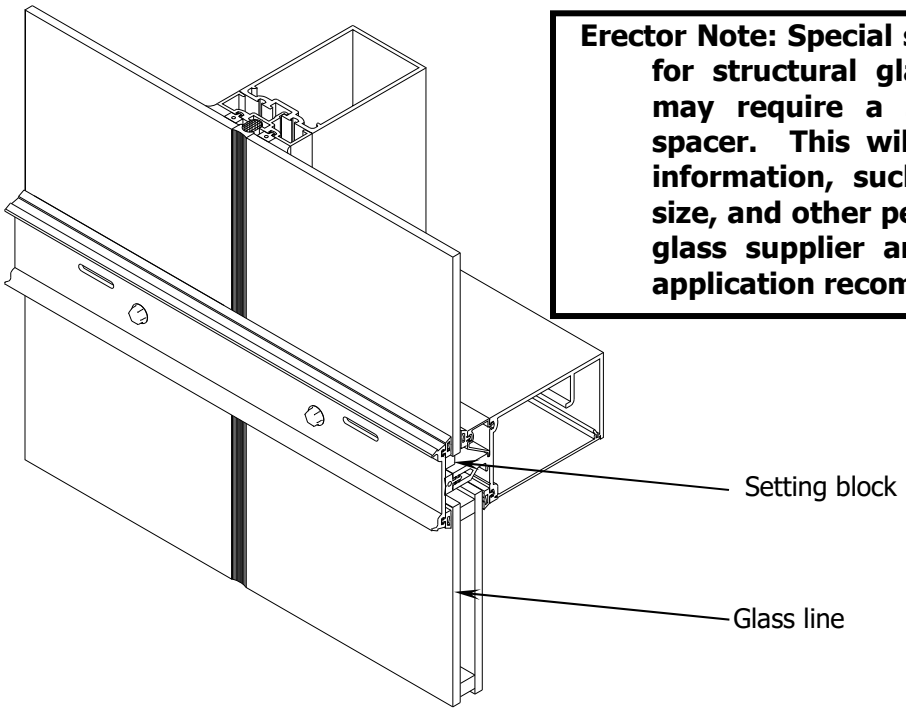
XI: Pressure Plate Attachment

Pressure Plate Attachment

A.) Attach pressure plates with ¼" X 1" stainless steel hex washer head pressure plate screws. Typical spacing is 6" on center.

B.) Torque all pressure plate screws to 80 inch pounds. In cold weather, first torque all screws to 40 inch pounds. When possible, work from the center outward on horizontal and from sill upward on verticals. Then torque all screws to 80 inch pounds after all four sides of the opening have been clamped.



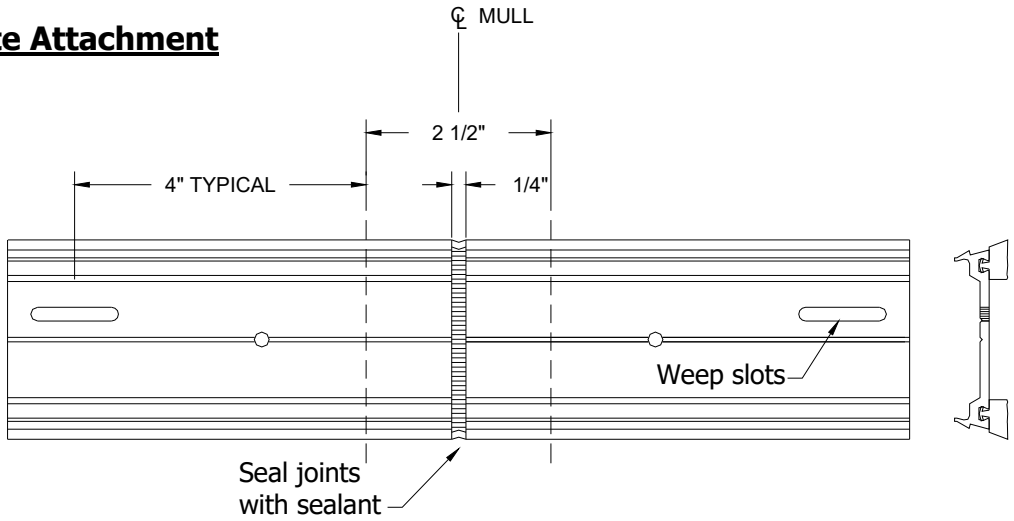


Erector Note: Special structural dual seals are required for structural glazing infill. The insulated glass may require a structural sealant bead at the spacer. This will be determined by job specific information, such as design pressure, infill lite size, and other pertinent information. Consult the glass supplier and or manufacturer for specific application recommendations.

Customer / Installer Note: EFCO setting blocks are typically 4" in length with different depths. If the glazing infill is "NOT BY EFCO" and glazing sizes are larger than 40 square feet, then the glazing details must be reviewed by the glazing manufacturer for proper setting block size.

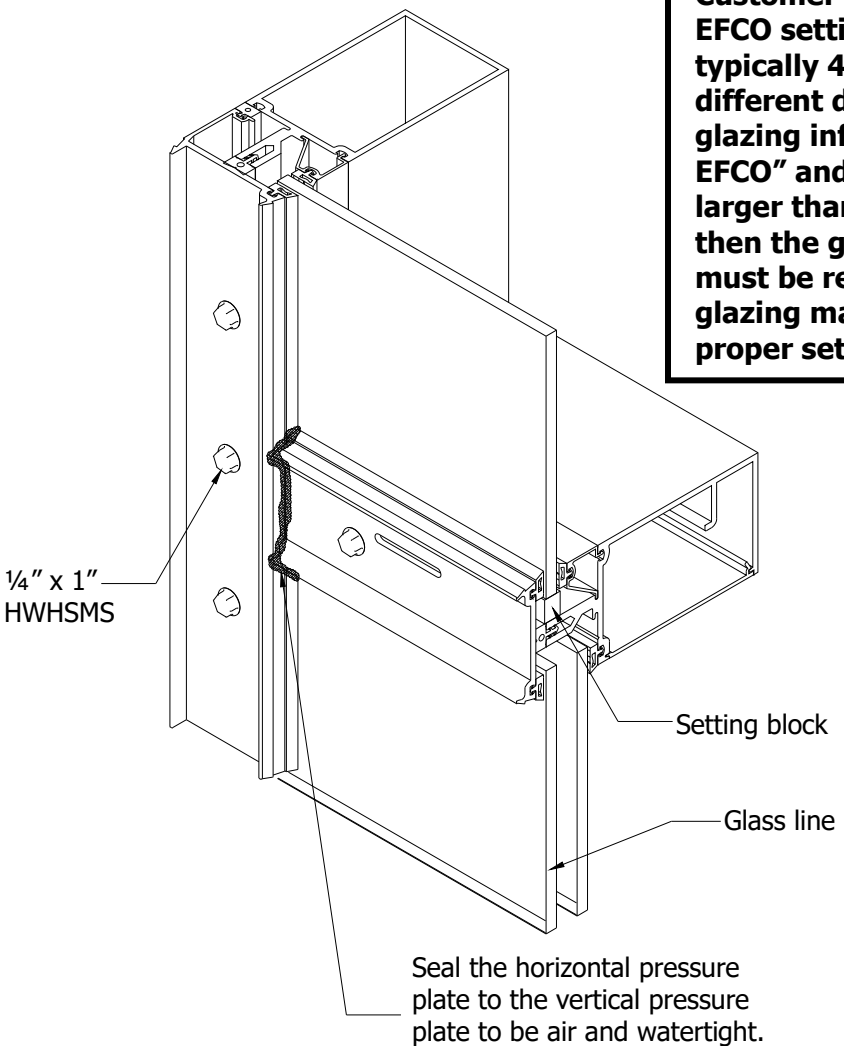
XI: Pressure Plate Attachment

Pressure Plate Attachment



Note: Reference pages 11 through 13 for recommended pressure plates at splice locations. Install the first screw approximately 3" from the end. Typical screw spacing is 6" on center. The glazier should always insert a screw in the vertical pressure plate directly opposite each horizontal, to provide maximum control of pressure on the mullion plugs, which provide a critical sealing function.

Customer / Installer Note: EFCO setting blocks are typically 4" in length with different depths. If the glazing infill is "NOT BY EFCO" and glazing sizes are larger than 40 square feet, then the glazing details must be reviewed by the glazing manufacturer for proper setting block size.

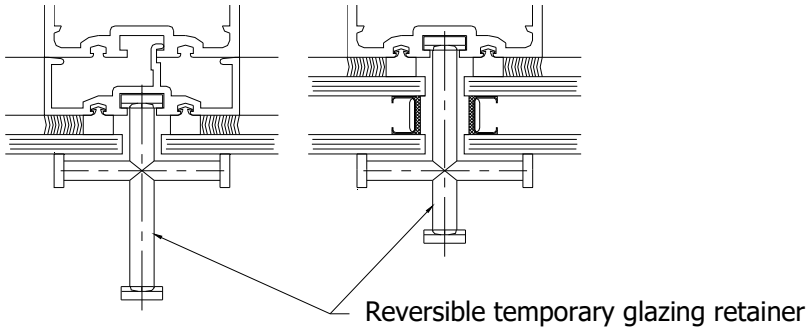


XII: Temporary Retainers and Sealant

Temporary Retainers

A.) Temporary retainers are supplied by EFCO based on the lineal footage of structural glazed members divided by 2.

B.) The location of the temporary exterior infill retainers should not exceed a maximum of 24"* on center. *(If high wind conditions are anticipated, additional retainers may be required. Please consult the sealant and /or glazing infill supplier for spacing recommendations.)



Erector Note: Special structural dual seals are required for structural glazing infill. The insulated glass may require a structural sealant bead at the spacer. This will be determined by job specific information, such as design pressure, infill lite size and other pertinent information. Consult the glass supplier and or structural sealant manufacturer for specific application recommendations.

Apply The Structural Silicone Sealant

A.) EFCO does not supply sealant.

B.) The sealant is to be a structural silicone as recommended by the sealant manufacturer.

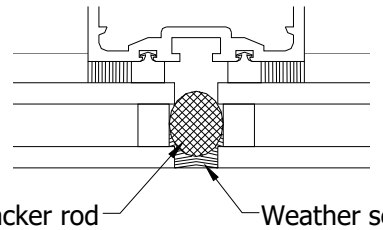
C.) The infill and metal is to be cleaned per the silicone manufacturer's recommendations.

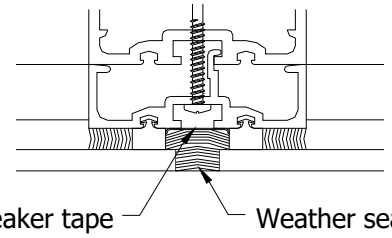
D.) Allow the structural silicone seal to cure per the manufacturer's recommendations before removing the temporary glazing retainers.

Exterior Weather Seal

A.) Install backer rod between the two insulated infill units or bond breaker tape behind the monolithic infills. **(Not By EFCO)**

B.) Apply the exterior weather seal as recommended by the sealant manufacturer. NOTE: Seal up to the temporary retainers. After the structural sealant cures, remove the temporary retainers, and seal the remaining gaps.

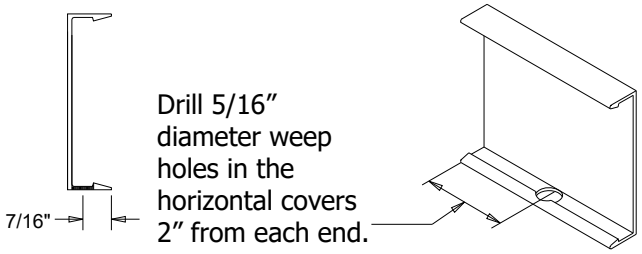


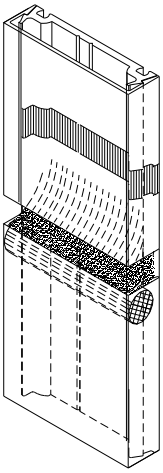


Section XIII: Exterior Cover Installation

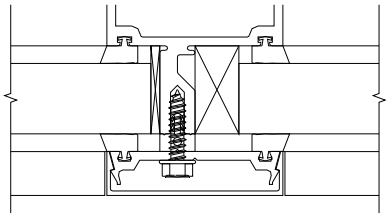
Snap-On Exterior Covers

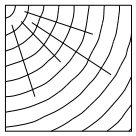
A.) Set vertical covers as shown on "APPROVED" shop drawings.



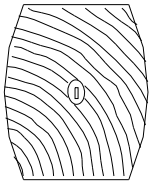


Note: Care must be taken to avoid damage to the covers during installation. Use a nominal 12" long 2 X 4 and mallet or hammer to seat the cover.





Approx. 12" long wood block



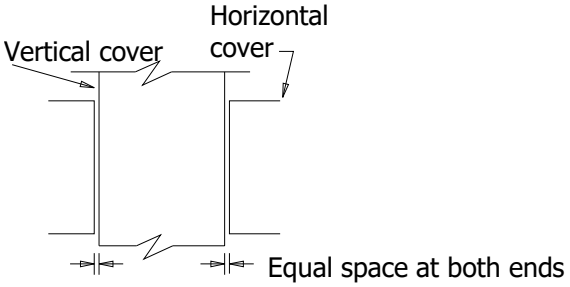
Mallet or hammer

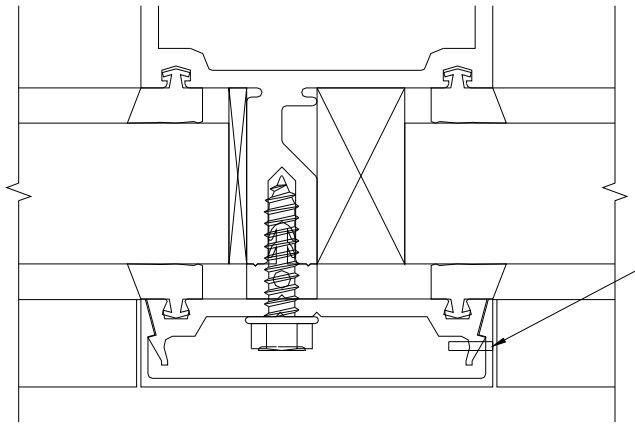
B.) Center the horizontal snap cover in the opening, align and engage one side, then use a block and mallet to engage the opposite side.

C.) Gaps at the ends should be equalized and are provided to allow installation, thermal movement, and weepage.

D.) Exterior horizontal covers are cut D.L.O. – 1/16".

E.) The erector is to split the difference on both ends.





Note: Horizontal covers 1" or more in depth must be mechanically attached, similar to detail below.

A 1/16" X 5/16" roll pin at the center of the cut length is recommended to prevent slippage. The roll pin can be located at the horizontal to eliminate exposure.

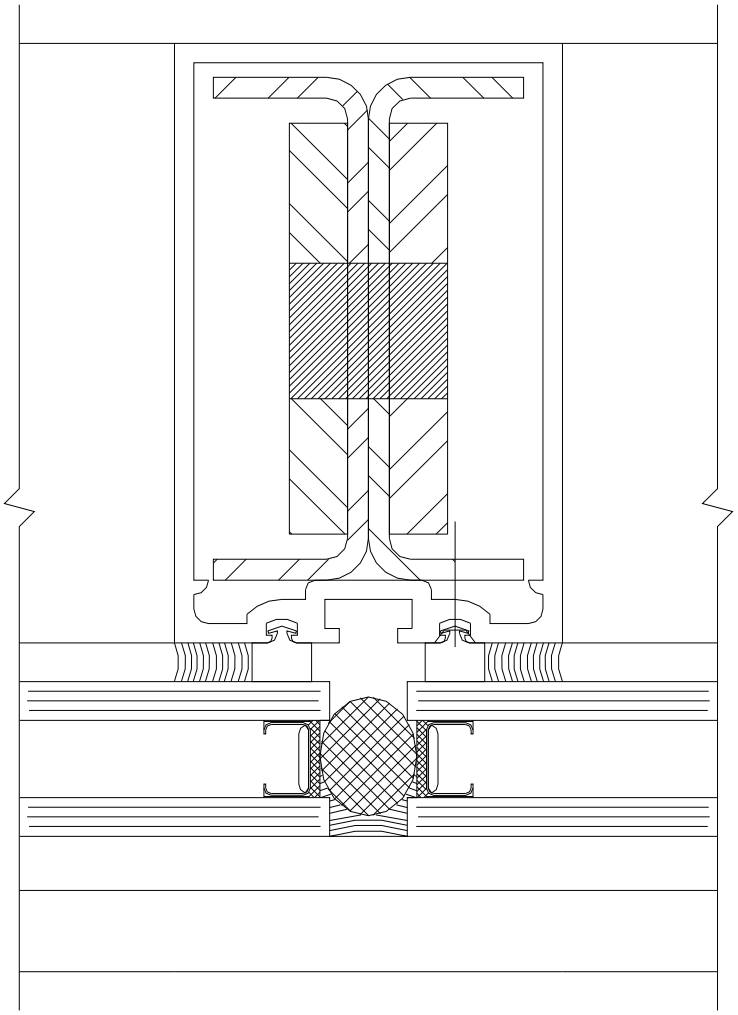
Section XIV: Steel Reinforcement

Steel Reinforcement

A.) At large spans or in high wind load areas, steel reinforcement may be necessary.

B.) Reinforcement requirements will vary on a per job basis.

C.) Reference the "APPROVED" shop drawings for steel requirements and locations.



D.) When steel reinforcement is factory installed in the mullions, use fasteners to prevent damage or slippage of the steel during shipping.