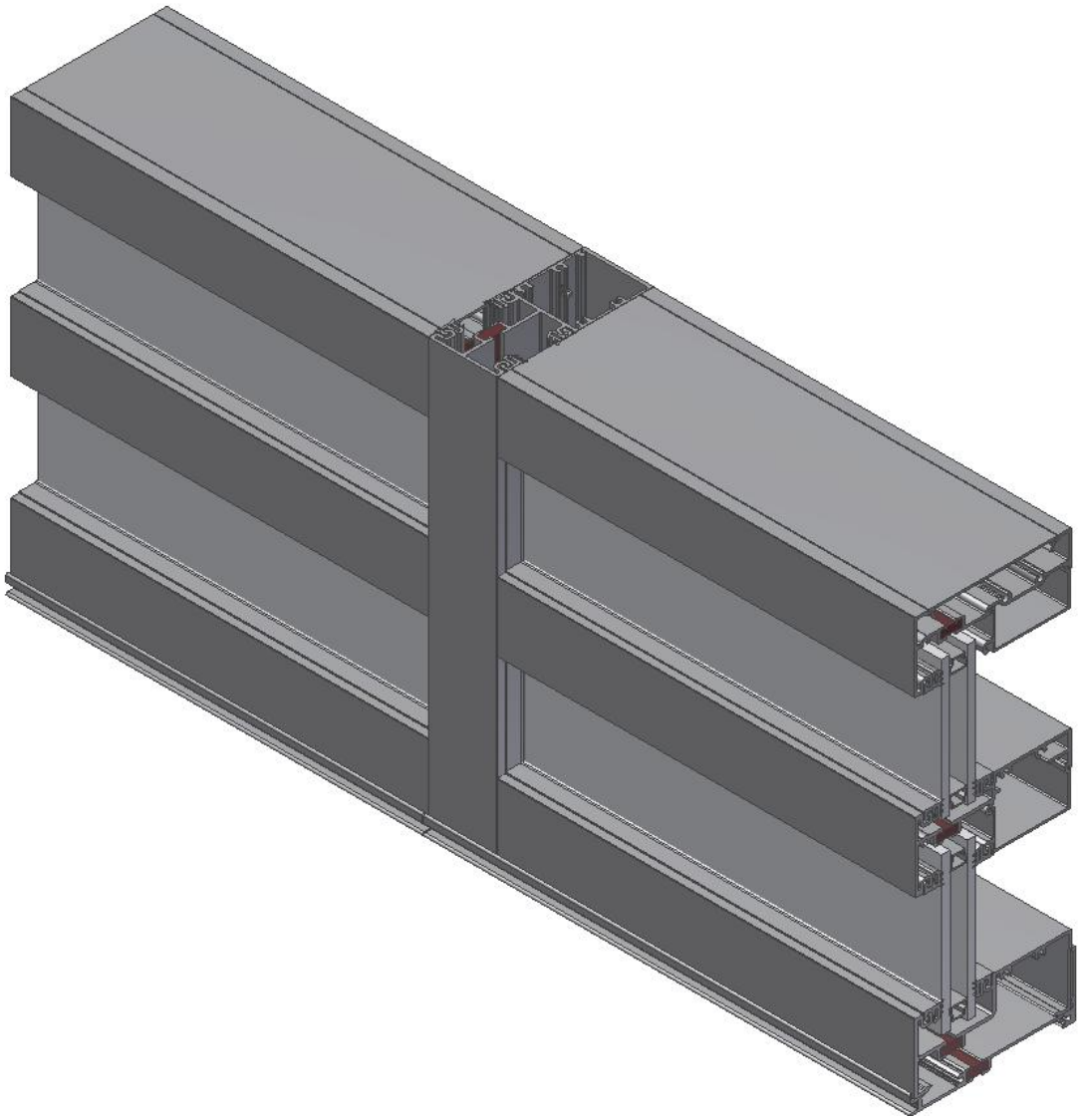
Installation Instructions

TUBELITE®
DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS



14000 I/O Storefront

3056 WALKER RIDGE DR. NW, SUITE G WALKER, MI 49544
800-866-2227 dependable@tubeliteinc.com

TABLE OF CONTENTS

GENERAL CONSTRUCTION NOTES

1. These instructions cover typical product application, fabrication, installation and standard conditions and are general in nature. They provide useful guidelines, but the final drawings may include additional details specific to this project. Any conflict or discrepancies must be clarified prior to execution.

2. Materials stored at the job site must be kept in a safe place protected from possible damage by other trades. Stack with adequate separation so materials will not rub together, and store off the ground. Cardboard or paper wrapped materials must be kept dry. Check arriving materials for quantity and keep record of where various materials are stored.

3. All field welding must be done in accordance with AISC guidelines. All aluminum and glass should be shielded from field welding to avoid damage from weld splatter. Results will be unsightly and may be structurally unsound. Advise general contractor and other trades accordingly.

4. Coordinate protection of installed work with general contractor and/or other trades.

5. Coordinate sequence of other trades which affect framing installation with the general contractor (e.g. fire proofing, back up walls, partitions, ceilings, mechanical ducts, HVAC, etc.).

6. General contractor should furnish and guarantee bench marks, offset lines and opening dimensions. These items should be checked for accuracy before proceeding with erection. Make certain that all adjacent substrate construction is in accordance with the contract documents and/or approved shop drawings. If not, notify the general contractor in writing before proceeding with installation because this could constitute acceptance of adjacent substrate construction by others.

7. Isolate all aluminum to be placed directly in contact with masonry or other incompatible materials with a heavy coat of zinc chromate or bituminous paint.

8. Sealant selection is the responsibility of the erector, installer and/or glazing contractor and must be approved by the sealant manufacturer with regard to application and compatibility for its intended use. All sealants must be used in strict accordance with the manufacturer's instructions and applied only by trained personnel to surfaces that have been properly prepared.

9. Sealant must be compatible with all materials with which they have contact, including other sealant surfaces. Consult sealant manufacturer for recommendations relative to shelf life, compatibility, cleaning of substrate, priming, tooling adhesion, etc.

10. Drainage gutters and weep holes must be kept clean at all times. Tubelite will not accept responsibility for improper drainage as a result of clogged gutters and weep holes.

11. This product requires clearances at head, sill and jambs to allow for thermal expansion and contraction. Refer to final distribution drawings for joint sizes. Joints smaller than ¼" may be subject to failure. Consult your sealant supplier.

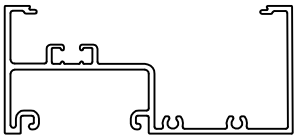
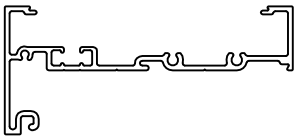
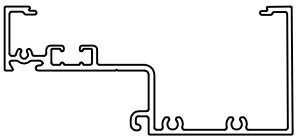
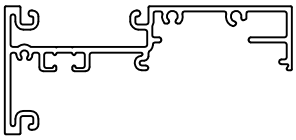
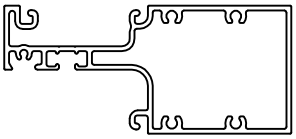
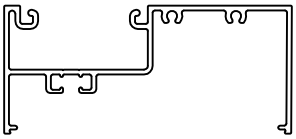
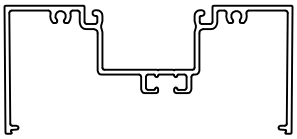
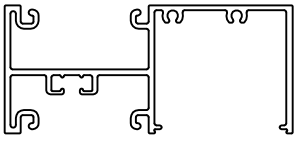
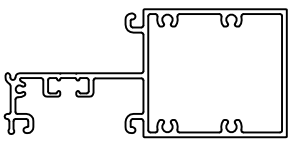
12. All materials are to be installed plumb, level and true with regard to established bench marks and column center lines established by the general contractor and checked by the erector, installer and/or glazing contractor.

13. Cleaning of exposed aluminum surfaces should be done per AAMA recommendations.

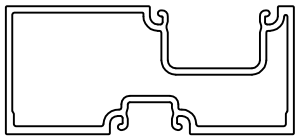
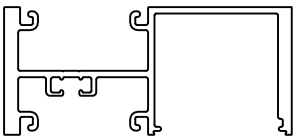
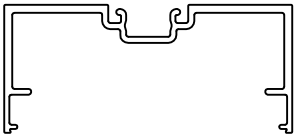
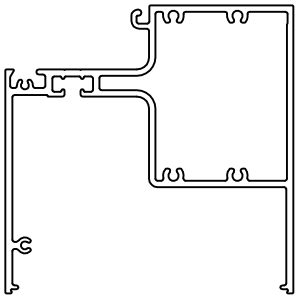
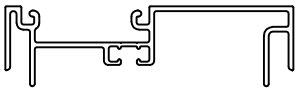
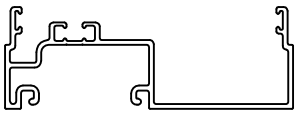
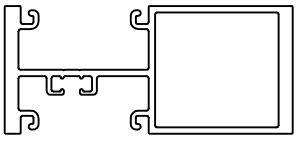
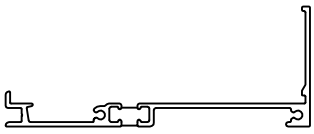
14. Due to varying perimeter conditions and job performance requirements, anchor fasteners are not specified in these instructions. For anchor fastening, refer to the shop drawings or consult the fastener supplier.

15. Check tubeliteinc.com for any updates on installation instructions.

EXTRUSIONS

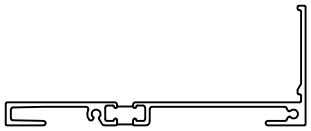
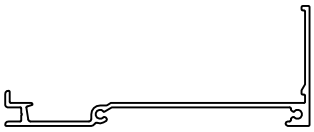
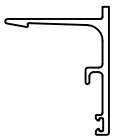
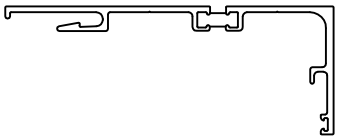
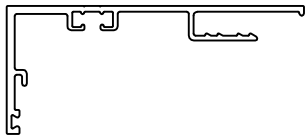
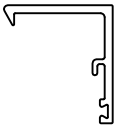
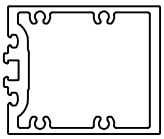
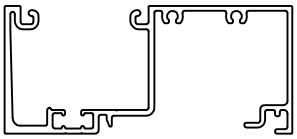
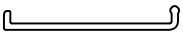
Shape	Description	Part No.
	Head/jamb/sill	T14301 (E14301)
	Head -- inside glazed	T14300 (E14300)
	Head -- outside glazed	T14310 (E14310)
	Intermediate horizontal -- inside glazed	T14303 (E14303)
	Intermediate horizontal -- outside glazed	T14313 (E14313)
	Intermediate vertical	T14311 (E14311)
	Intermediate vertical -- center glazed	T14321 (E14321)
	Intermediate vertical	T14306 (E14306)
	Intermediate horizontal -- outside glazed	T14323 (E14323)

EXTRUSIONS

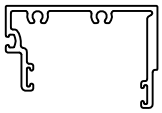
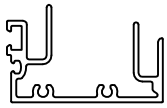
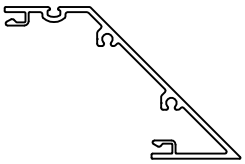
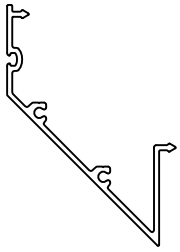
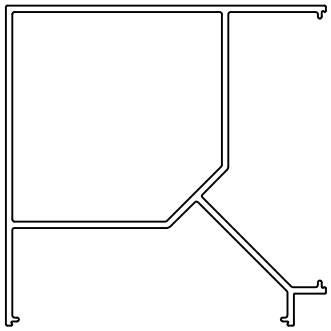
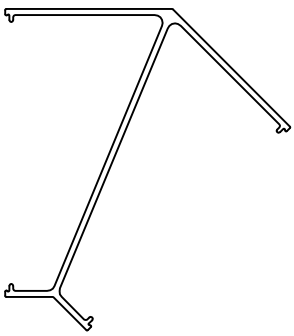
Shape	Description	Part No.
	Door jamb	E14341
	Heavy wall vertical	T14356 (E14356)
	Door jamb	E14305
	4 1/2" x 4 1/2" horizontal	T14347 (E14347)
	Female expansion mullion	T14346 (E14346)
	Male expansion mullion	T14336 (E14336)
	Heavy wall vertical	T14366 (E14366)
	Extruded sill flashing	T14259

TUBELITE®
DEPENDABLE
LEADERS IN ECO-EFFICIENT STOREFRONT, CURTAINWALL AND ENTRANCE SYSTEMS

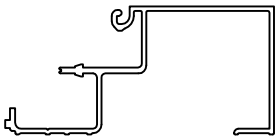
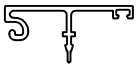
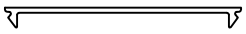
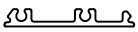
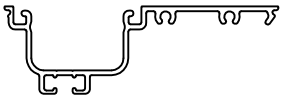
EXTRUSIONS

Shape	Description	Part No.
	Extruded sill flashing	T14055
	Extruded sill flashing	E14059
	Male head receptor	E14130
	Female head receptor	T14129 (E14129)
	Female head receptor	T14329 (E14329)
	Male head receptor	E14339
	SSG vertical	E14326
	SSG sill	T14340 (E14340)
	Sill runner	E1360

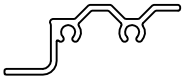
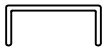
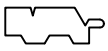
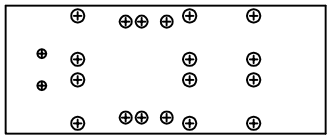
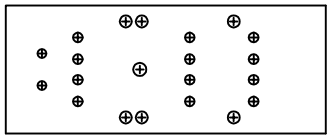
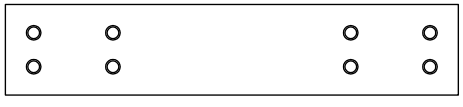
EXTRUSIONS

Shape	Description	Part No.
	Male expansion SSG mullion	E14376
	Female expansion SSG mullion	E14386
	90 degree female SSG corner	E14349
	90 degree male SSG corner	E14348
	90 degree corner	E14309
	135 degree corner	E14319

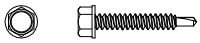
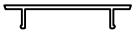
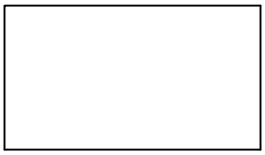
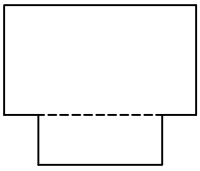
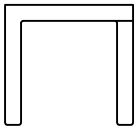
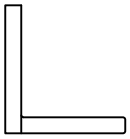
EXTRUSIONS

Shape	Description	Part No.
	Glass stop -- outside glazed	E14324
	Glass stop -- inside glazed	E14304
	Glass stop -- outside glazed	E14314
	Perimeter for curving -- back	E14388
	Perimeter for curving -- face	E14389
	Flat snap-in filler	E4543
	Vertical filler	E14302
	Pocket closure	T14312 (E14312)
	Pocket closure	T14342 (E14342)
	Deep pocket closure	T14332 (E14332)
	Glazing adapter for 1/2" glass	E14061
	Glazing adapter for 1/4" glass	E14036

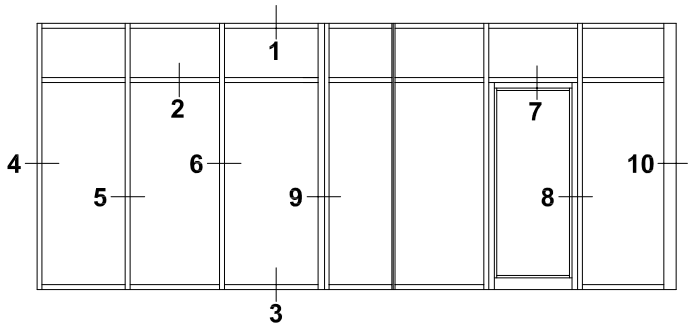
ACCESSORIES

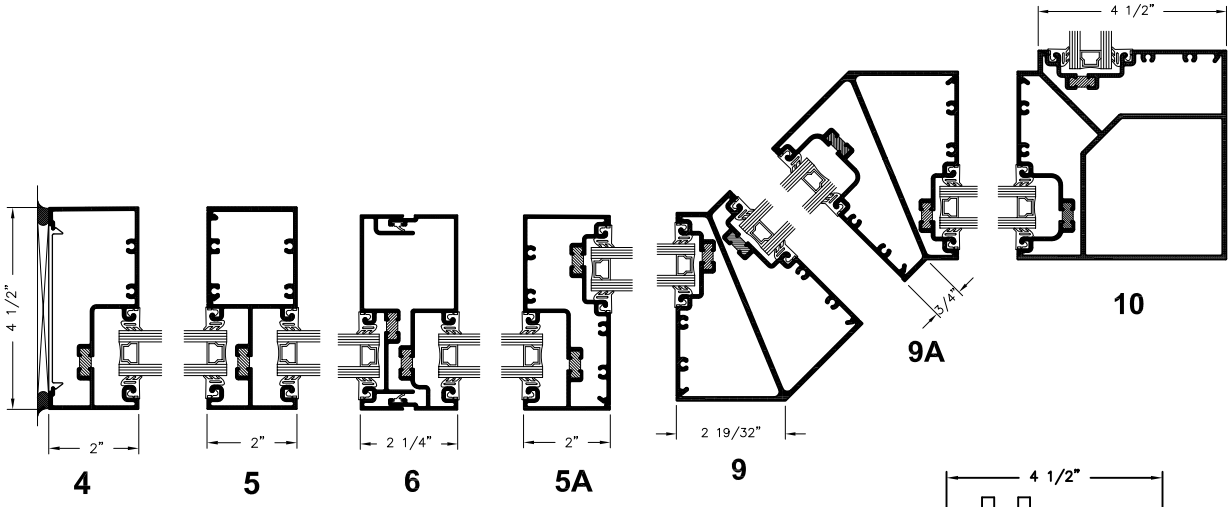
Shape	Description	Part No.
	Roll-in glazing gasket -- 1" glass	P2728
	Roll-in glazing gasket -- 1 1/8" glass	P487
	Gasket for undersized glass	P2428
	Wiper gasket	P1221
	Improved bulb gasket	P2511
	SSG glazing gasket	P2310
	Frame clip inside head and horizontal	P2402
	Frame clip outside sill and head	P2403
	Frame clip outside sill and head	P2404
	SSG sill setting chair	P2408
	4" setting block	P1131: Silicone P1132: EPDM
	Setting block	P946
	Drill fixture screw spline	P2405
	Drill fixture shear block	P2406
	Mounting sunshade bracket drill fixture	P3952
	Sill flashing splice	P1144
	1" long by 1/8" diameter roll pin	P2401

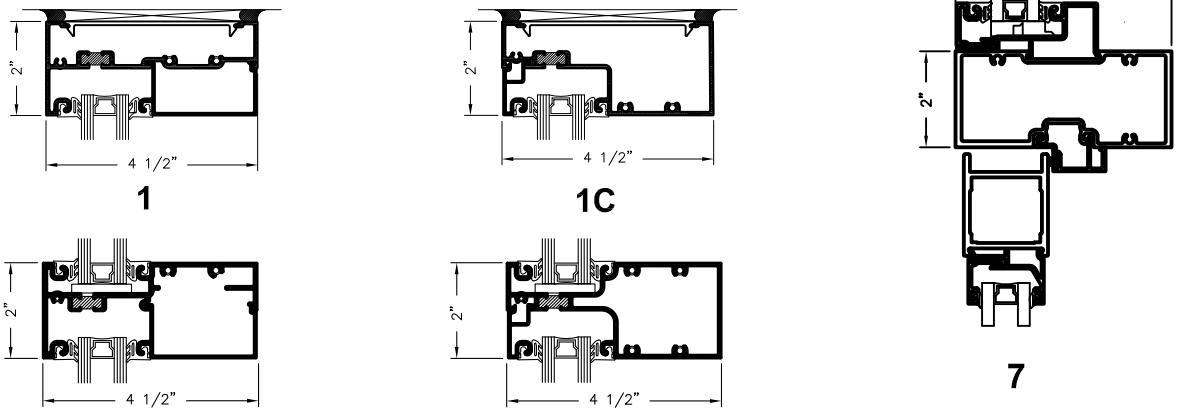
ACCESSORIES

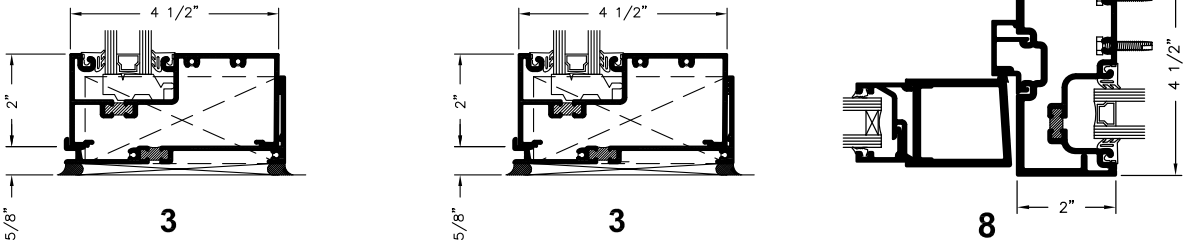
Shape	Description	Part No.
	#10 x 1 3/4" type B Phillips pan head	S009
	#12 x 3/4" Phillips flat head	S149
	#10 x 1/2" Phillips truss head	S191
	#10-16 x 1-1/4" hex unslotted washer high head	S429
	Rigid PVC snap-in filler	P4543
	Rigid PVC pocket filler	P4563
	End dam for sill flashing	P1153
	SSG water dam (use with T/E14340 sill)	P2409
	3" long weep baffle	PTB42
	Water diverter	P1135
	SSG water diverter	P2407
	Sunshade bracket at intermediate vertical	Standard: P3948 Top mounting: P3950
	Sunshade bracket at jamb	Standard: P3949 Top mounting: P3951L/R

ELEVATION DETAILS







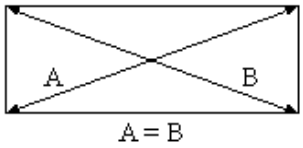


FRAME FABRICATION

Step 1: Determine Frame Size

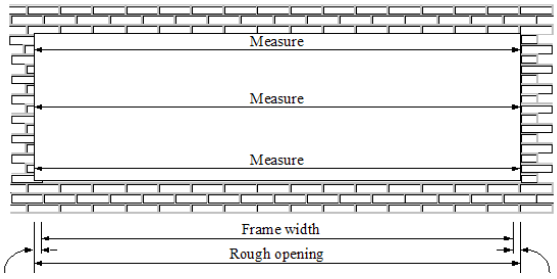
Determine Width

• Check that the opening is square and plumb at both ends. Units must be installed in a true rectangle.



A = B

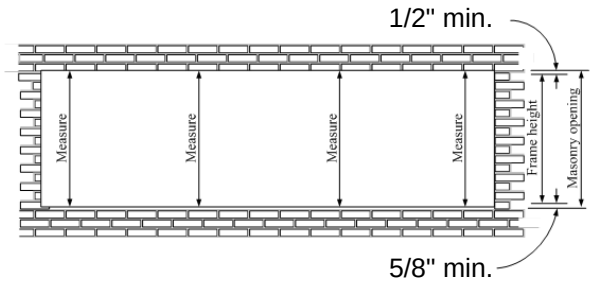
• Measure the width of the opening at the top, middle and bottom.
• Select the smallest dimension measured. To determine the frame width to be used, subtract a minimum of 1/2” from the smallest measured width, to allow a minimum of 1/4” at each jamb for shimming and caulking.
• Allow a larger clearance if necessary to accommodate building tolerances, an out-of-square opening, anticipated thermal expansion within the unit and/or as required by project.



1/4" min. 1/4" min.

Determine Height

• Measure the height of the opening in several places along the entire length of the opening.
• To determine the frame height to be used, select the smallest dimension measured and subtract 1 1/8” to allow a minimum of 5/8" at sill and 1/2" head for shimming and caulking.
• Allow a larger clearance if necessary to accommodate building tolerances, an out-of-square opening, anticipated thermal expansion within the unit and/or as required by project.



Step 2: Cut Extruded Sill Flashing to Size

• Field cut extruded sill flashing to frame width + 1/8" determined in Step #1 (rough opening minus clearances). If the installation includes an entrance, flashing should butt against back of door jamb (no clearance).
• At the quarter points of each lite, drill 7/32" diameter weep holes and slot 1/4" in the flashing (or drill a hole slightly larger than the anchor bolt diameter). The slot will accommodate thermal expansion of the subsill and the anchor bolts.
• Install a weep baffle (PTB42) in the gutter of the extruded sill flashing behind each weep hole.
• Expansion mullions must be used every 16' to 20' with corresponding flashing splice located at the center of the DLO between verticals. The dimension of the expansion mullion should be adjusted based on the temperature at the time of assembly and expected high and low service temperatures. The sight line will be reduced slightly when installed in hot weather and increased slightly when installed in cold weather.

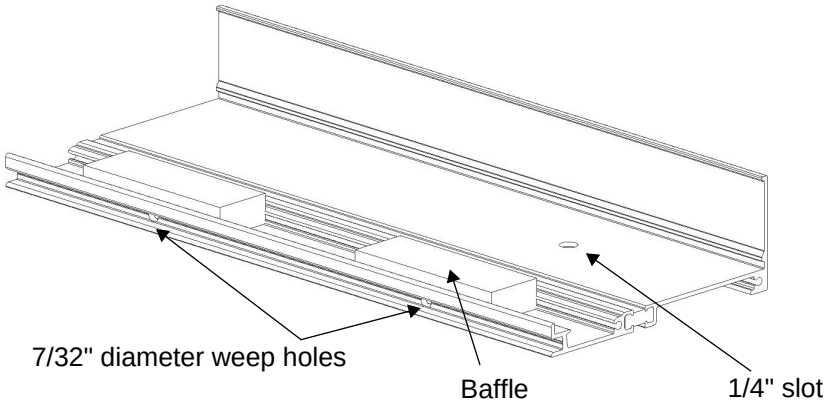


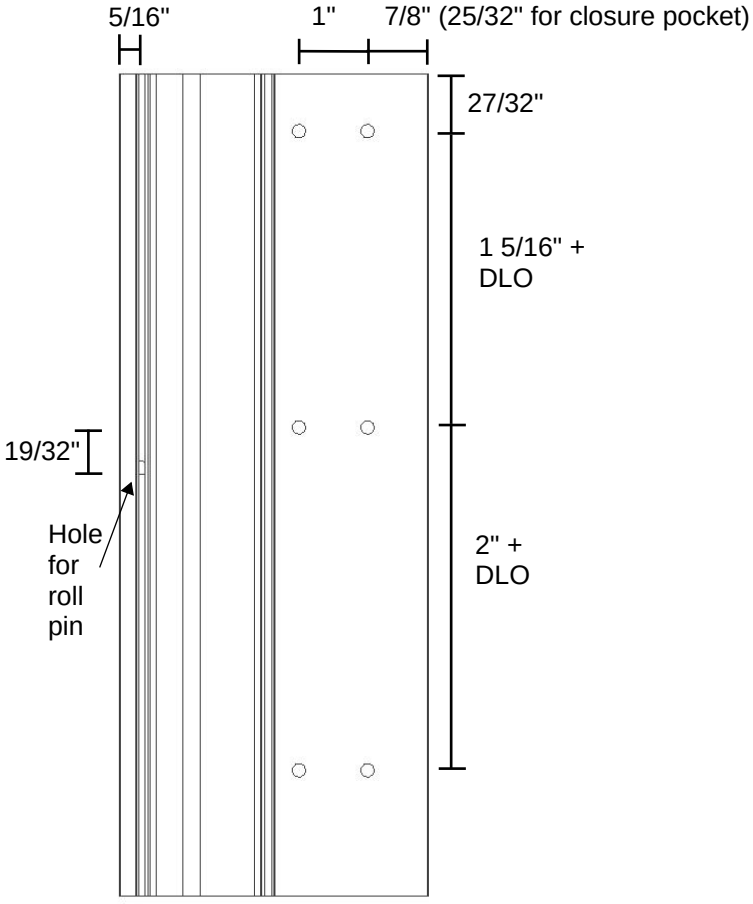
Figure 1: Field cut extruded sill flashing to frame width + 1/8" and drill weep holes at the quarter points of each lite.

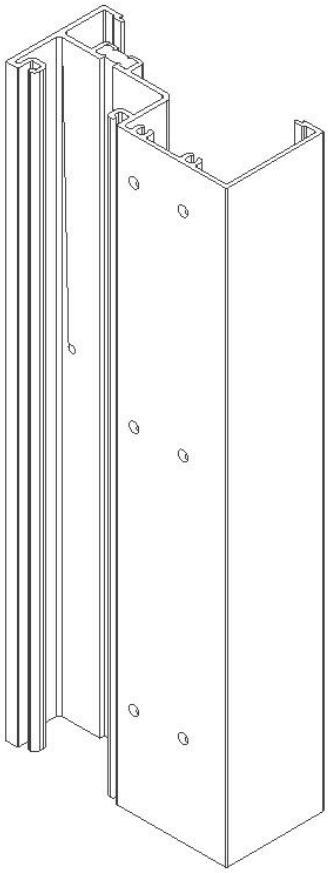
Step 3: Cut Mullions and Glass Stops to Size

• Verticals should be frame height found in Step #1 (rough opening height minus clearances).
• Vertical framing members run through.
• Cut horizontal framing members to the daylight opening (the distance between verticals).
• Cut glass stops to length of DLO - 1/16".

Step 4: Drill Holes in Vertical Framing Members (inside glazed screw spline)

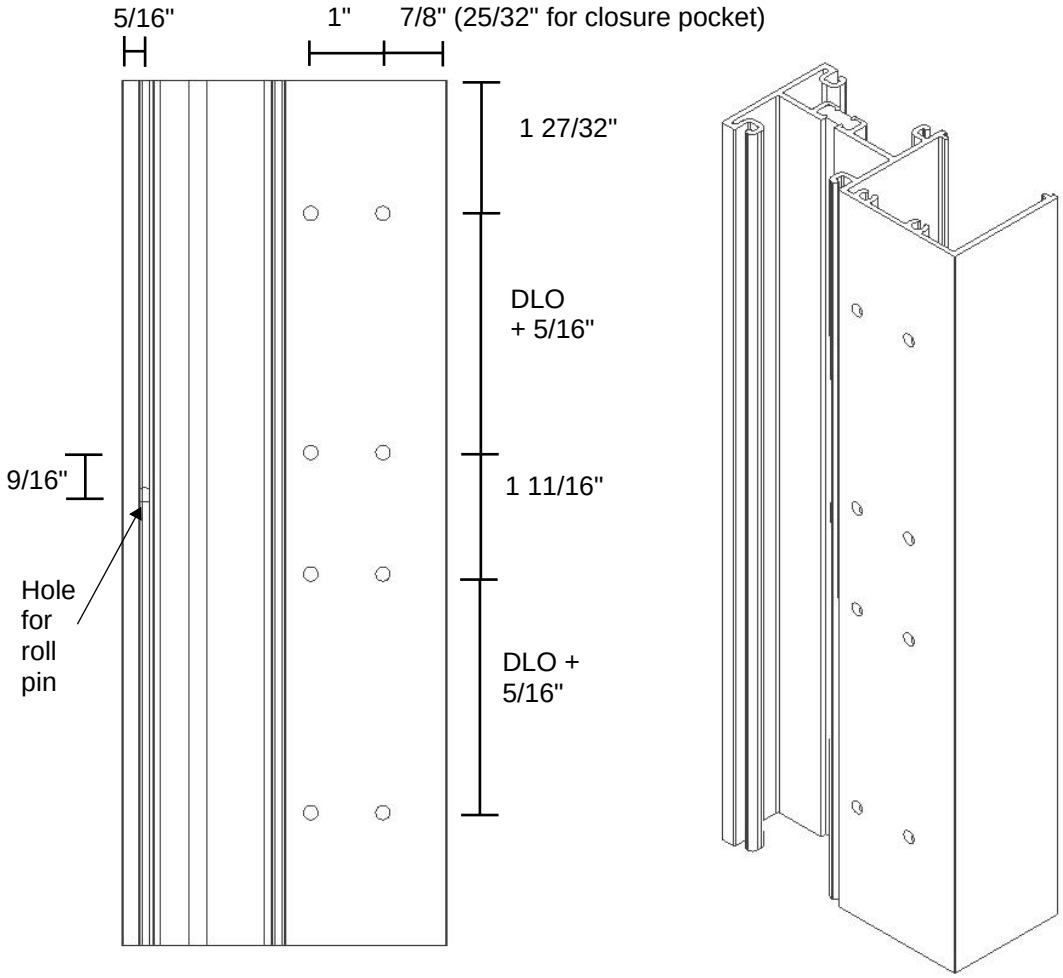
• For screw spline assembly, fasteners are driven directly through holes in the vertical members into holes in the horizontal members.
• Drill .201" diameter holes in the vertical framing members using a drill fixture, as shown below.
• For insulated glass lights larger than 15 square feet, a 1/8" diameter clearance hole will be needed for each horizontal to accommodate a roll pin (P2401) as shown at right.





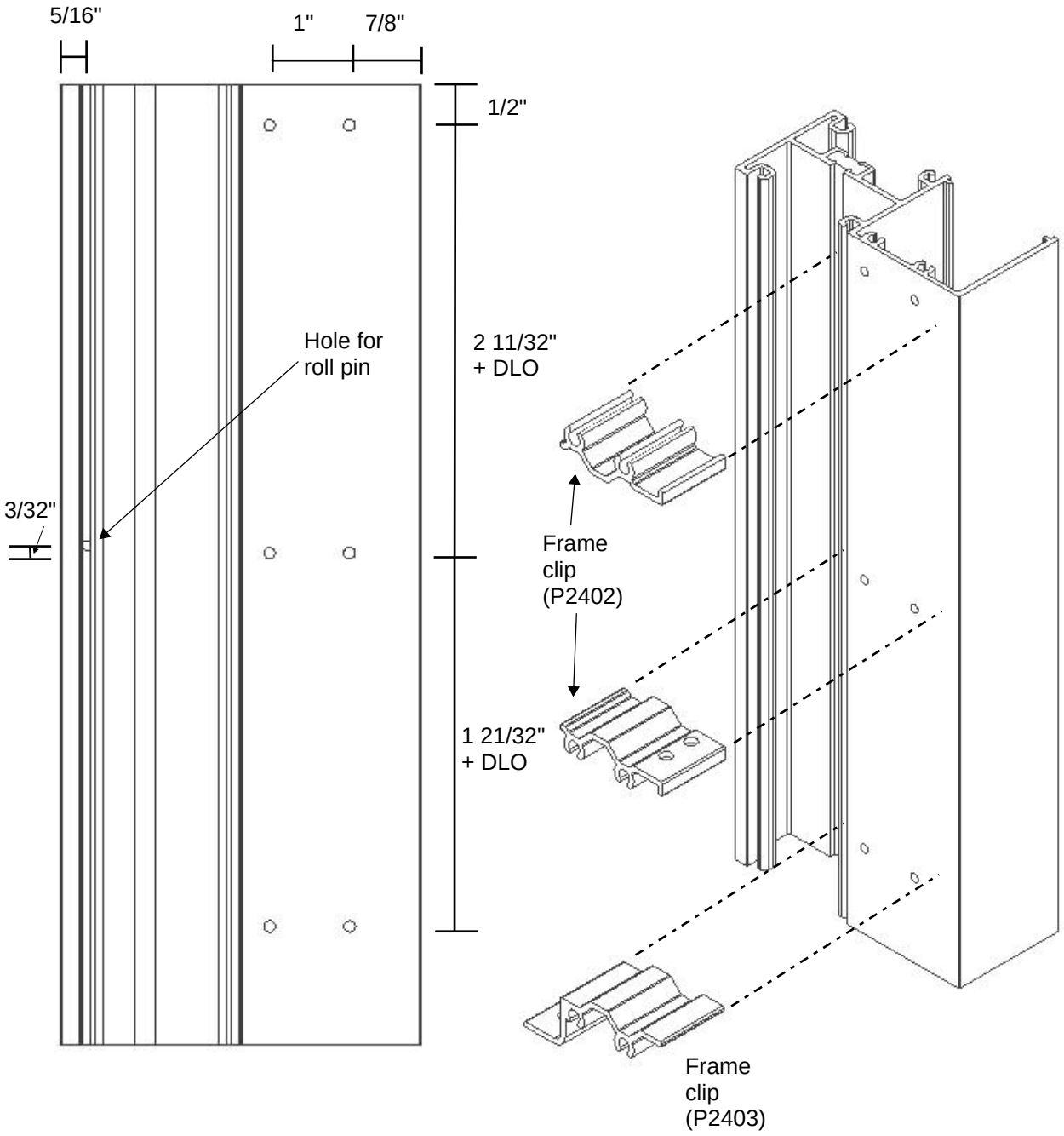
Step 4: Drill Holes in Vertical Framing Members (outside glazed screw spline)

• For screw spline assembly, fasteners are driven directly through holes in the vertical members into holes in the horizontal members.
• Drill .201" diameter holes in the vertical framing members using a drill fixture, as shown below.
• For insulated glass lites larger than 15 square feet, a 1/8" diameter clearance hole will be needed for each horizontal to accommodate a roll pin (P2401) as shown below.



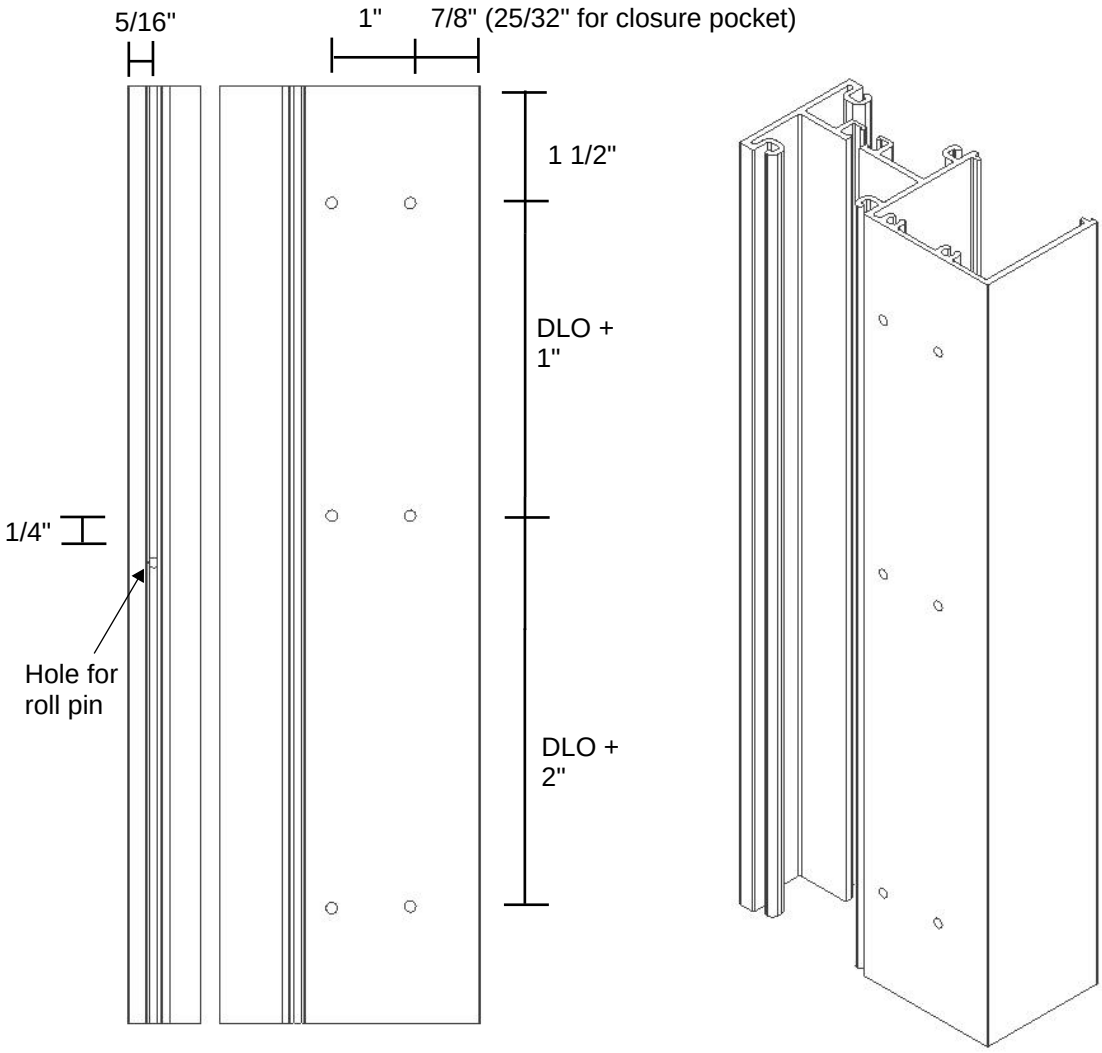
Step 5: Drill Holes in Vertical Framing Members (inside glazed shear block)

• In shear block assembly, the installer secures frame clips to the vertical members with fasteners, slides the horizontal members over the frame clips and secures the horizontal members to the frame clips with fasteners.
• Drill .149" diameter holes in the vertical framing members using a drill fixture, as shown below. Distances for holes will vary vertically depending on horizontals used.
• For insulated glass lights larger than 15 square feet, a 1/8" diameter clearance hole will be needed for each horizontal to accommodate a roll pin (P2401).



Step 5: Drill Holes in Vertical Framing Members (outside glazed shear block)

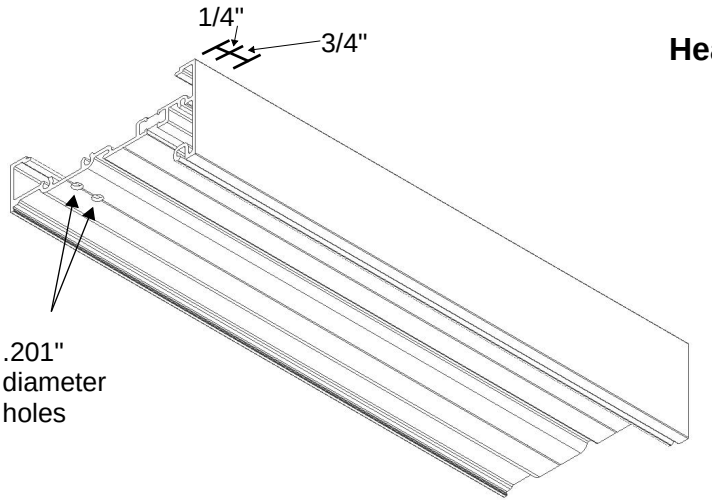
• In shear block assembly, the installer secures frame clips to the vertical members with fasteners, slides the horizontal members over the frame clips and secures the horizontal members to the frame clips with fasteners.
• Drill .149" diameter holes in the vertical framing members using a drill fixture, as shown below. Distances for holes will vary vertically depending on horizontals used.
• For insulated glass lights larger than 15 square feet, a 1/8" diameter clearance hole will be needed for each horizontal to accommodate a roll pin (P2401).



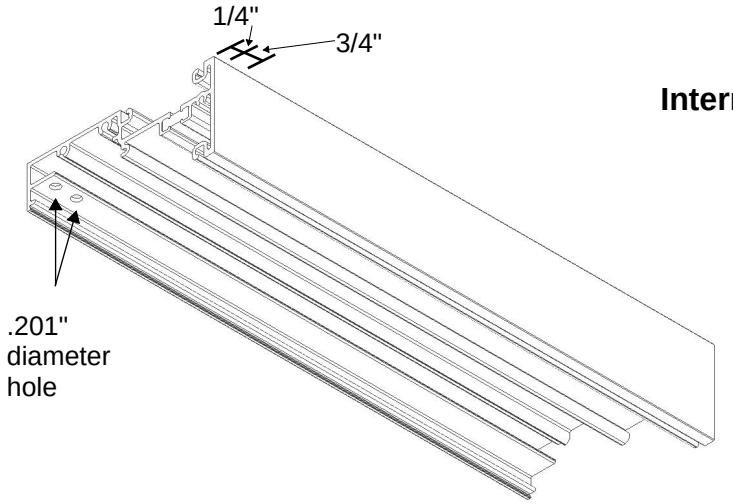
Step 6: Drill Holes in Horizontal Framing Members (inside glazed shear block)

• Shear block assembly requires drilling of horizontals so they can be fastened to frame clips.
• Drill .201" diameter holes in the head, intermediate and sill horizontals using a drill fixture as shown at right.

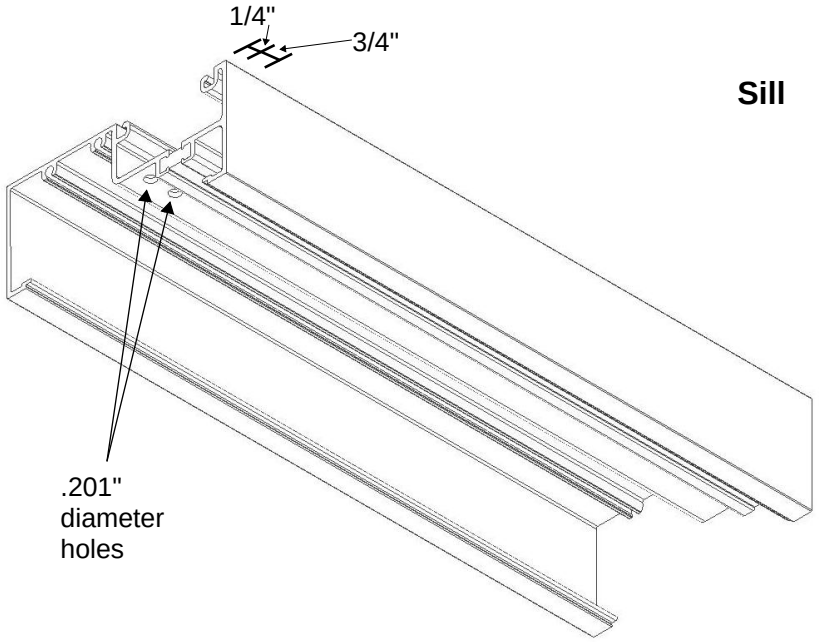
Head



Intermediate



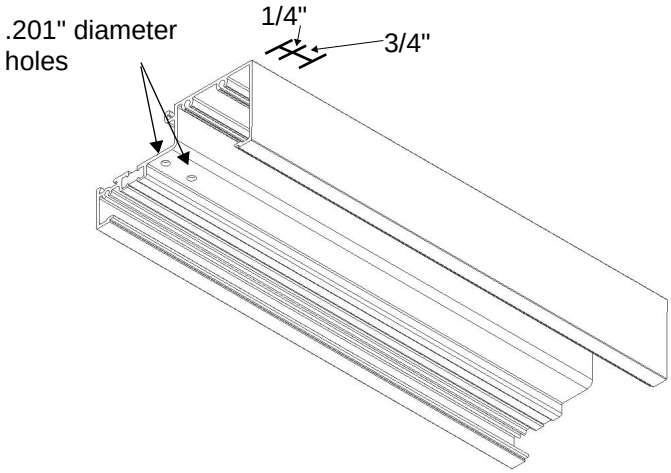
Sill



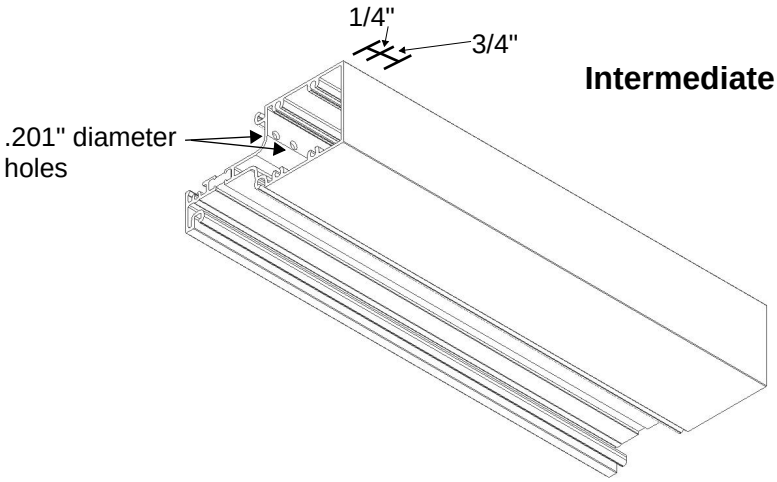
Step 6: Drill Holes in Horizontal Framing Members (outside glazed shear block)

- Shear block assembly requires drilling of horizontals so they can be fastened to frame clips.
- Drill .201" diameter holes in the head, intermediate and sill horizontals using a drill fixture as shown at right.

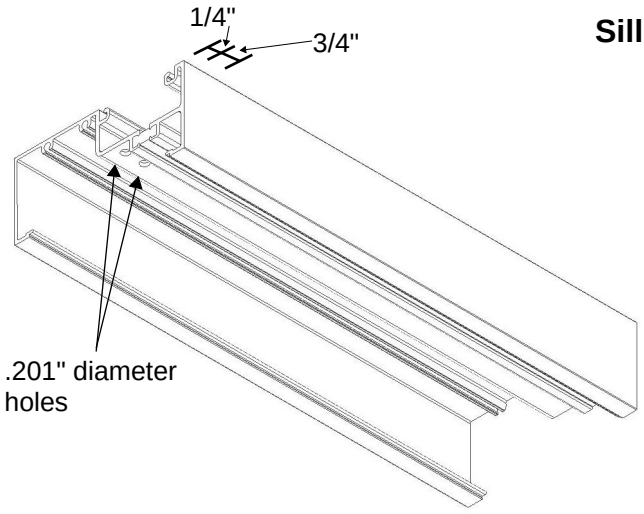
Head



Intermediate



Sill



FRAME INSTALLATION

Step 7: Splice the Sill Flashing Where Required

• If there is an entrance, it should be installed first, taking care to locate it accurately within the opening.
• Properly prepare floor surface as recommended by sealant manufacturer.
• Flashing longer than 24' in length should be spliced as shown in Figure 2.
• Set splice in a bed of sealant at the predetermined location.
• Properly shim flashing off floor to allow for sealant joint width (refer to sealant manufacturer recommended joint width based on expected expansion/contraction of sill flashing).
• Place and anchor the sill in the opening. Ensure the anchor bolt is cap sealed after installation. The gap between any two pieces of sill should be a minimum 3/8" to 1/2" wide, depending on the length of flashing used. Do not drill through the thermal barrier.
• Apply sealant between the two pieces of flashing spanning the splice joint as seen in Figure 3.

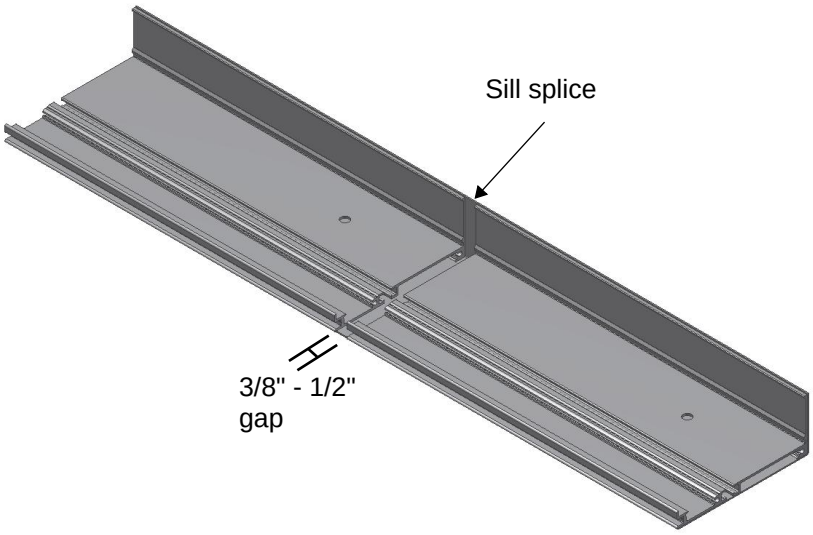


Figure 2: Extruded sill flashing longer than 24' in length should be spliced.

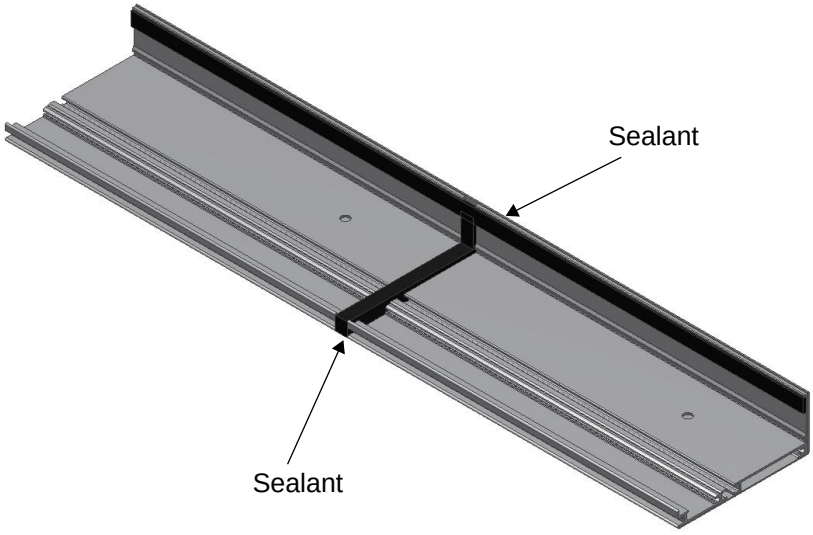
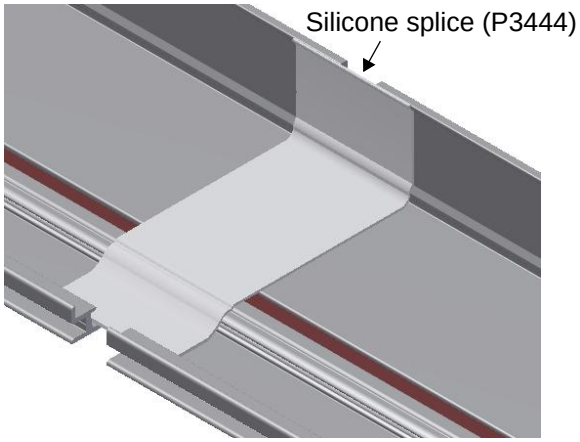
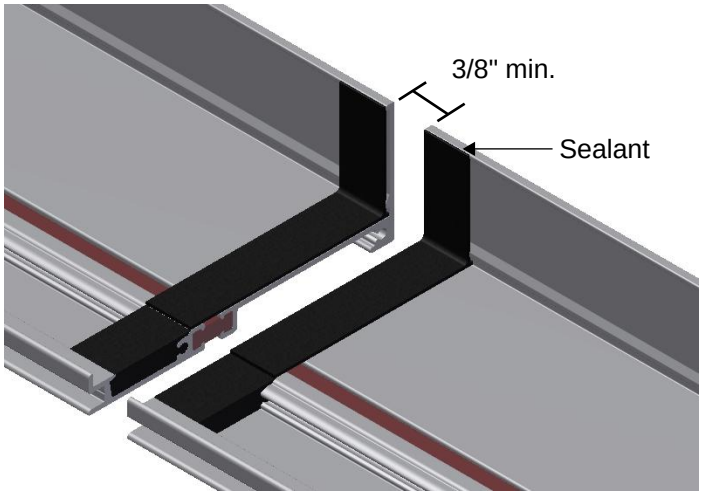


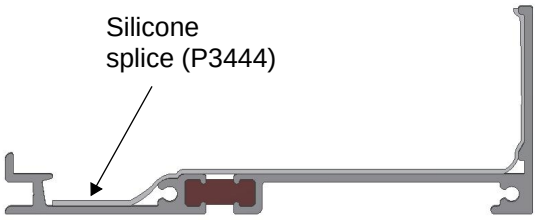
Figure 3: Apply sealant between the two pieces of sill flashing spanning the splice joint.

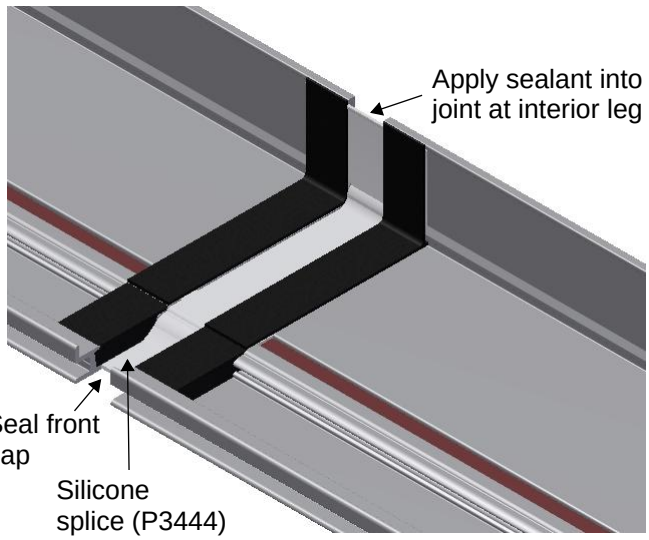
Step 9: Splice the Sill Flashing Where Required (silicone splice, optional)

• If there is an entrance, it should be installed first, taking care to locate it accurately within the opening.
• Properly prepare floor surface as recommended by sealant manufacturer.
• Flashing longer than 24' in length should be spliced.
• Lay silicone splice sleeve (P3444) into sill flashing at splice location and cut to length as shown at top right. Do not run sleeve onto the lip of the flashing; run the sleeve to the lower portion.
• Install backer rod under the sill flashing at the splice joint.
• Clean surfaces where splice will be applied. Apply sealant as shown at right.
• Set splice sleeve in place and tool sealant as shown at bottom right. Seal front and back joints.









Step 8: Attach End Dam to Sill Flashing at Wall

• At a wall, attach an end dam (P1153) to the end of the sill flashing with two S196 fasteners and seal the sill to the end dam as shown in Figure 4. Cap seal fastener heads.
• End dam must be completely sealed on all sides.

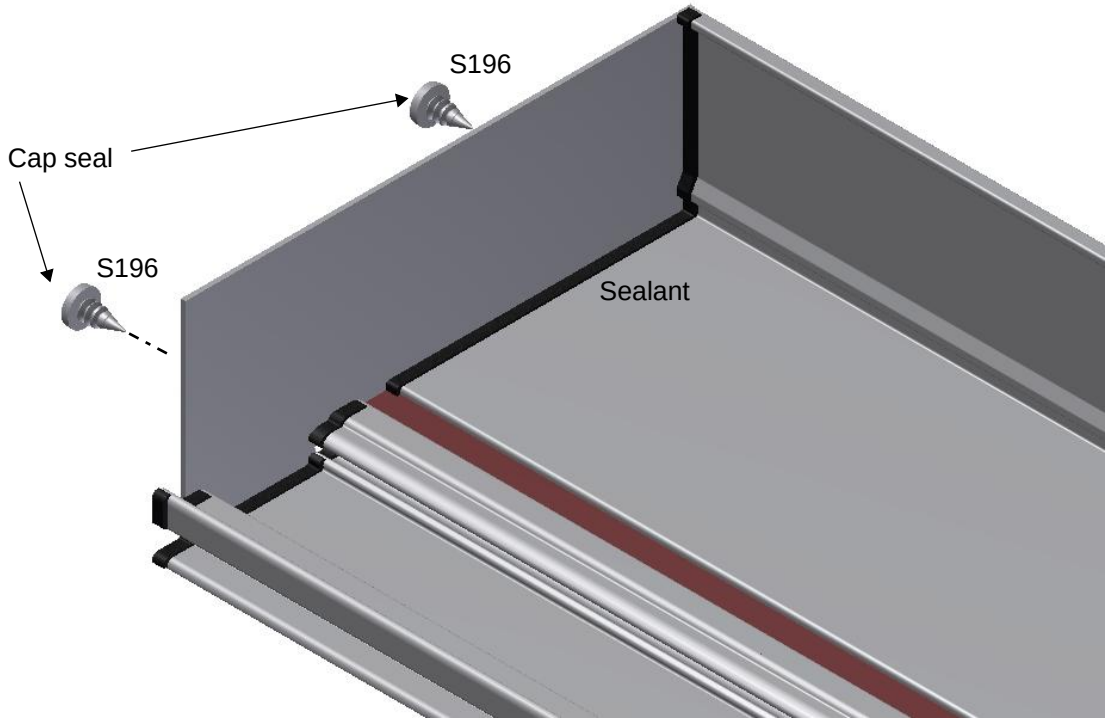


Figure 4: Attach an end dam to the end of the sill flashing at a masonry wall.

Step 9: Seal and Anchor the Sill Flashing

• At jamb conditions, butt the sill flashing up against the back of the door jamb and seal the sill to the back of the entrance frame as shown in Figure 5. Place shims (not by Tubelite) under the flashing as needed to support the sill and level it.
• Fill the jamb pocket cavity completely with sealant.
• Perimeter anchors should be located within 6" of each side of the vertical mullion or as dictated by shop drawings. There should be one anchor per side of intermediate mullions and one at the jamb.
• Drill holes for anchor bolts (not by Tubelite) through the sill and into the masonry, and secure the sill with bolts, as specified in the approved shop drawings. Do not drill through the thermal barrier.
• Cap seal all anchor bolts with sealant. Before the fastener is inserted, force sealant into the hole for the sill perimeter fastener to ensure that the hole through the sill is sealed.
• Do not block weep holes of sill flashing.

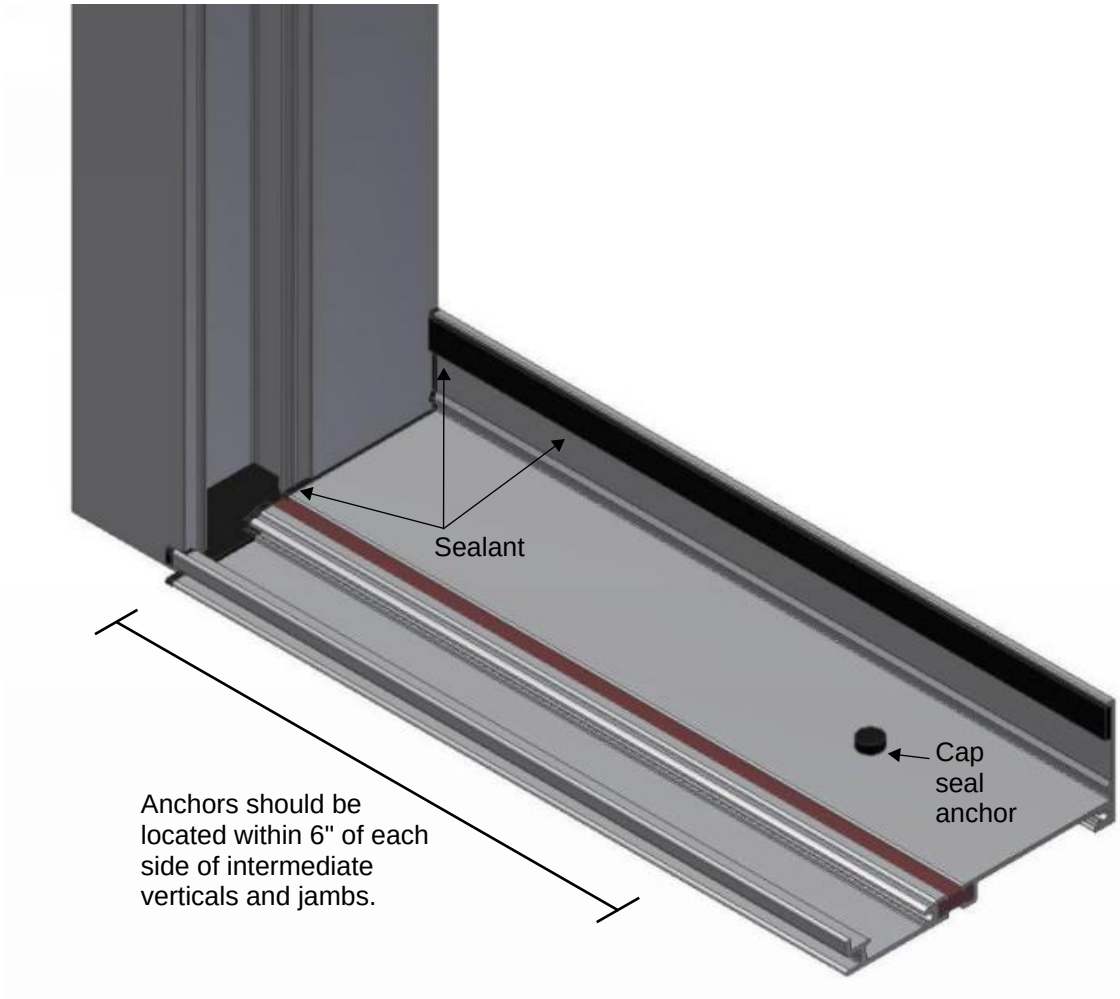
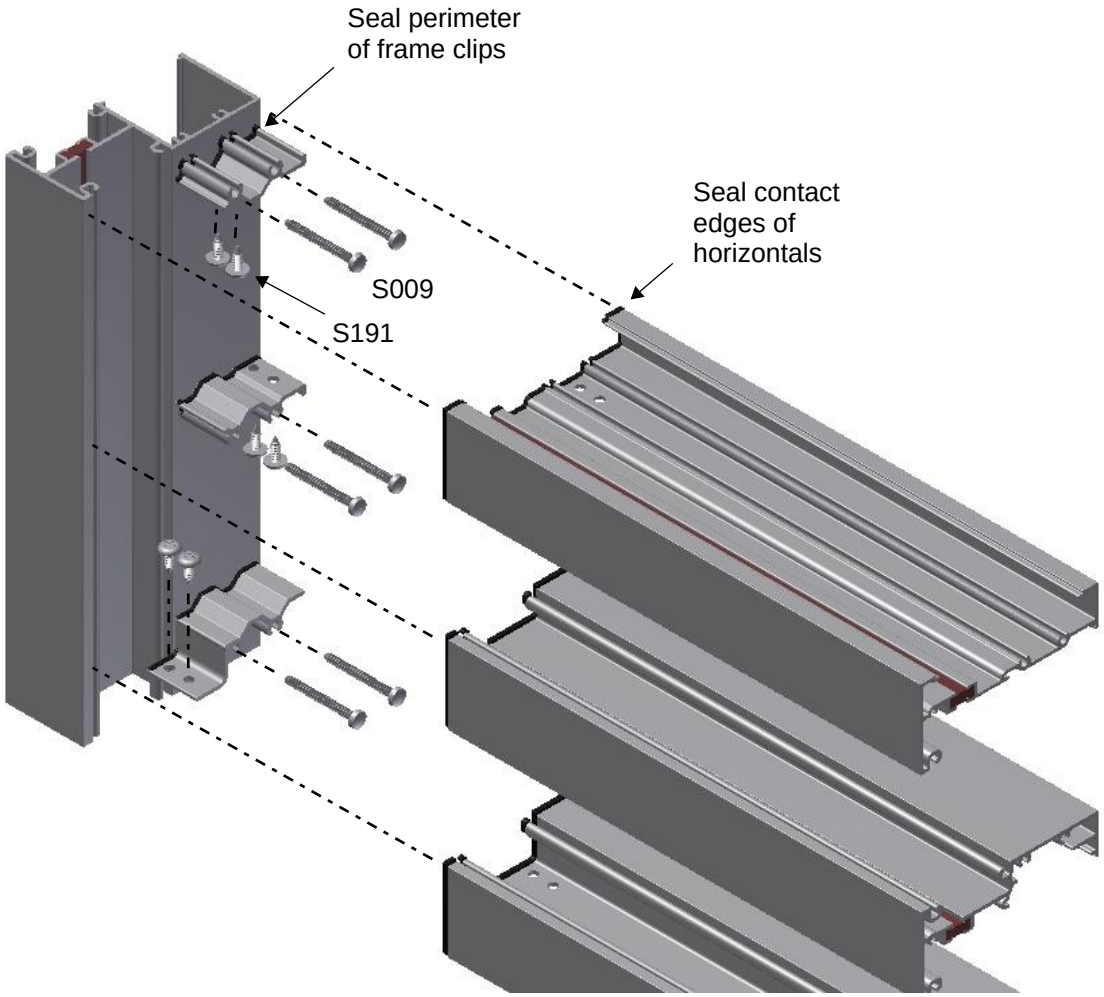


Figure 5: Butt the sill flashing up against the back of the door jamb.

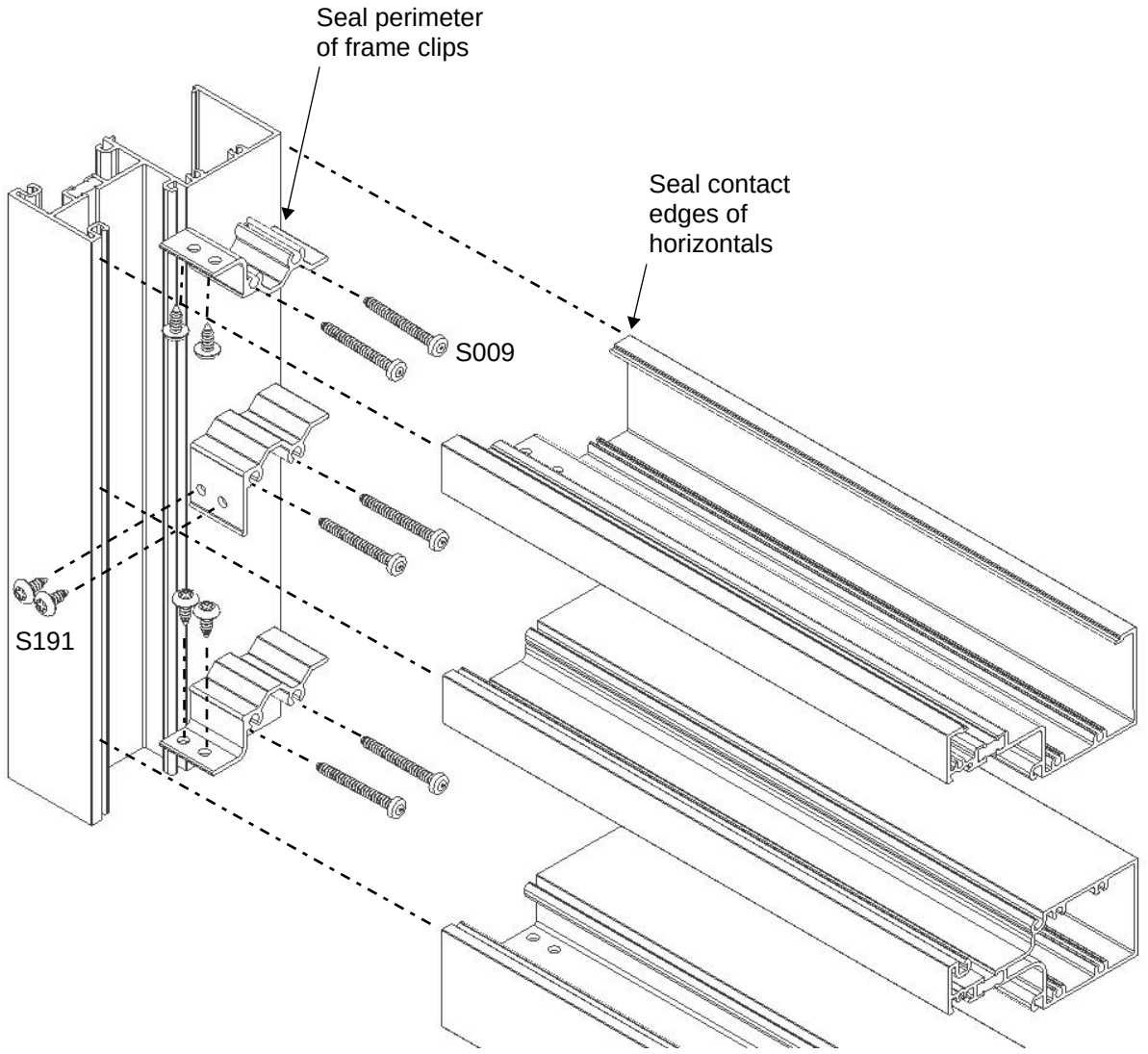
Step 10: Attach Horizontals to Frame Clips (inside glazed shear block)

• Attach frame clips to verticals with S009 fasteners as shown below.
• Apply sealant to the perimeter of the frame clips.
• Apply sealant to contact edge of the horizontal.
• Slide horizontals onto frame clips as shown below. Match drill tap holes in the frame clips using holes in the horizontals as guides and secure horizontals to frame clips with S191 fasteners.
• Apply sealant to the heads of the S191 fasteners.



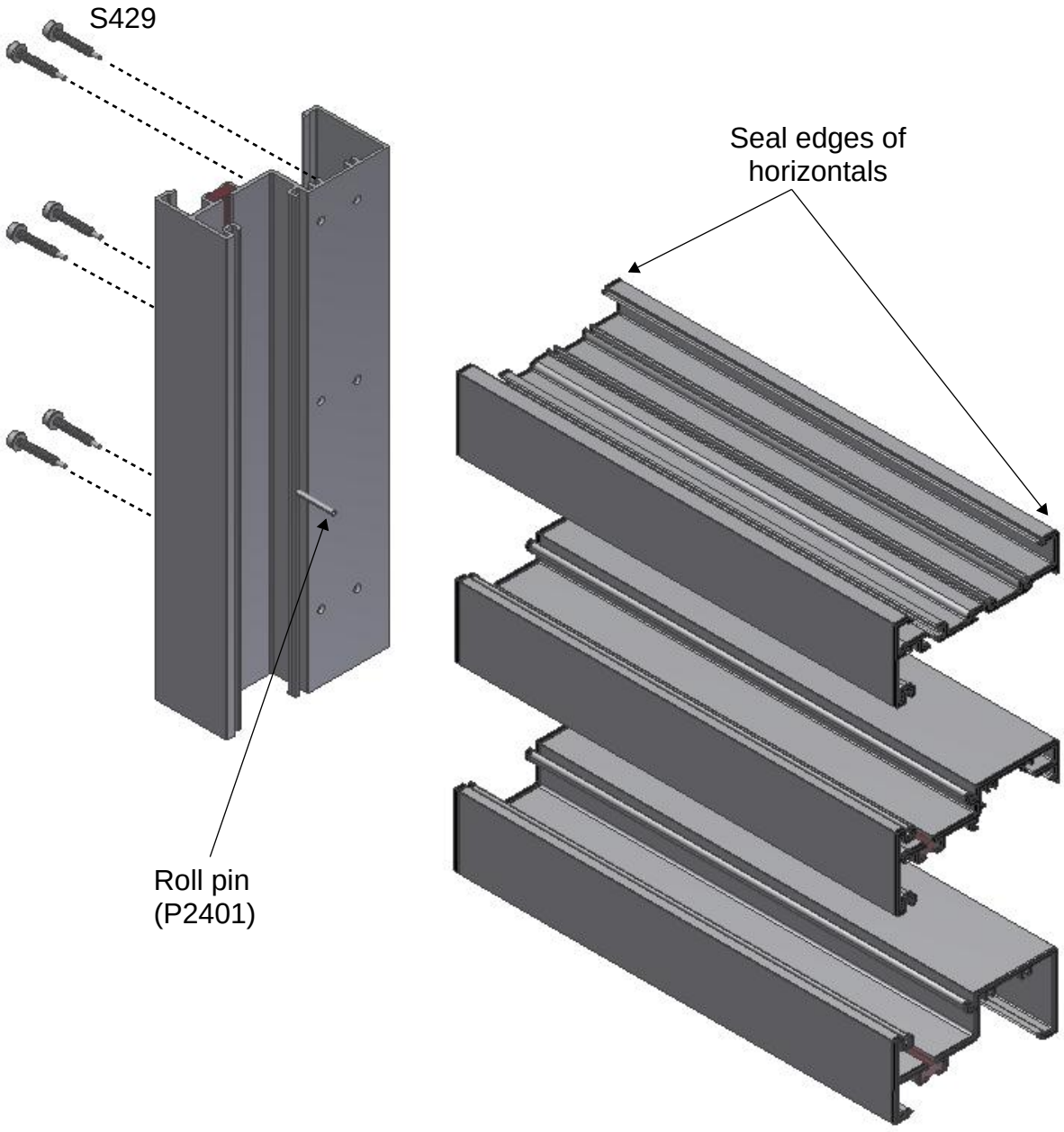
Step 10: Attach Horizontals to Frame Clips (outside glazed shear block)

- Attach frame clips to verticals with S009 fasteners as shown below.
- Apply sealant to the perimeter of the frame clips.
- Apply sealant to contact edge of the horizontal.
- Slide horizontals onto frame clips as shown below. Match drill tap holes in the frame clips using holes in the horizontals as guides and secure horizontals to frame clips with S191 fasteners.
- Apply sealant to the heads of the S191 fasteners.



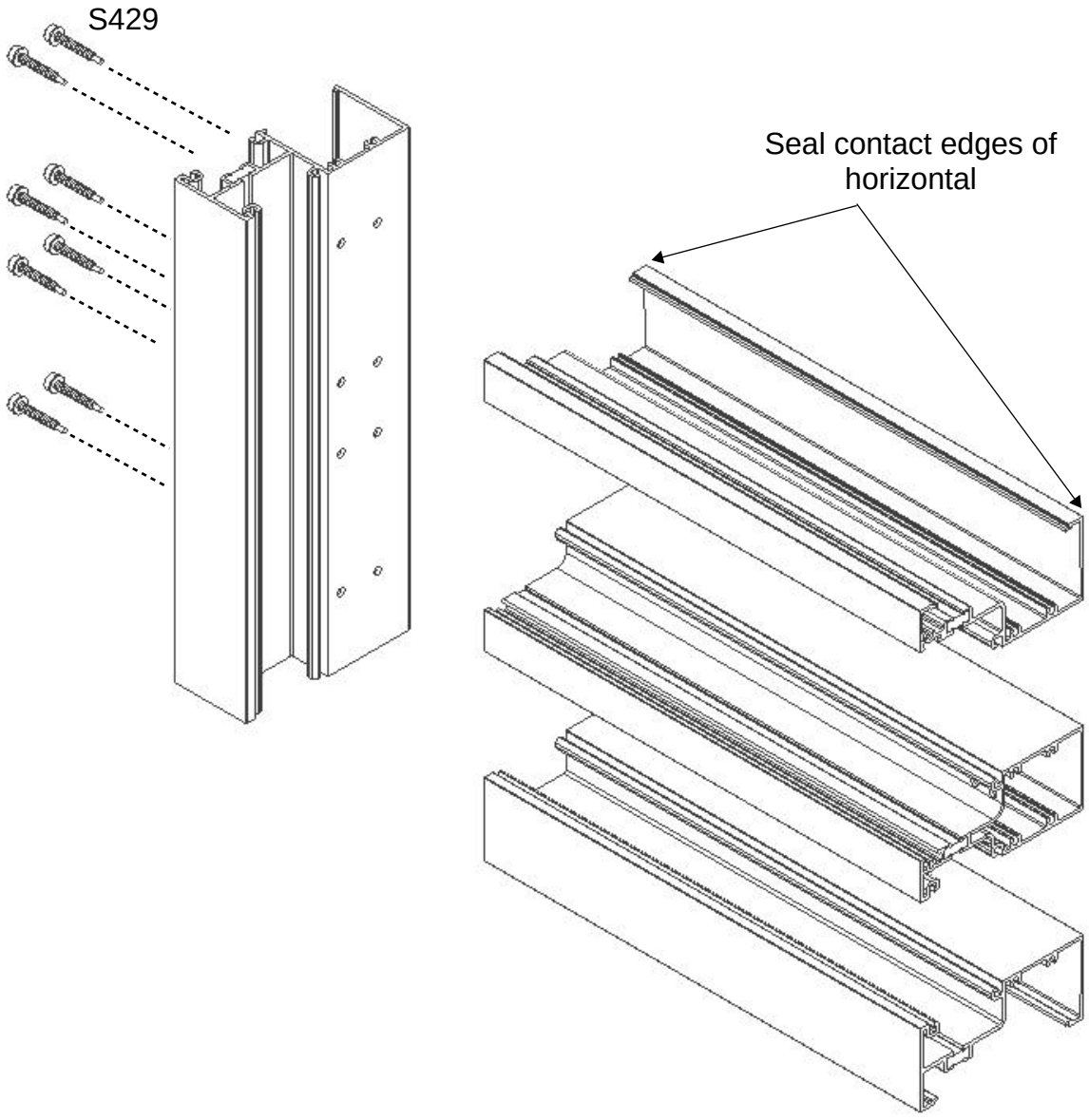
Step 11: Attach Horizontals to Verticals (inside glazed screw spline)

- Apply sealant to all the contact edges of the horizontal.
- Secure horizontals to vertical using S429 fasteners as shown below.



Step 11: Attach Horizontals to Verticals (outside glazed screw spline)

- Apply sealant to all the contact edges of the horizontal.
- Secure horizontals to vertical using S429 fasteners as shown below.



Step 12: Install Assembled Units (screw spline)

• Apply sealant to end of horizontal.
• Install the assembled units beginning at the entrance, and working toward the jambs. If there is no entrance, begin at one jamb and work toward the other.
• In the case of smaller units, the last two may need to be snapped together and then pivoted into position together.

Step 13: Add Steel Reinforcement (if necessary)

• Refer to approved shop drawings to determine whether the application requires steel reinforcement.
• Cut steel reinforcement channel 4" shorter than mullion length or as required by shop drawings. Paint ends to prevent rust.
• Insert steel into the mullion as shown in Figure 6. Align and center the steel with mullion, then drill .213" diameter holes through the mullion and steel according to shop drawings.
• Attach the steel reinforcement using an appropriate fastener (not by Tubelite).

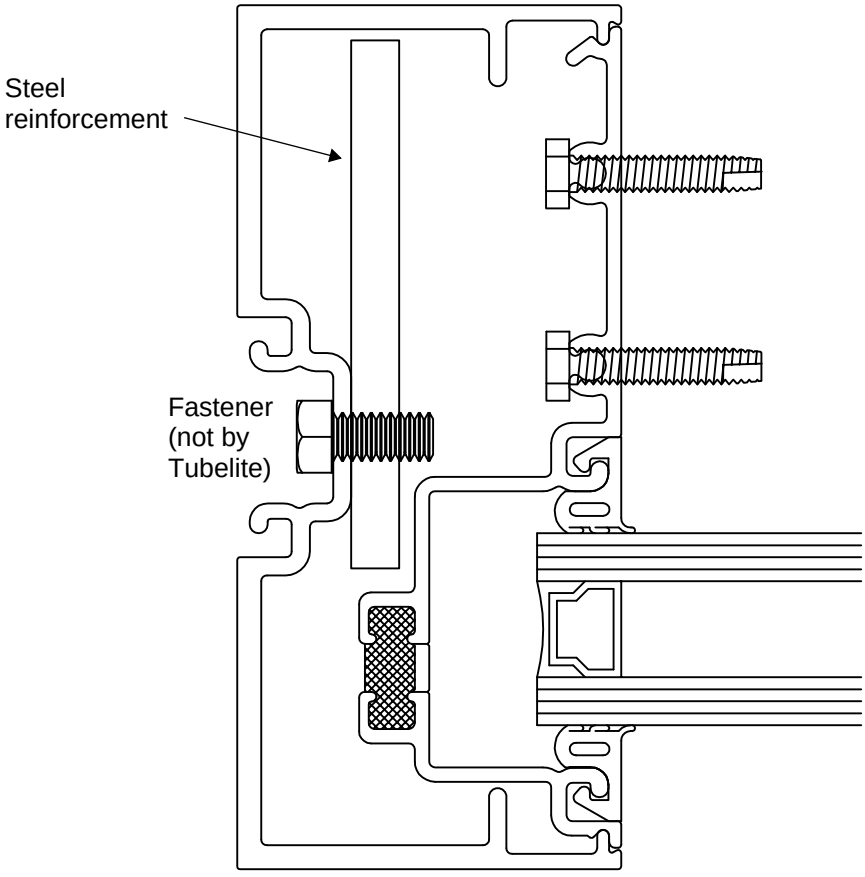


Figure 6: Install steel reinforcement if necessary.

Step 14: Attach Frame to Building Structure

• Install shims at head and jambs and ensure frames are installed plumb and true. Use a piece of P1745 to provide back-up support for shimming and fasteners.
• Attach the jambs and head to the perimeter of the opening with suitable fasteners. Perimeter anchors should be located within 6" of each side of the vertical mullion. Note: This is for general erection procedures only. For actual job conditions, refer to shop drawings for appropriate fastener and hole locations as determined by a qualified engineer or consult the project design professional.

Step 15: Install Water Diverters

• Use a solvent and a clean cloth to clean the surfaces of the horizontals where water diverters will be installed. Also clean the vertical reglets on both sides to at least 1” above the gasket reglets on the horizontal member.
• When the surfaces are dry, butter the underside of the P1135 water diverter with sealant and press the diverter to the horizontal in the glazing pocket as shown in Figure 7. Extend diverter past glass edge.
• Pump sealant into both vertical gasket reglets, and seal the edges of the diverter on all sides EXCEPT the edge facing the pocket. You must avoid getting sealant in this area in order to allow the system to drain.
• Seal the joint between the vertical and horizontal members from the diverter to the top of the horizontal gasket reglet.
• Cap seal fastener heads and embed water diverter in sealant.

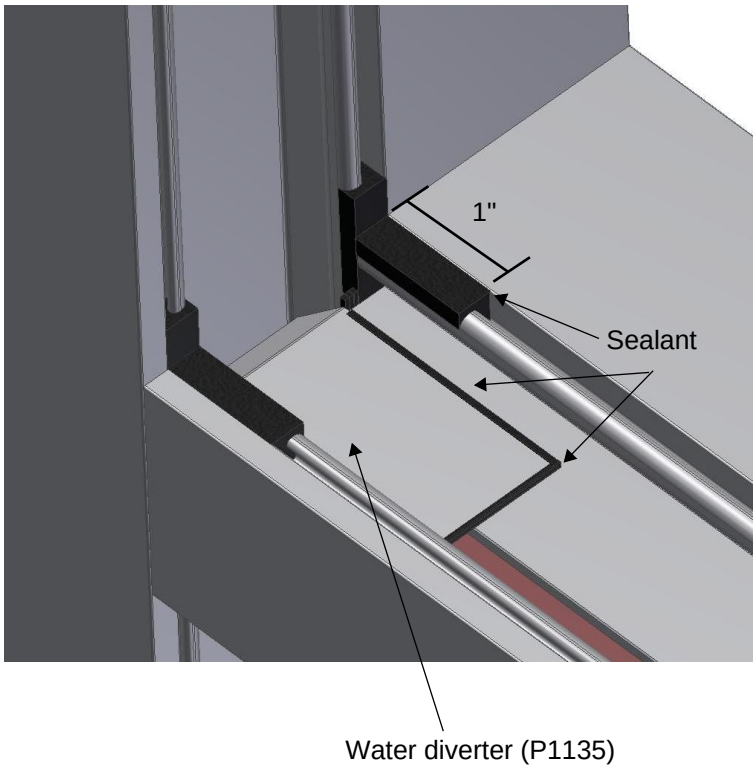


Figure 7: Install a water diverter on the surface of the horizontals. Seal the reglets and the water diverter on all edges except the one facing the vertical pocket.

GLAZING INSTALLATION

• All glazing pockets are 1 7/16” wide, and will accept glazing up to and including 1 1/8” thick, dry glazed.
• Glass dimensions should not exceed daylight opening (DLO) plus 3/4”.
This formula does not take into account out-of-square openings or glass tolerances. Consult the glass manufacturer before determining final glass sizes.
• When cutting gaskets, add 1/16” to 1/8” per foot of daylight opening for shrinkage (an eighth of an inch per foot is approximately 1%) as shown in Figure 8. Open, unsealed gasket joints are a potential source of leakage and water damage to interior finishes.
• Do not stretch gasket or it will return to its original form, creating gaps at the gasket intersections.
• For installations that use 1/4" or 1/2" glass, glazing adapters will need to be installed in the glazing pockets of the vertical and horizontal framing members that surround the lights to be glazed. For verticals, glazing adapters should be 3/32" longer than the vertical DLO of the light. For horizontals, the length of the glazing adapters should equal the horizontal DLO.
• In areas with seismic concerns, anti-walk blocks (not by Tubelite) are recommended.

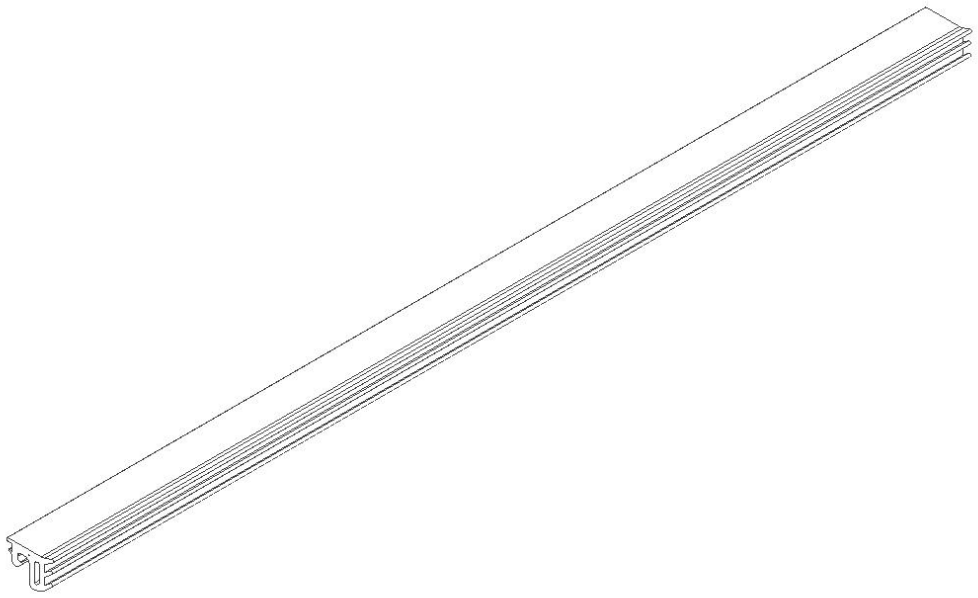


Figure 8: When cutting gaskets, add 1/16" to 1/8" per foot of daylight opening for shrinkage.

Step 16: Cut and Install Exterior Gaskets (inside glazed)

- For outside glazed applications, the interior gaskets will be installed first.
- Cut the exterior gaskets.
- Install gaskets on the side of frame opposite glass stop first.
- Apply sealant in the gasket reglet for 1” from the intersection of the vertical member.
- Install the exterior vertical gaskets, at each end and work toward the center, firmly pushing the gasket in place, as shown in Figure 9.
- Apply sealant in the gasket reglet for 1” from the intersection of the horizontal member.
- Install the exterior horizontal gaskets at each end and work toward the center, firmly pushing the gasket in place as shown in Figure 10.
- Apply sealant at the intersection to marry the vertical and horizontal glazing gaskets as shown in Figure 11. Tool all sealant to present a neat, clean appearance.

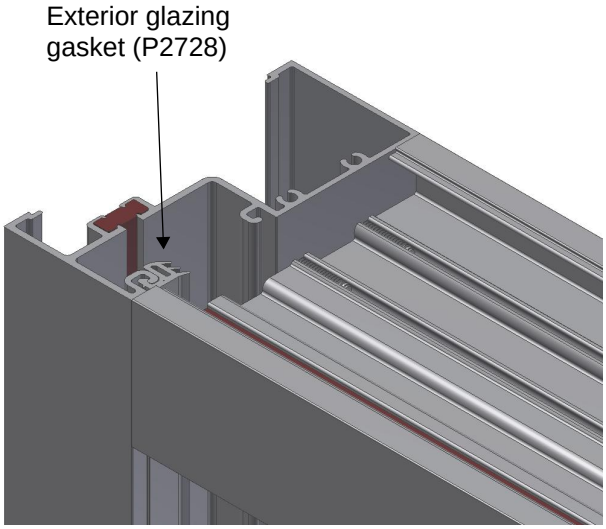


Figure 9: Install the exterior vertical gaskets.

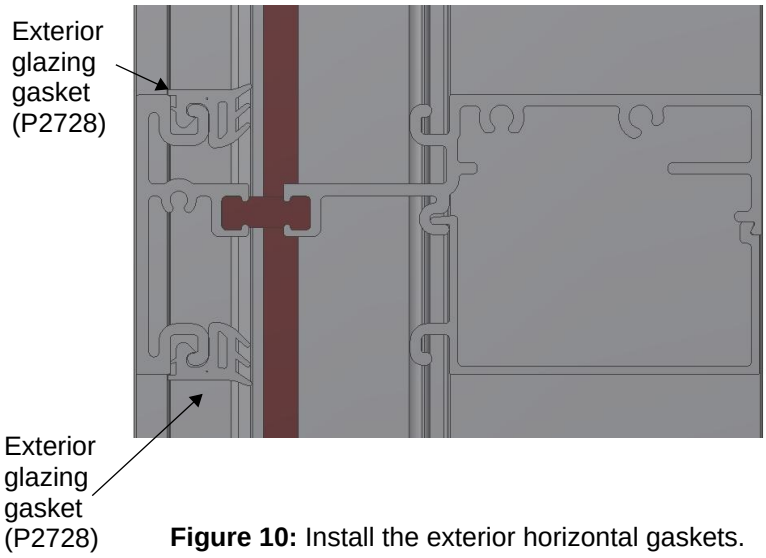


Figure 10: Install the exterior horizontal gaskets.

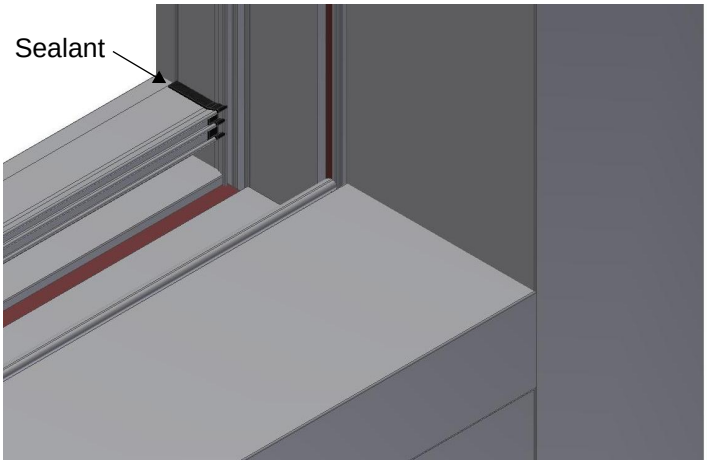


Figure 11: Apply sealant to the intersection of the gaskets.

Step 17: Install the Glass

• Position the glass in the frame.
• Raise the glass off the bottom horizontal, and place a setting block at each quarter point (two setting blocks per lite) or as required by project.
• Lower the glass onto the setting blocks as shown in Figure 12.
• Consult glass manufacturer about setting block location and length requirements if glass size exceeds 40 square feet.

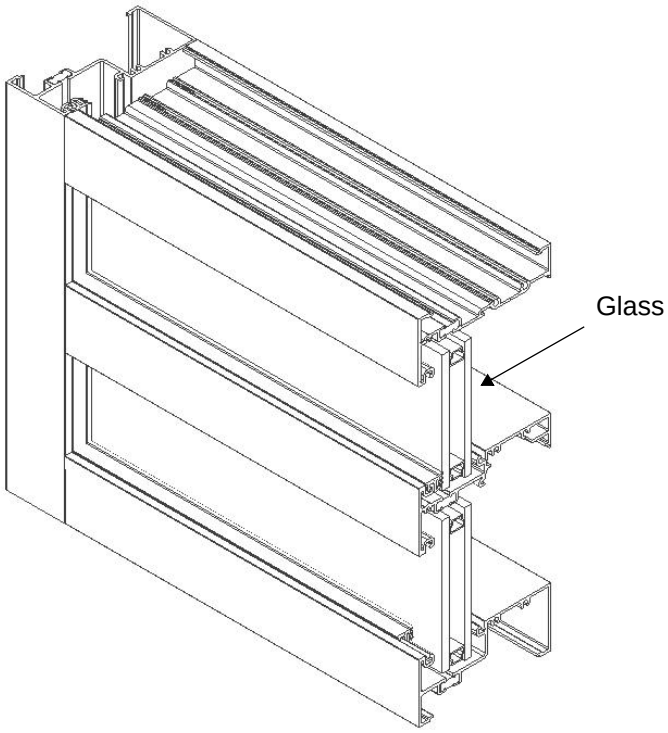


Figure 12: Install the glass with setting blocks.

Step 18: Install Glass Stop

• Install the glass stop into the horizontal after the glass has set, as shown in Figure 13.

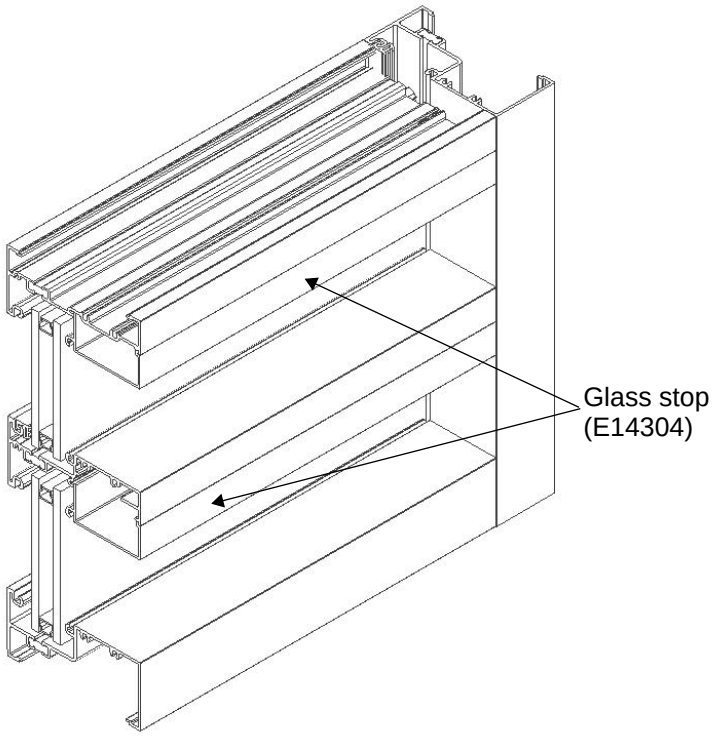


Figure 13: Install the glass stop into the horizontal after the glass has set.

Step 19: Cut and Install the Interior Gaskets (inside glazed)

• The exterior gaskets will be installed at this point for outside glazed applications.
• Cut the interior vertical gaskets.
• Apply sealant in the gasket reglet for 1” from the intersection of the vertical member.
• Install the interior vertical gaskets at each end and work toward the center, firmly pushing the gasket in place, as shown in Figure 14.
• Cut the interior horizontal gaskets.
• Apply sealant in the gasket reglet for 1” from the intersection of the horizontal member.
• Install the interior horizontal gaskets, at each end and work toward the center, firmly pushing the gasket in place.

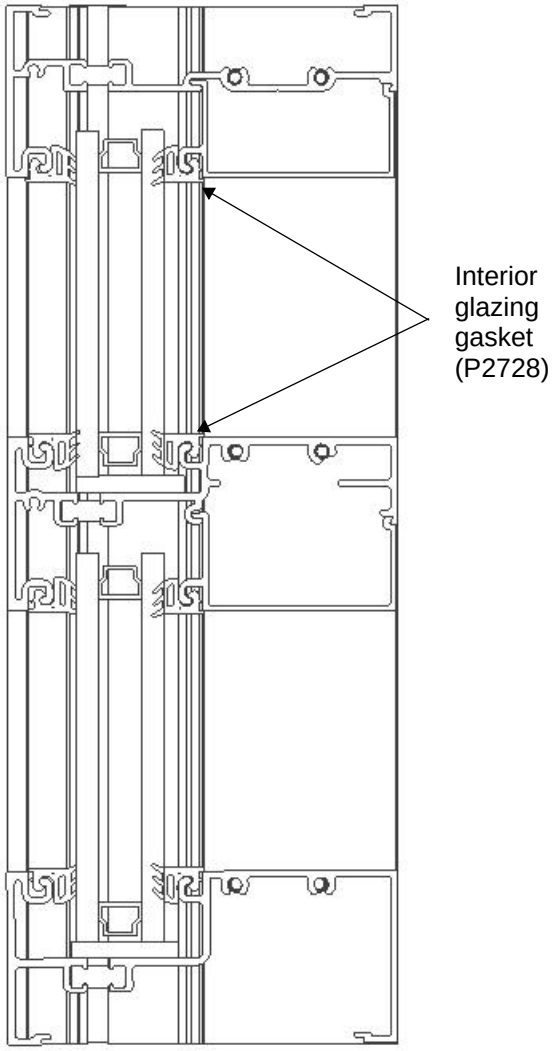


Figure 14: Install the interior vertical gaskets.

Step 20: Seal Perimeter of Installation

• The primary, critical seal location is at the exterior leg of the framing members, including the exterior leg at the bottom of the sill flashing.
• Insert backer rod into the gap between the frame and the building substrate on top, sides and bottom of the installation as shown in Figure 15.
• Apply sealant to fill the void.
• Tool the sealant smooth.

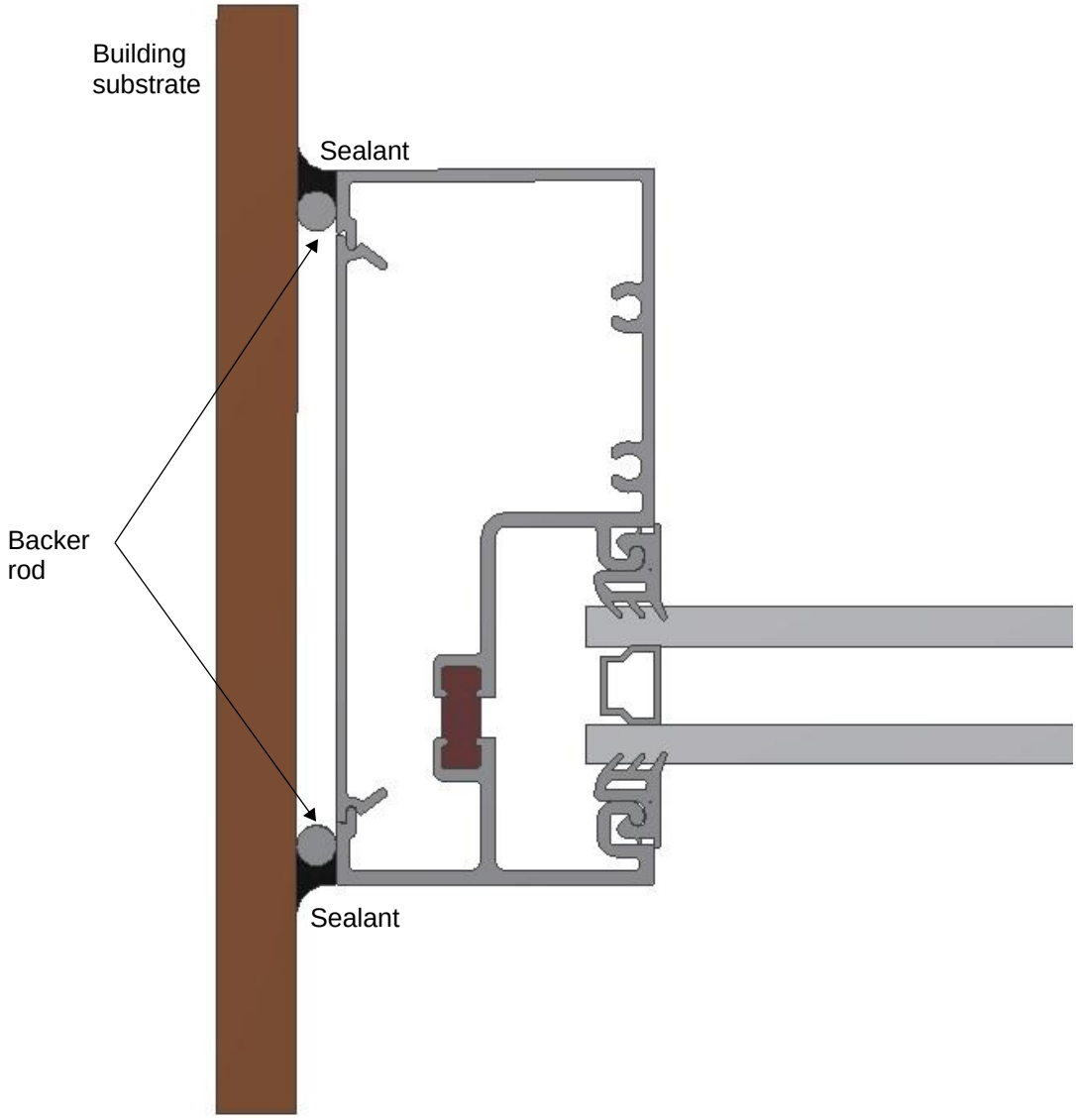
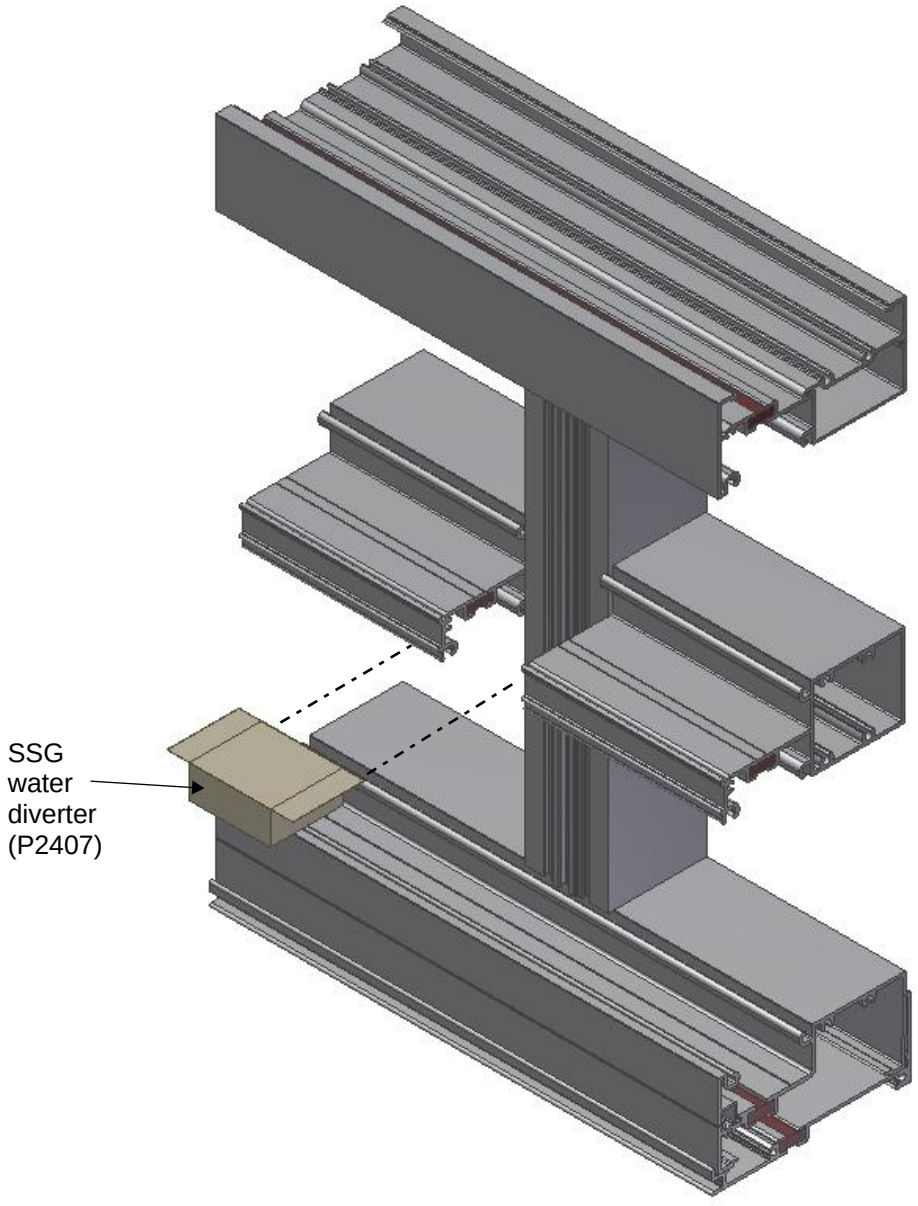


Figure 15: Insert backer rod into the gap between the frame and building substrate.

SSG CONDITION

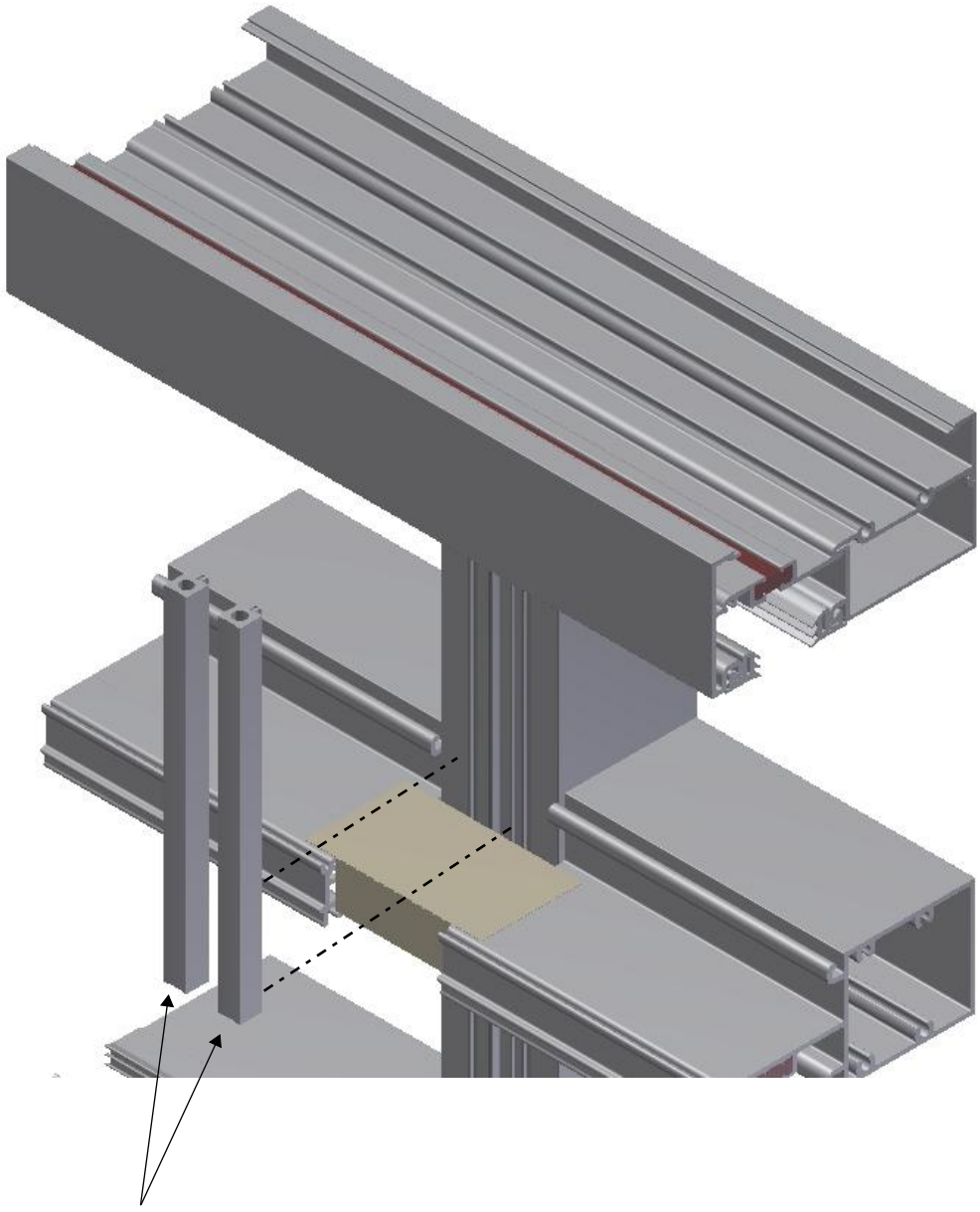
Step 1: Install Water Diverter

• For an SSG condition, shear block assembly must be used. The head and sill run through, while the intermediates attach to the vertical. After the horizontals have been attached to the SSG vertical mullion, a water diverter is necessary.
• Install a water diverter (P2407) between the horizontal and the SSG vertical as shown below. Seal perimeter of diverter on horizontals.



Step 2: Install Spacers

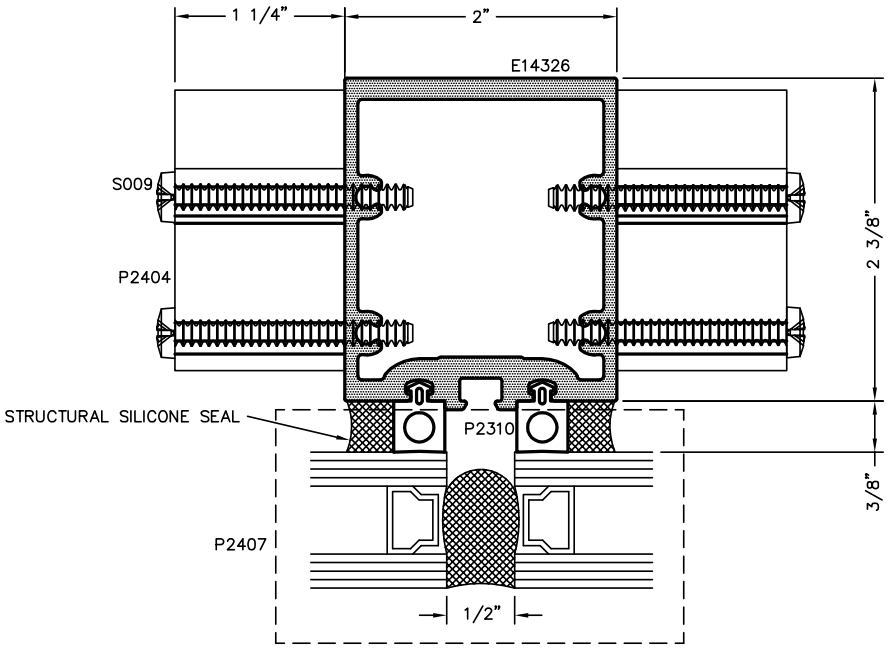
• The SSG condition uses a different type of gasket (P2310) than the typical 14000 I/O system (P2728).
• Install gaskets into the reglets of the vertical mullion as shown below.

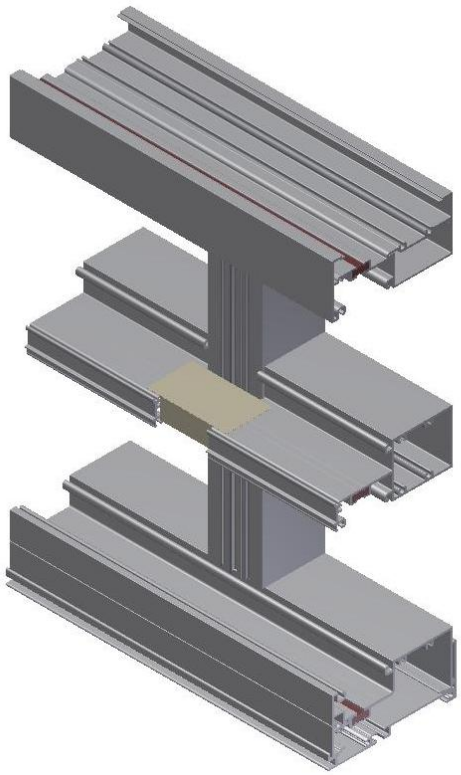


Glazing gasket (P2310)

Step 3: Set Glass and Apply Structural Sealant

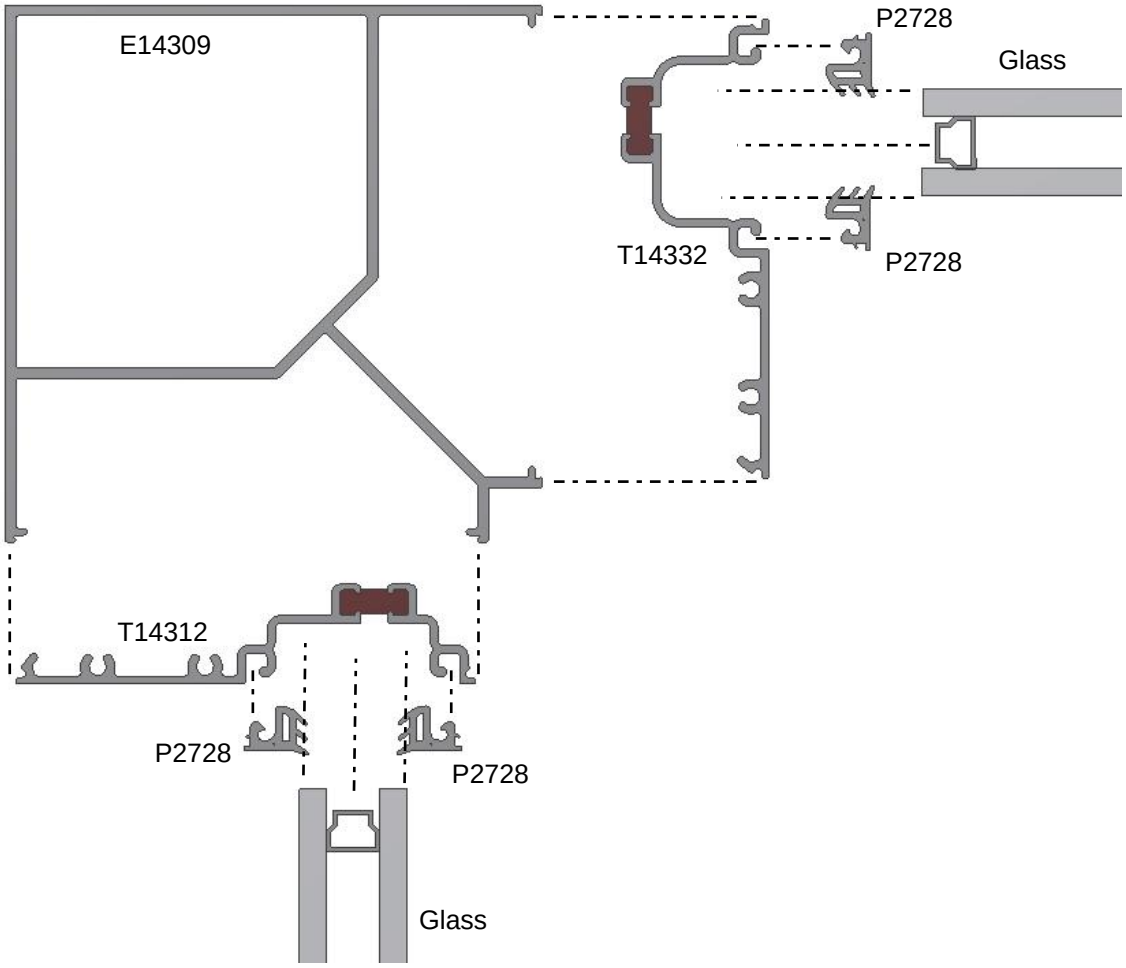
- Set the glass.
- Apply structural sealant as shown below.





CORNER CONDITIONS

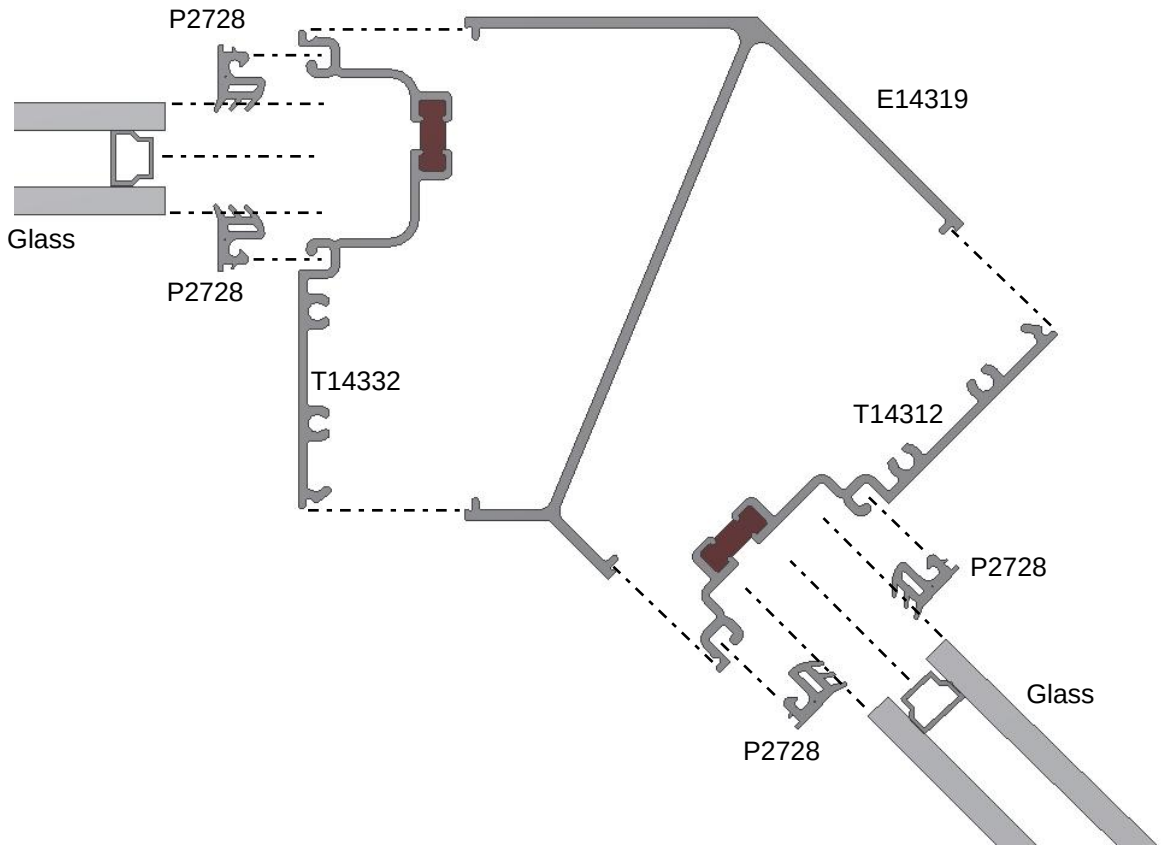
90 Degree Captured Corner Assembly



Assembly

- Install a pair of vertical fillers (T14332 and T14312) to the 90 degree corner member (E14309).
- Seal the joints where they intersect.
- Install the interior glazing gaskets (P2728) to the vertical fillers.
- Set the glass.
- Install the exterior glazing gaskets (P2728) to the vertical fillers.

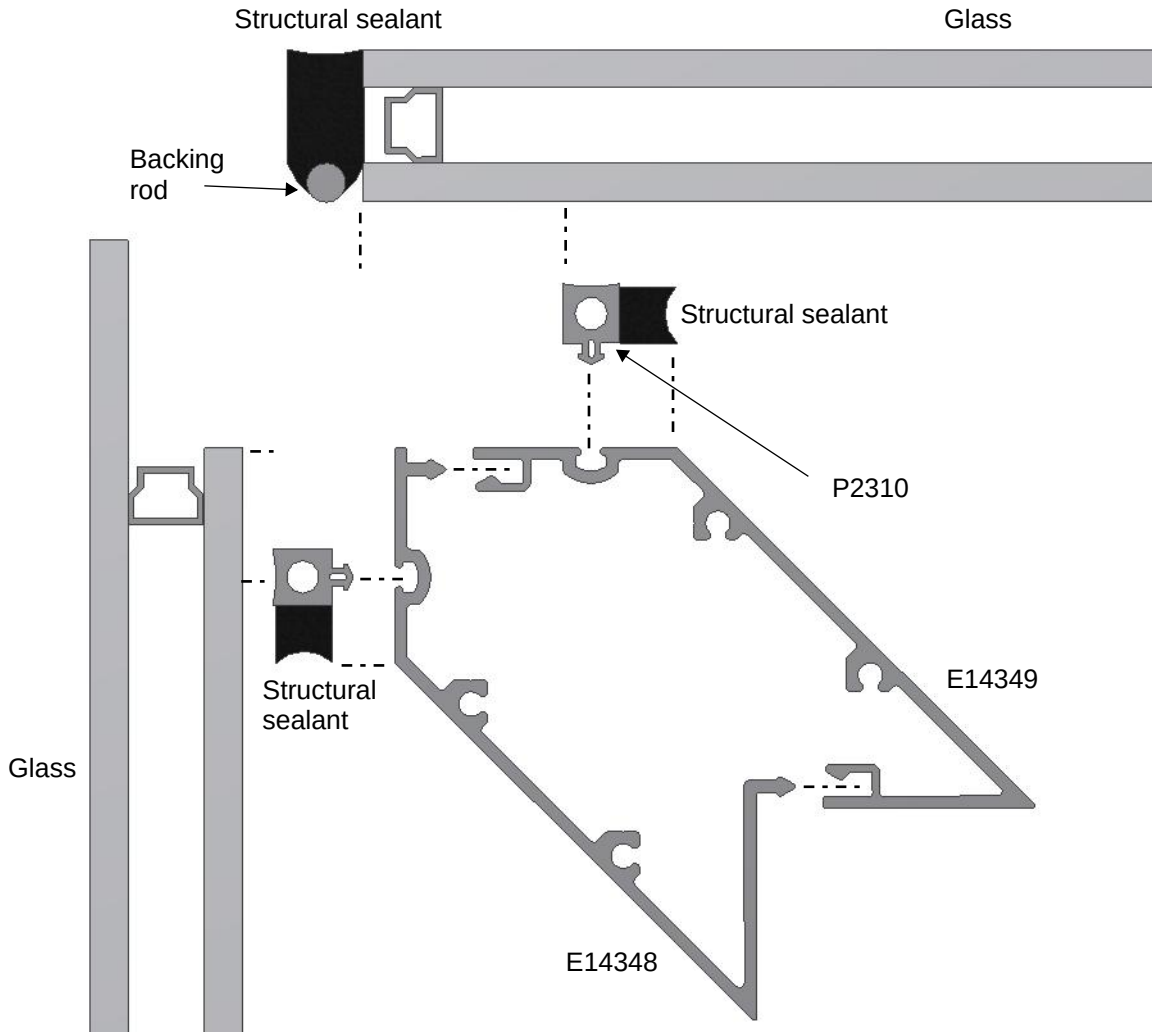
135 Degree Captured Corner Assembly



Assembly

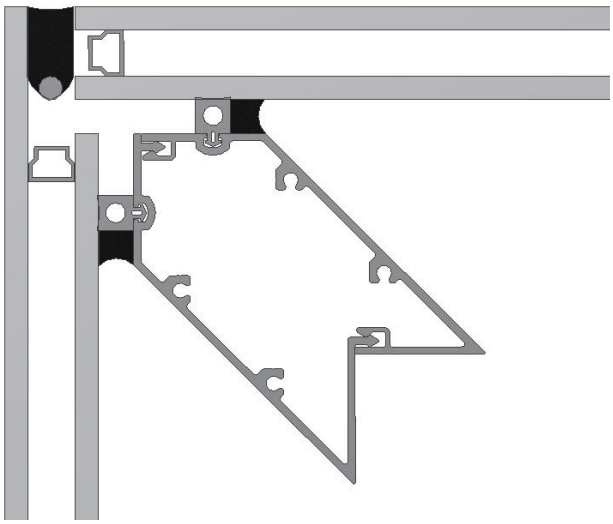
- Install a pair of vertical fillers (T14312 and T14332) to the 135 degree corner member (E14319).
- Seal the joints where they intersect.
- Install the interior glazing gaskets (P2728) to the vertical fillers.
- Set the glass.
- Install the exterior glazing gaskets (P2728) to the vertical fillers.

90 Degree SSG Corner

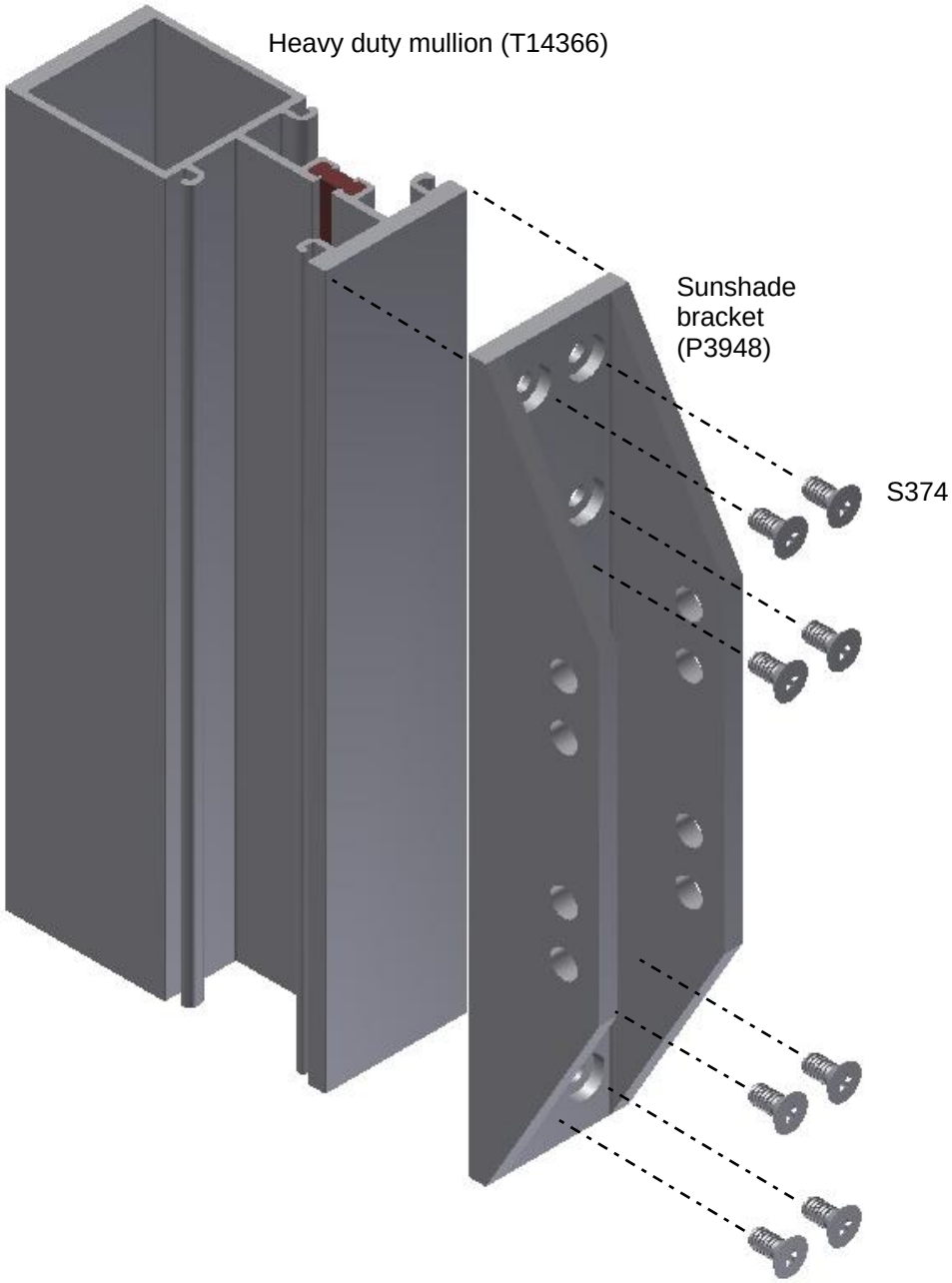


Assembly

- Attach the male SSG corner member (E14348) to the female SSG corner member (E14349)
- Attach glazing gaskets (P2310) to the corner members.
- Set the glass.
- Apply structural sealant next to the gaskets.
- Apply structural sealant and a backer rod where the lites of glass meet.



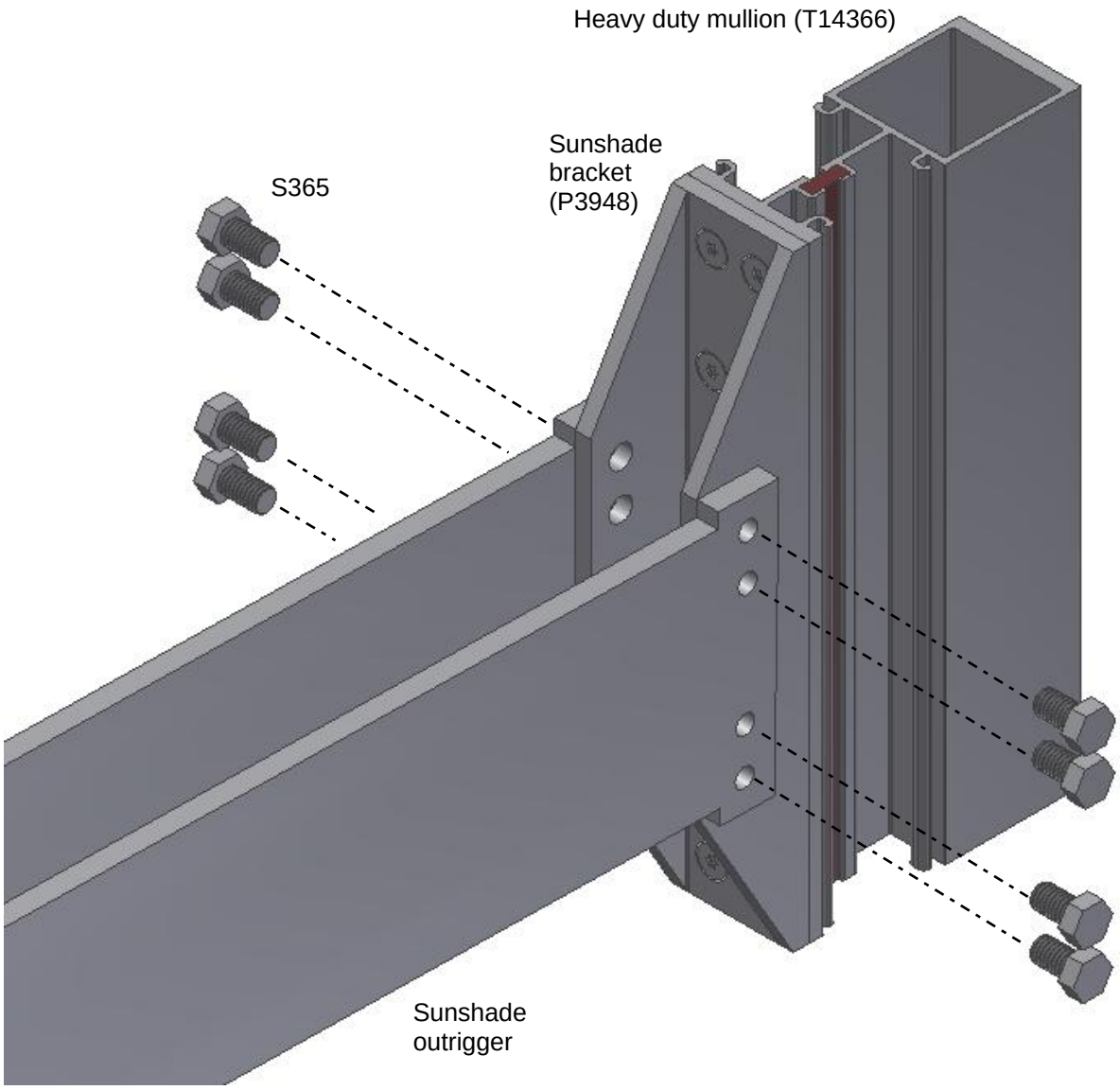
SUNSHADE ATTACHMENT



Assembly

- A drill fixture is available (P3952) to locate holes on the sunshade attachment bracket (P3948).
- Attach sunshade attachment bracket (P3948) to heavy duty vertical (T14366) using eight S374 fasteners.

SUNSHADE ATTACHMENT



Assembly

- Using eight S365 fasteners, attach the sunshade outrigger to the sunshade attachment bracket.