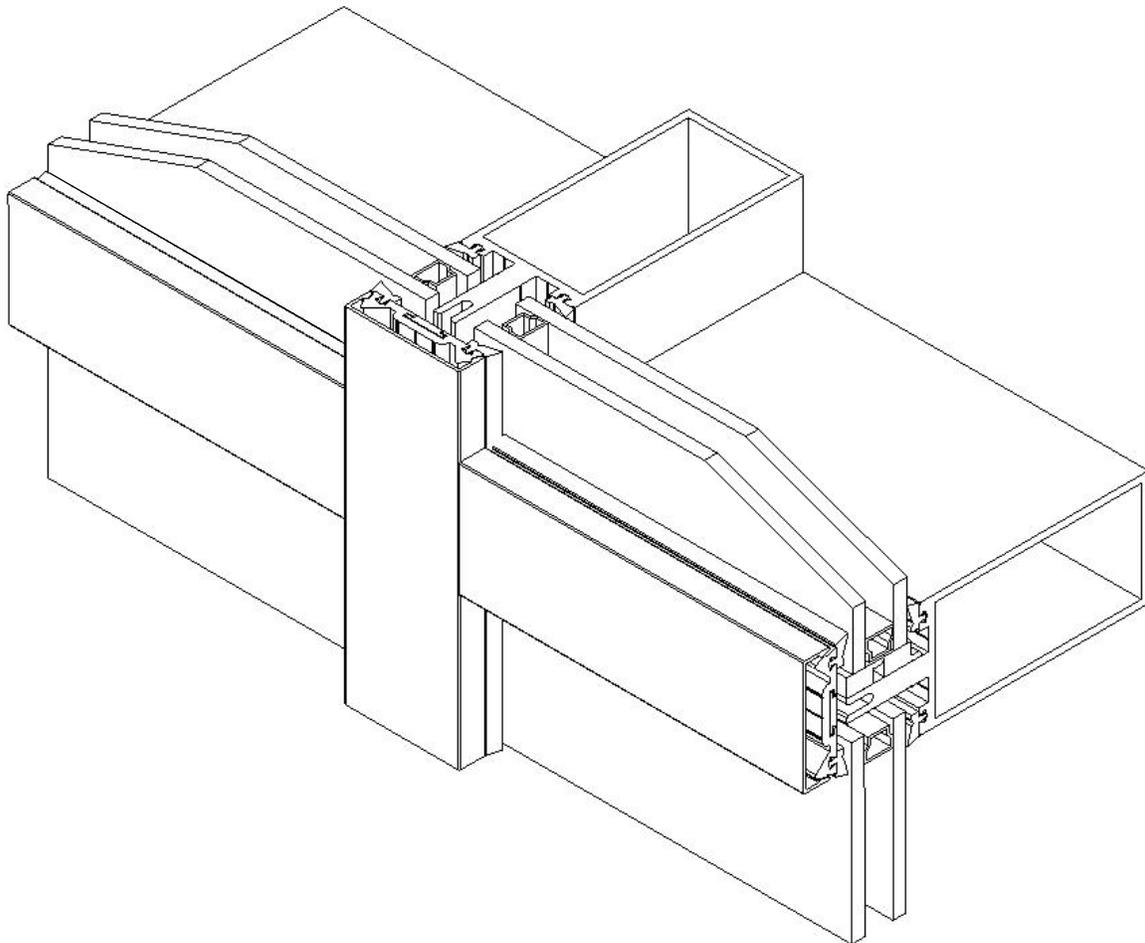


Installation Instructions

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



200 Series Curtainwall

3056 WALKER RIDGE DR. NW, SUITE G WALKER, MI 49544
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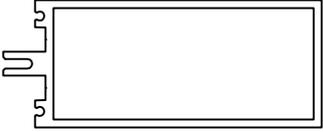
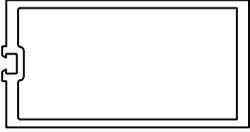
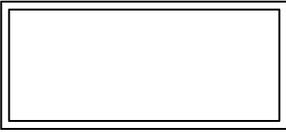
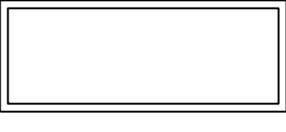
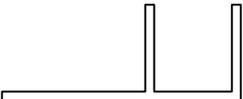
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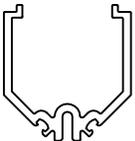
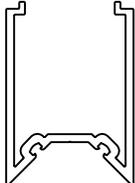
GENERAL CONSTRUCTION NOTES

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.

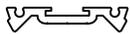
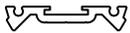
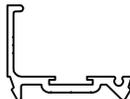
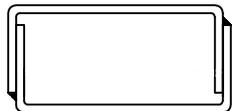
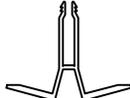
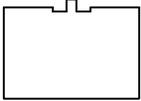
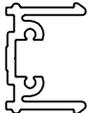
EXTRUSIONS

Shape	Description	Part No.
	Back member for captured 1" glass	E1180: 2" x 2 1/2" E2053: 2" x 3 5/8" E1199: 2" x 4" E1025: 2" x 4 1/2" E2297: 2" x 6"
	Back member for captured 1/4" glass	E1046: 2" x 2 1/2" E1495: 2" x 4" E0977: 2" x 4 1/2" E1584: 2" x 6"
	Open-back perimeter	E3284: 2" x 4" E3285: 2" x 6"
	Back member for silicone glazed 1" glass	E3127: 2" x 4" E3126: 2" x 4 1/2" E3125: 2" x 6"
	2" screw applied horn	E3270: 1" glass E2012: 1/4" glass
	2" x 4 1/2" tube	E1451
	1 3/4" x 4 1/2" slick tube	E0041
	4" x 1" F anchor perimeter runner	E3162
	2 1/2" x 1" F anchor perimeter runner	E1094

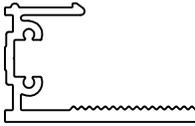
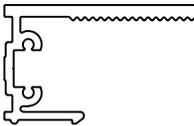
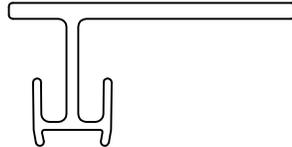
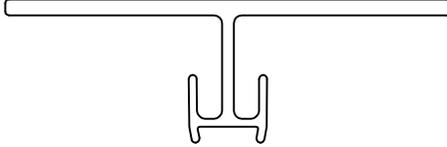
EXTRUSIONS

Shape	Description	Part No.
	Snap cover	E0968: 2" x 1/2" E0992: 2 x 3/4" E2606: 2" x 1" E1214: 2" x 1 1/2" E0978: 2" x 2" E3642: 2" x 3" E1587: 4" x 3/4"
	O.S. corner adapter	E2101
	I.S. corner adapter	E2100
	Pocket reducer for 1/4" glazing	E4TB69
	Pocket reducer for 3/8" - 1/2" glazing	E4TB80
	Glass pocket - closure plate for 1" glass	E3192
	Return leg pressure plate	E1062

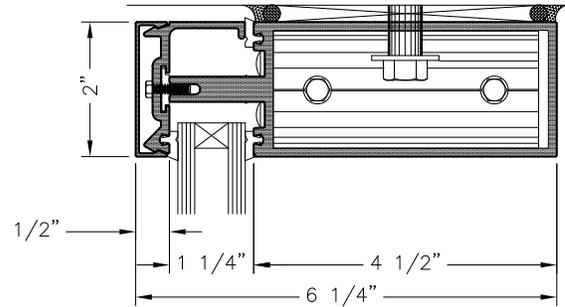
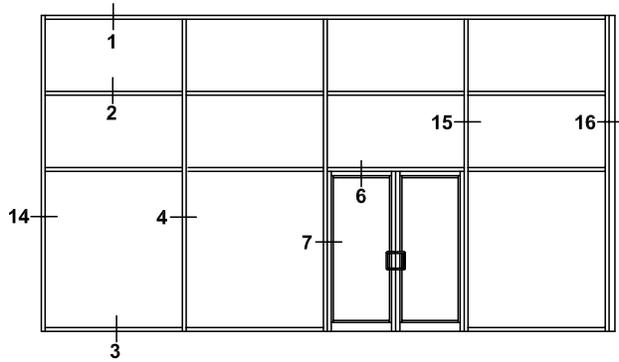
ACCESSORIES

Shape	Description	Part No.
	Insulated pressure plate	M1061
	Temporary glazing clip	P1193
	Return leg pressure plate	M1202
	Back member splice	P1625A: For E1180 P1625B: For E1199, E1495 P1625C: For E0977, E1025 P1625D: For E1584, E2297 P1625E: For E2053 P1625F: For E3125 P1625G: For E3126 P1625H: For E3127
	Insulator for M1061	P914
	Temporary glazing clip (use with E3125/3126/3127)	P1108
	Setting block for 1" glass	P946: EPDM P947: Silicone
	Snap cover splice	P1626A: 1/2" P1626B: 3/4"
	Fixed glazing gasket	PTB28: 1/8" PTB31: 3/16"
	Silicone glazing spacer	P1690
	Water dam for 1" glazed system	P945
	Water dam for silicone glazed verticals	P1629
	Locking lug	P1265: .3125" hole diameter P1266: .375" P1267: .4375"
	Shear block	P1320A: 4" back member P1320B: 6" P1320C: 4 1/2" P1320D: 2 1/2" P1320F: 3 5/8" P1320K: 4" open back member P1320L: 6" open back member

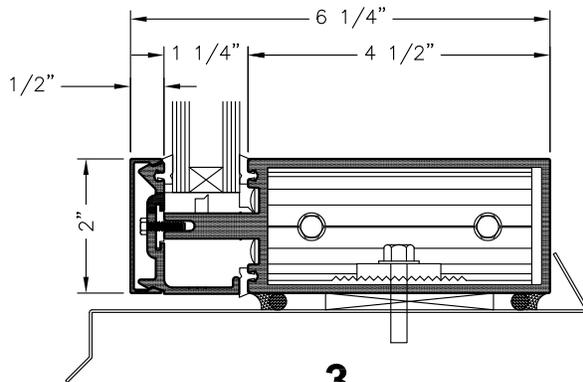
ACCESSORIES

Shape	Description	Part No.
	Sill anchor	P1318A: 4" back member P1318B: 6" P1318C: 4 1/2" P1318D: 2 1/2" P1318F: 3 5/8" P1318K: 4" open back member P1318L: 6" open back member
	Head anchor	P1543: 4" back member P1543A: 6" P1543B: 4 1/2" P1543C: 2 1/2" P1543E: 3 5/8" P1543J: 4" open back member P1543K: 6" open back member
	F anchor	P2078A: For E1215 P2078B: E1180 P2078C: E2053 P2078D: E1199 P2078E: E1025 P2078F: E2297 P2078G: E3127 P2078H: E3126 P2078J: E3125
	T anchor	P2079A: For E1215 P2079B: E1180 P2079C: E2053 P2079D: E1199 P2079E: E1025 P2079F: E2297 P2079G: E3127 P2079H: E3126 P2079J: E3125
	Pipe sleeve spacer for 3/8" diameter bolt	P2028
	#10 UNC x 5/8" type B hex washer head	S357
	#14-14 x 1/2" type B hex head	S139
	#10 x 1/2" type B Phillips truss head	S191
	#14-14 x 1/2" type B hex head	S270

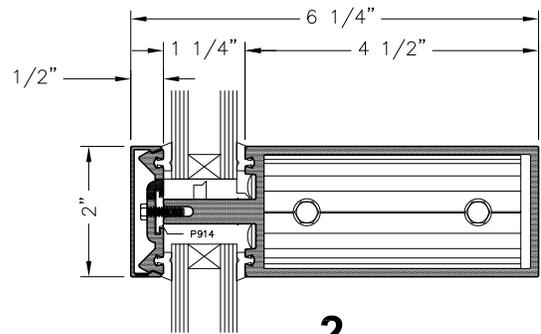
ELEVATION DETAILS



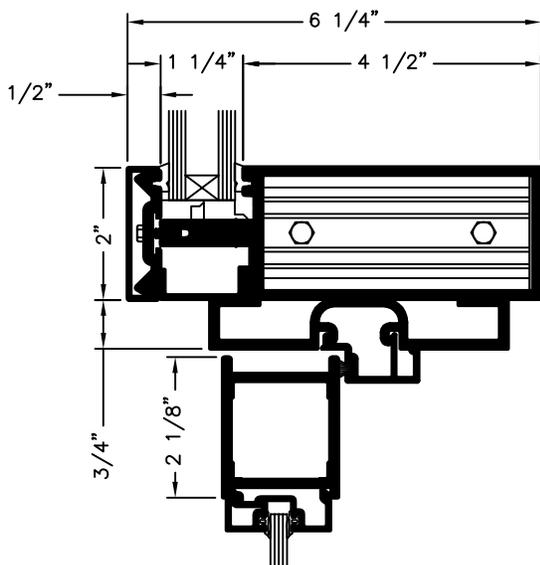
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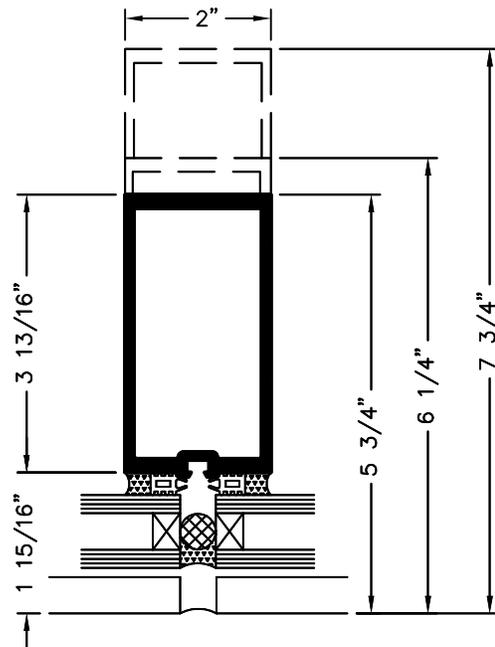
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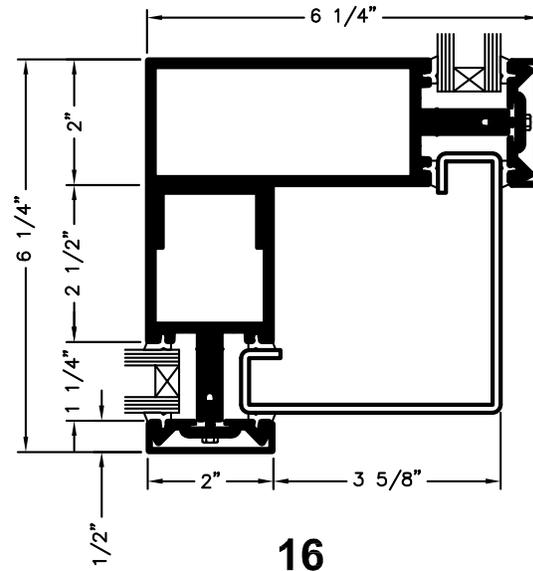
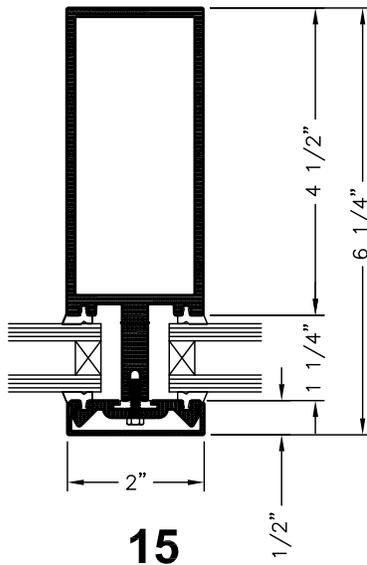
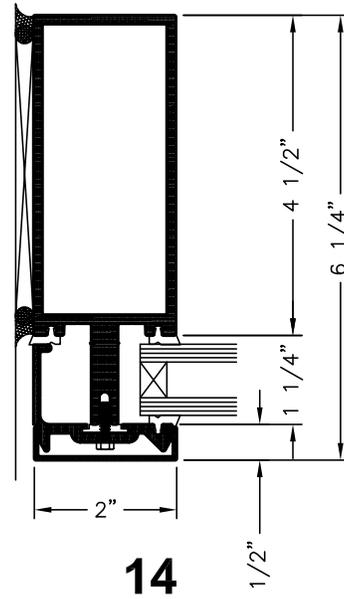
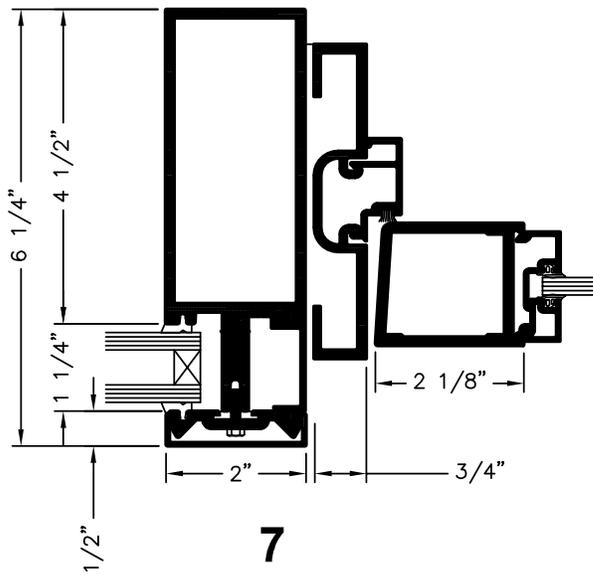
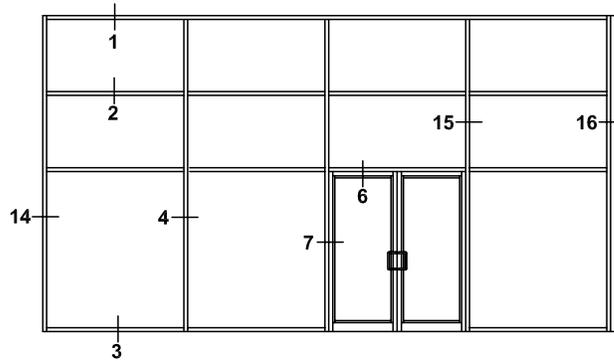


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ELEVATION DETAILS

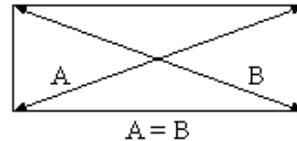


FRAME FABRICATION

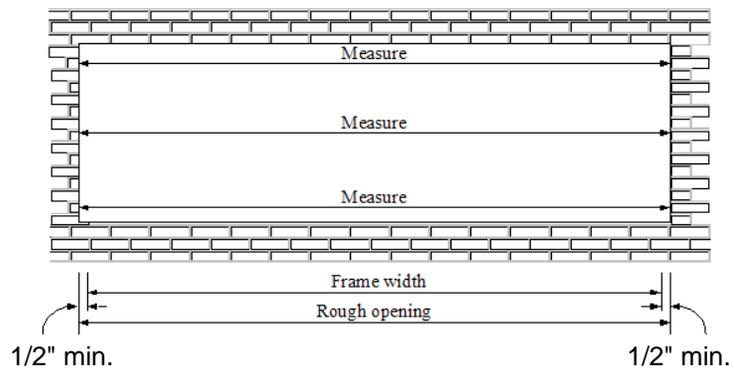
Step 1: Determine Frame Size

Determine Width

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

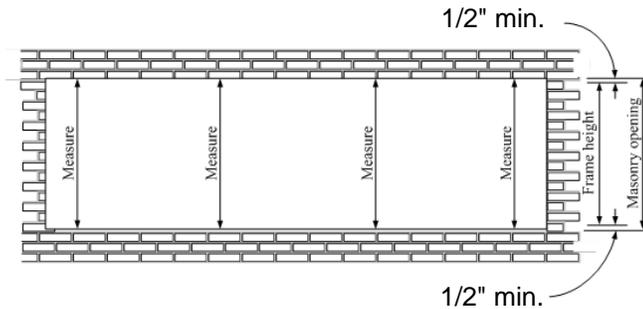


- Measure the width of the opening at the top, middle and bottom.
- Select the smallest dimension measured. To determine the frame width to be used, subtract a minimum of 1" from the smallest measured width, to allow a minimum of 1/2" at each jamb for shimming and caulking.
- Allow a larger clearance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



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" to allow a minimum of 1/2" at sill and 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 according to project needs.



Step 2: Cut Mullions to Size

- Verticals should be frame height found in Step #1 (rough opening height minus clearances).
- Vertical framing members run through as shown in the elevation overview.
- Cut horizontal framing members to the daylight opening (the distance between verticals) minus 1/16" total.

Step 3: Cut Pressure Plates, Snap-on Face Covers and Snap-in Fillers to Length

- Cut vertical pressure plates and face covers to the same length as the corresponding vertical.
- Cut horizontal pressure plates to a minimum of daylight opening minus 3/8" (3/16" off each side) and a maximum of DLO minus 1/8" (1/16" off each side).
- Cut horizontal face covers and snap-in fillers for roll-over horizontals to the same length as the corresponding horizontals (daylight opening).
- To splice vertical pressure plates and face covers, allow a 3/8" gap for the splice joints. The splice in a vertical pressure plate should be 2" below the splice in the mullion, and the splice in a vertical snap-on cover should be 2" below the splice in the pressure plate as shown in Figure 1.

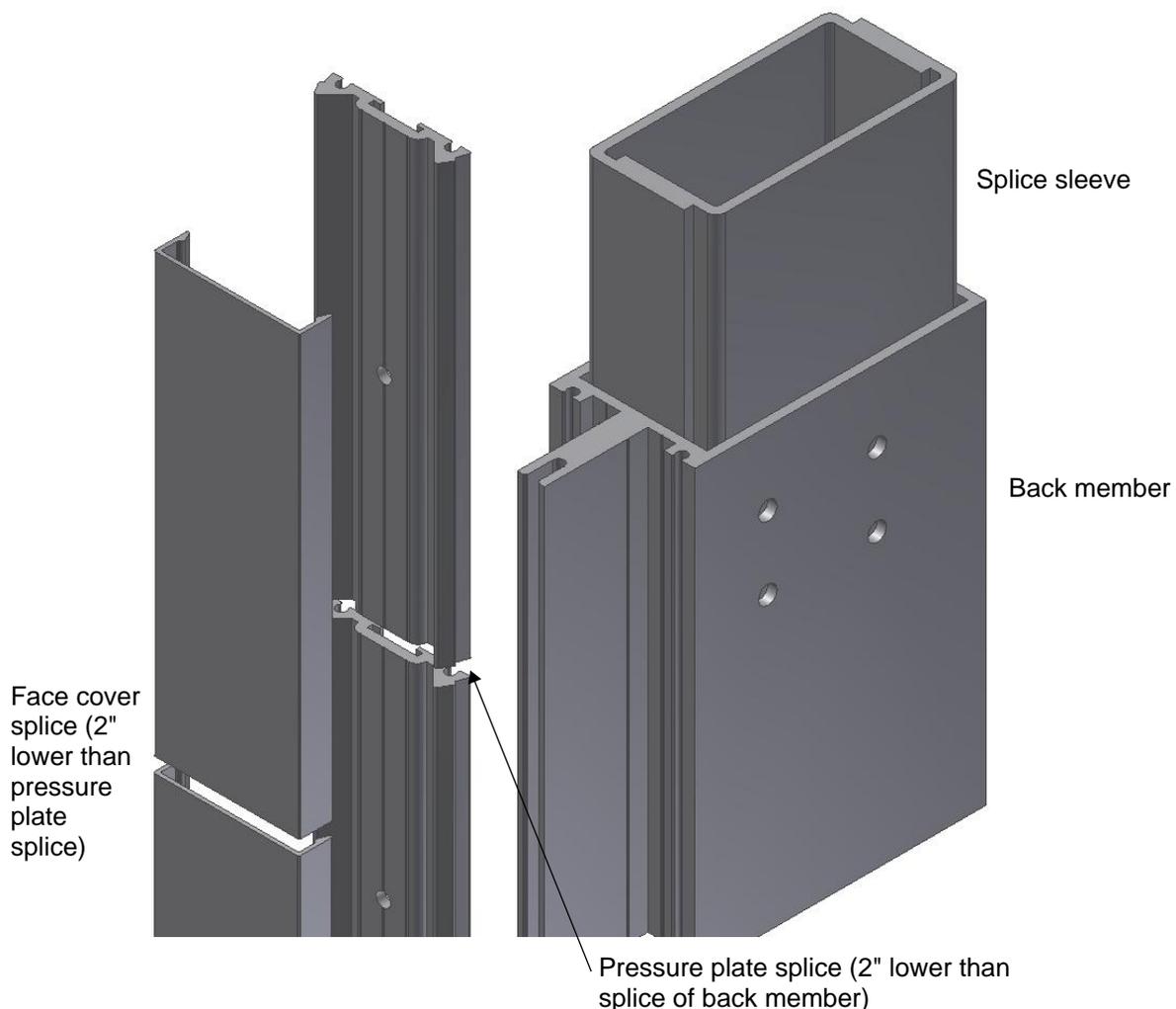


Figure 1: Splice face covers and pressure plates as necessary.

Step 4: Drill Weep Holes in Horizontal Pressure Plate

- Drill three weep holes in the horizontal pressure plate: two halfway between the center and the end of the pressure plate and one at the center of the pressure plate, as shown in Figure 2.
- Drill all weep holes 5/16" above the groove which marks the center line of the pressure plate.
- Pressure plate is pre-punched with holes for fasteners. Drill additional holes as required to ensure end holes are a minimum of 2" and maximum of 4" from the vertical and then assume a 10" center to center spacing for the remainder.

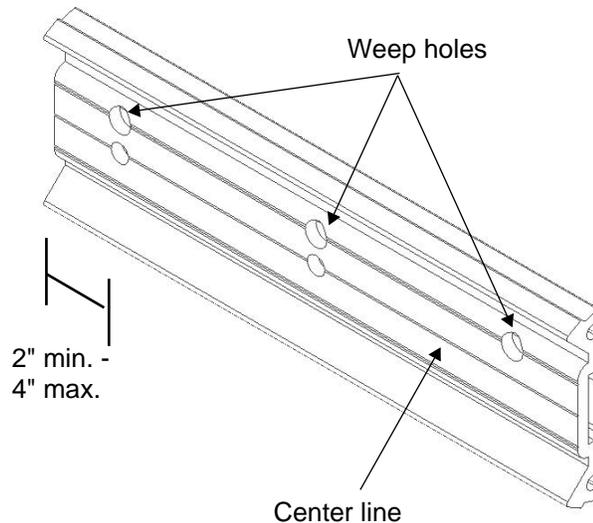


Figure 2: Install three weep holes in the horizontal pressure plate.

Step 5: Mill Weep Slot in Horizontal Snap-on Cover

- Mill a weep slot a maximum of 1" from the end of the cover. The weep slots are to be 1/4" wide x 1/2" long as shown in Figure 3.

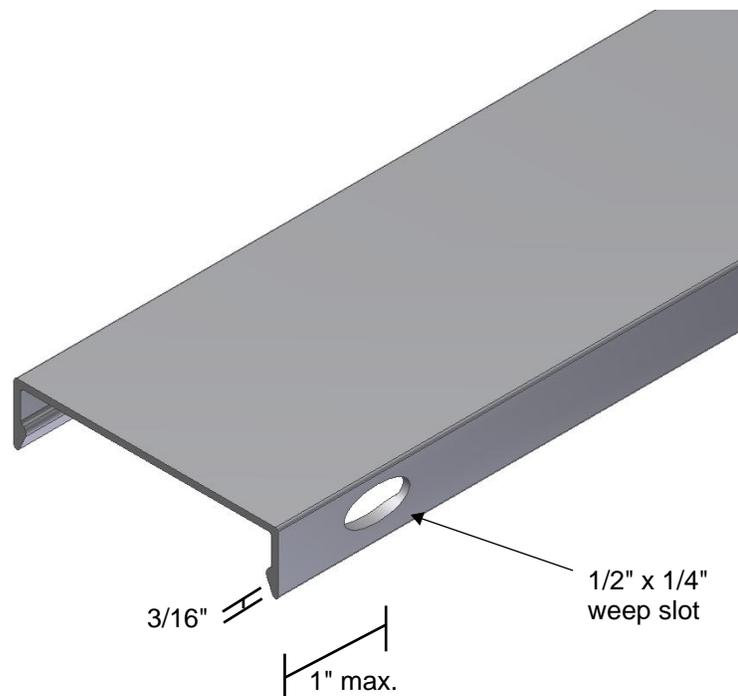


Figure 3: Mill a weep slot in the horizontal snap-on cover.

**Step 6: Drill Slots
 in Horizontal**

- Drill two slots in the front of the horizontal back member between the reglet and the glass support tongue.
- The slots are .281" x .201" in diameter and centered 3/8" from the end of the horizontal member, on the V-shaped groove in the extrusion, as shown in Figure 4.

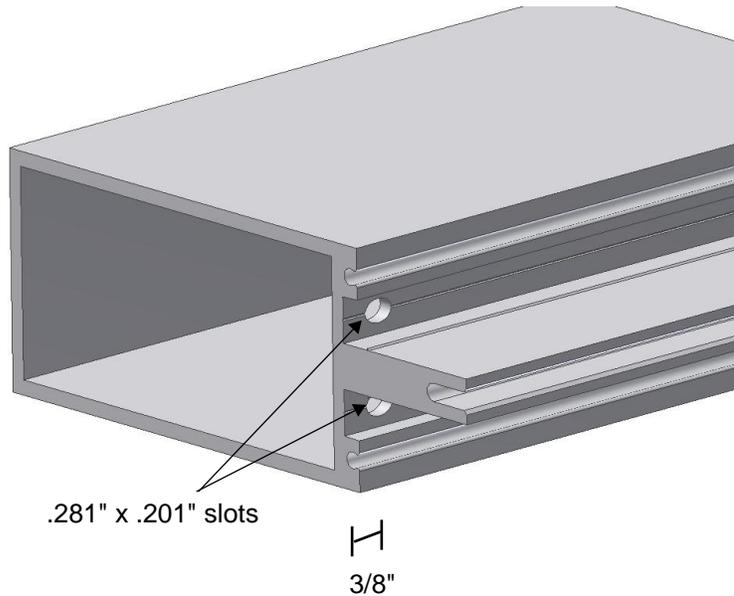


Figure 4: Drill slots in the horizontal member.

**Step 7: Mill Sills and
 Heads**

- Mill sills and heads to clear anchor clips. This step is only necessary for installations that use tubular back members for heads and sills, not for open-back perimeter members.
- The notch must not damage the vertical walls of the tube, but should remove the top or bottom of the tube from wall to wall, to a depth of 3 1/16" from the end of the sill or head as shown in Figure 5.

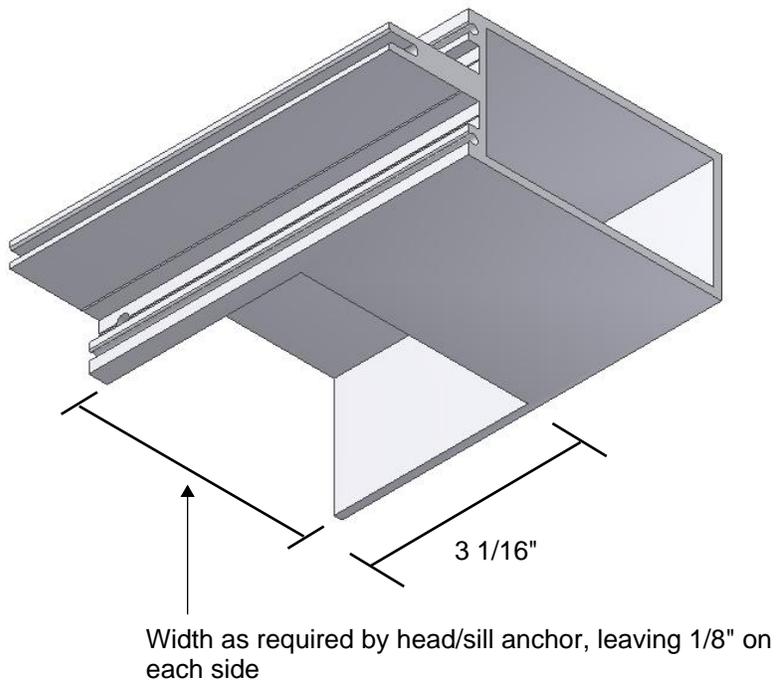


Figure 5: Notch the sills, shown, and heads, similar, to fit in the anchor clips.

Step 8: Mill Horizontal in Final Bay (if necessary)

- The tubular horizontals for the last bay to be installed may need to be milled on both ends, as the masonry may prevent movement of the jamb to get the frame clips into the horizontals.
- Mill the sill, head and intermediate horizontals in the final bay as shown in Figure 6, or attempt to spread the vertical mullions apart.

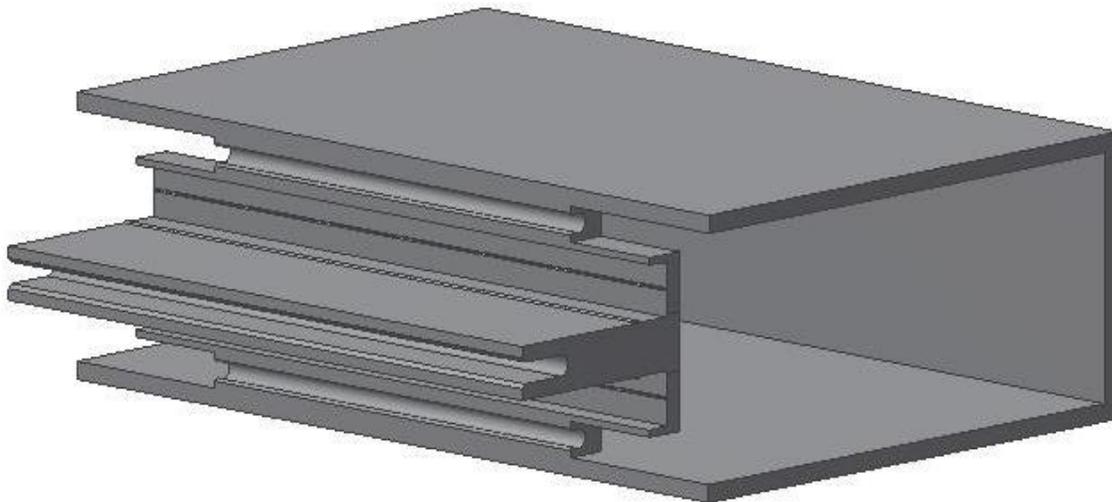
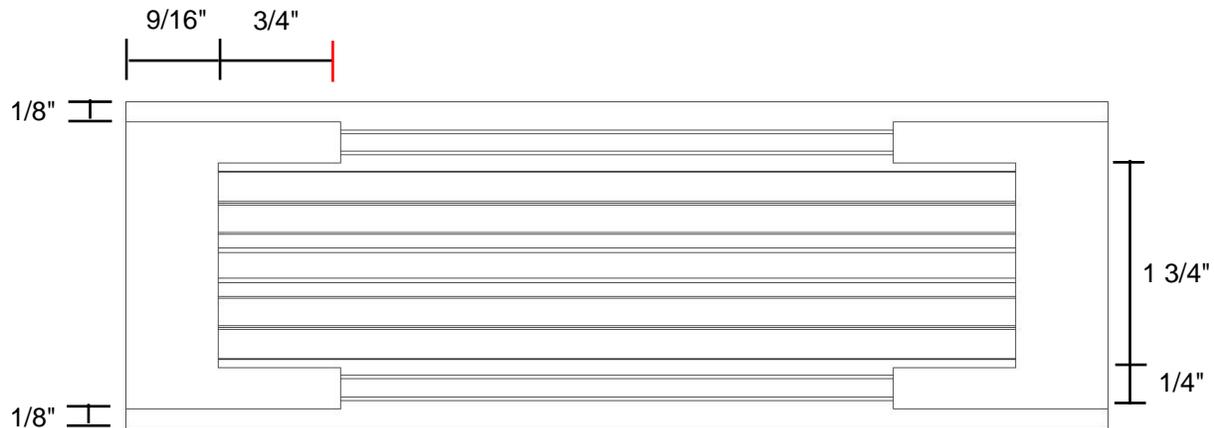
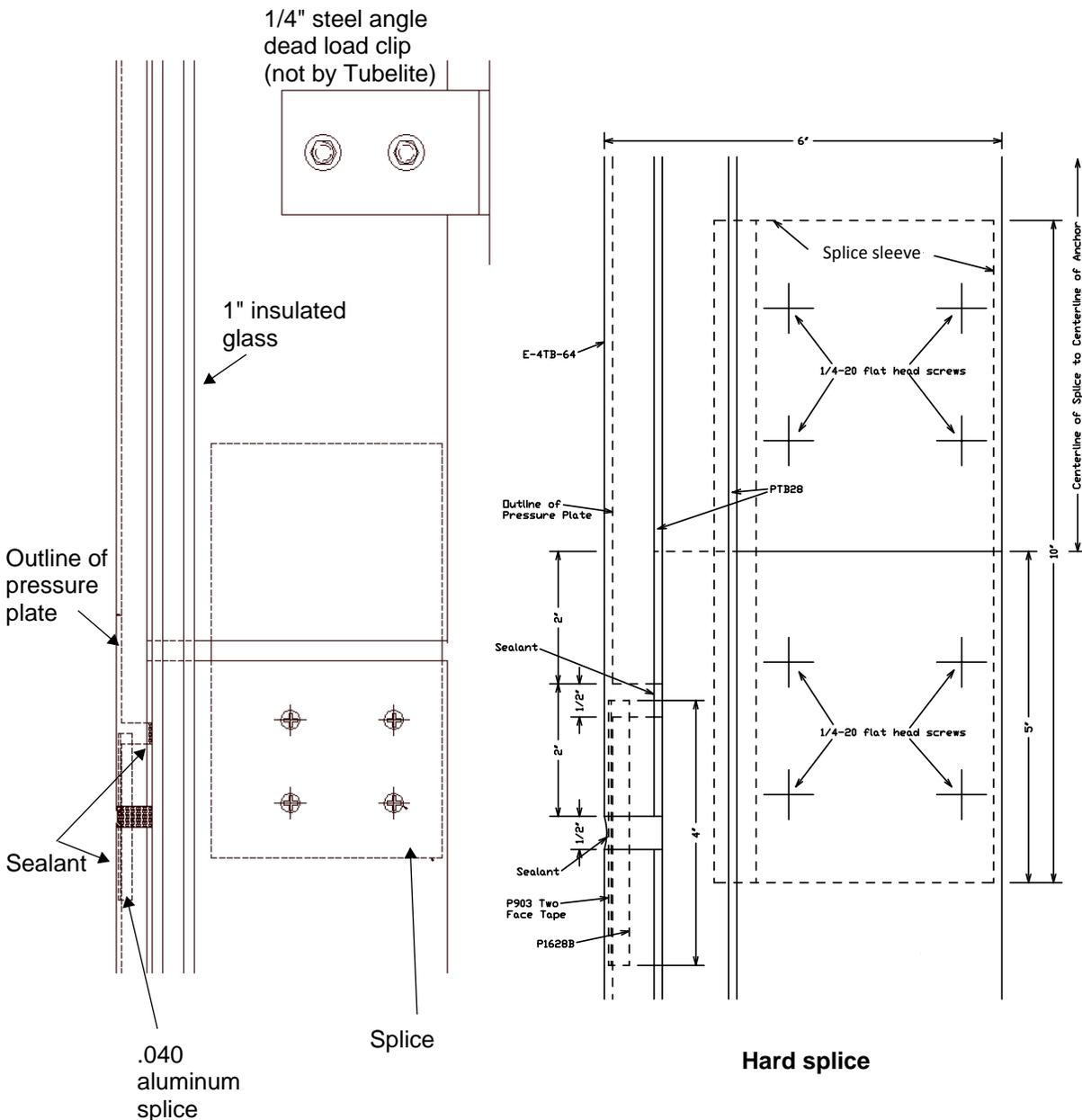


Figure 6: Notch the horizontals in the last bay so they can slide over the frame clips.

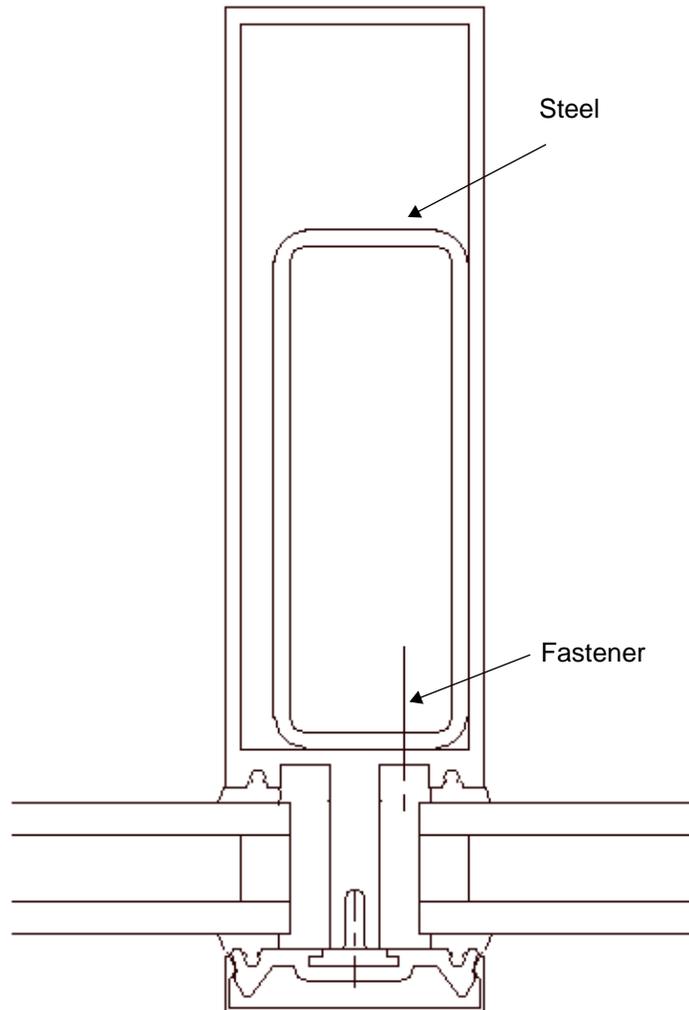
Step 9: Fasten Splice Sleeves in Lower Segments of Verticals (if necessary)

- Consult the approved shop drawings to see what size of 1/4-20 flat-head fasteners (minimum 3/4") to use when fastening the splice sleeves to the lower segments of the verticals.
- Drill and countersink four holes on both sides of the verticals (eight holes per vertical), in the locations shown on the approved shop drawings. The diameter of the holes should be appropriate for the fasteners.
- Slide a splice sleeve into the end of the vertical mullion where holes were just drilled as shown below. The splice sleeve is 10" long. Half its length should be inside the mullion, and half should project out the end of the mullion.



Step 10: Add Steel Reinforcement (if necessary)

- Refer to approved shop drawings to determine whether the application requires steel reinforcement.
- If reinforcement is required, cut steel to 6" less than the frame height.
- Slide the steel into the vertical mullion from one end, recessing it 3" in from the end of the vertical.
- Drill pilot holes through the steel and the vertical mullion at the center of each horizontal, and anchor the steel to the vertical using fasteners of an appropriate size (not by Tubelite) as shown at right.



CURTAINWALL INSTALLATION

Step 11: Attach Shear Block

- Drill .201" diameter holes into the side of the vertical back member as shown in Figure 7.
- Attach an intermediate shear block for the corresponding vertical back member using S139 fasteners. For dimensions, examine the table below.
- Dimensions also apply to where the head and sill anchors meet the vertical. However, the drilled holes must be 1" from the top and bottom of the mullion.

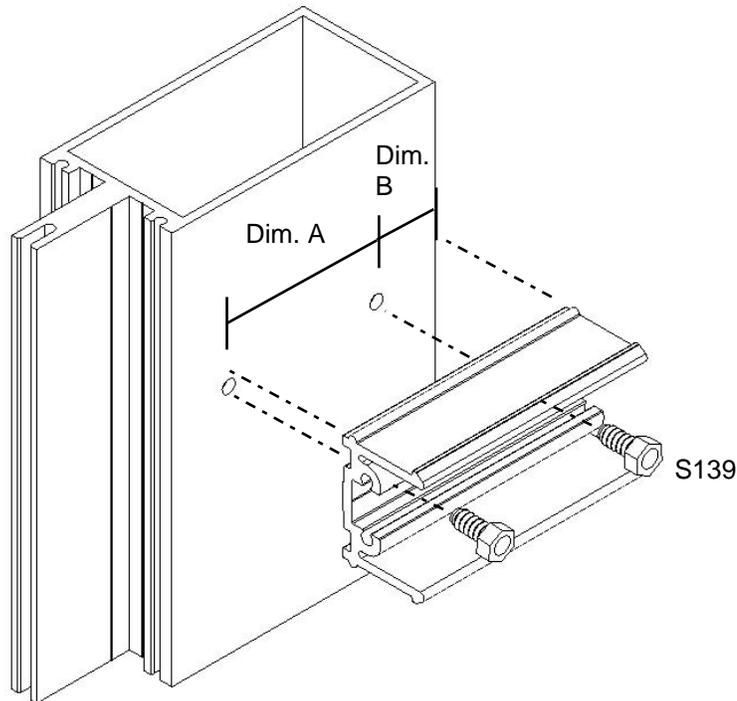


Figure 7: Attach shear block to the vertical back member.

<u>Clip</u>	<u>Dim. A</u>	<u>Dim. B</u>	<u>Use With Extrusion</u>	<u>Glass</u>	<u>Tube depth</u>
P1320A	2.250"	0.886"	E1199, E1495, E3283	1", 1/4"	4"
P1320B	4.218"	0.897"	E1584, E2297	1", 1/4"	6"
P1320C	2.250"	1.136"	E0977, E1025	1", 1/4"	4 1/2"
P1320D	0.750"	0.886"	E1046, E1180	1"	2 1/2"
P1320F	1.875"	0.886"	E2053	1"	3 5/8"
P1320K	1.750"	1.136"	E3284	1"	4"
P1320L	3.750"	1.136"	E3285	1"	6"

Step 12: Butt Sill Anchor to Side of Mullion

- Position an end vertical back member in an opening in the masonry. Leave a gap for sealant between the masonry and the vertical. Fasten sill anchor to vertical using S139 fasteners. Head anchor is similar.
- Place a shim (not by Tubelite) under the sill anchor, and butt the sill anchor against the side of the mullion, as shown in Figure 8.

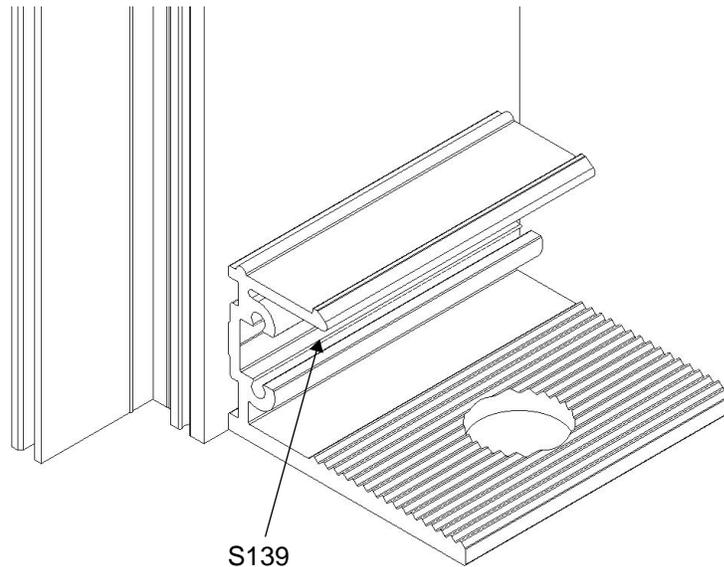


Figure 8: Butt the sill anchor against the side of the mullion.

Step 13: Fasten Sill Anchor to Masonry

- Using the hole in the sill anchor clip as a guide, drill a hole into the masonry for the anchor bolt.
- Place a locking lug on the anchor clip and a washer over the locking lug as shown in Figure 9. Then fasten the anchor clip to the masonry with the anchor bolt (not by Tubelite) shown in the shop drawings. Head anchor is similar.

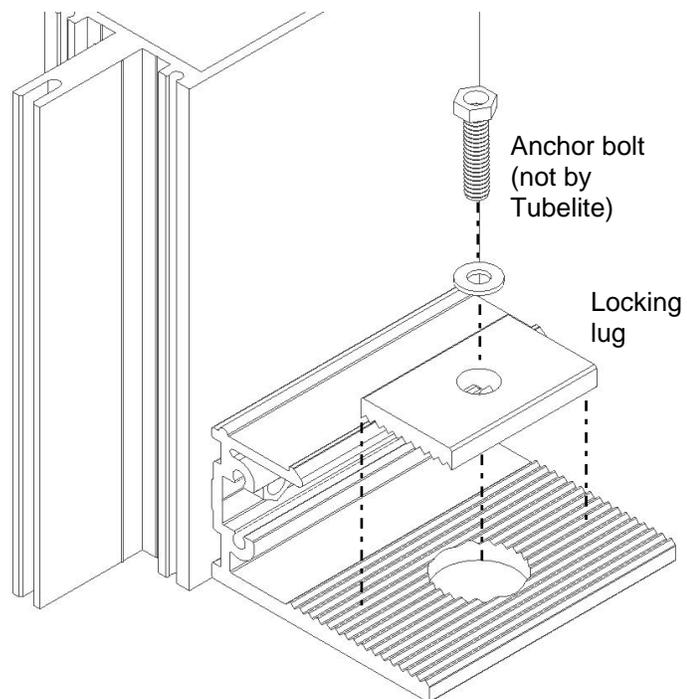


Figure 9: Place a locking lug on the anchor clip and a washer over the locking lug, then fasten an anchor bolt (not by Tubelite) to the masonry.

Step 14: Slide Horizontal Onto Shear Block

- Seal the perimeter of the shear block to the mullion.
- Seal the ends of the horizontal that will attach to the vertical.
- Slide the end of the horizontal onto the frame clip, and fasten the horizontal to the frame clip using two S270 fasteners, as shown in Figure 10.
- Seal fastener heads.

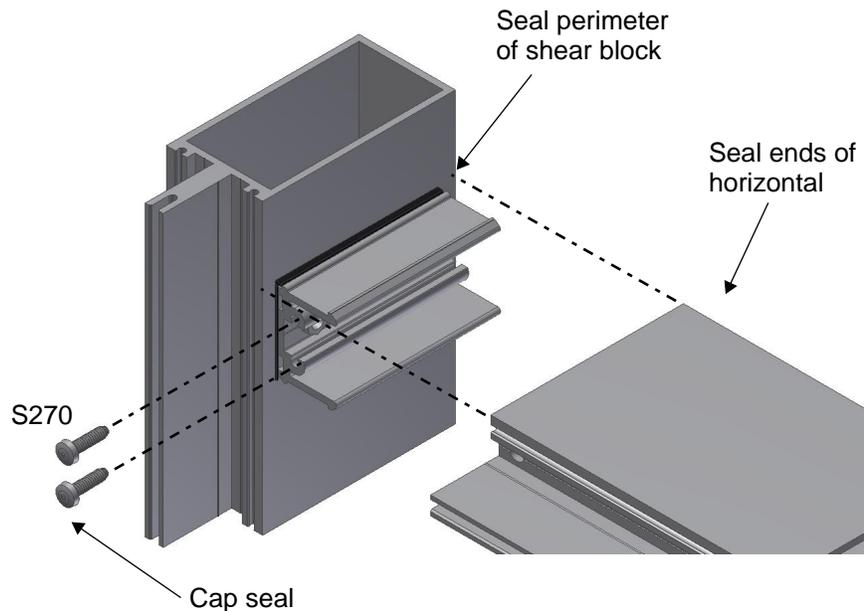


Figure 10: Slide the end of the horizontal onto the shear block and fasten using two S270 fasteners.

Step 15: Slide Horizontal Onto Sill Anchor Clip

- Seal the perimeter of the sill anchor to the mullion.
- Seal the ends of the horizontal that will attach to the vertical.
- Slide the end of the sill onto the sill anchor clip, and place shims under the sill as necessary to make it level, and to create a sealant gap.
- Slide the end of the horizontal onto the frame clip, and fasten the horizontal to the frame clip using two S270 fasteners, as shown in Figure 11.
- Seal fastener heads.
- For perimeter anchoring and connection details, go to page 30.

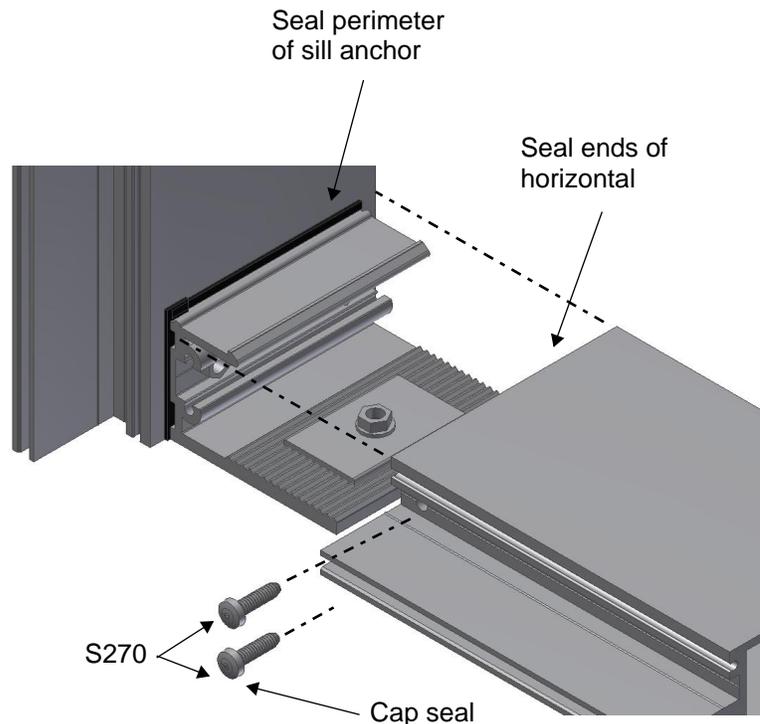


Figure 11: Slide the end of the horizontal onto the sill anchor and fasten using two S270 fasteners.

Step 16: Seal Joints Between Verticals and Horizontals

- Seal the joints between verticals and horizontals, as shown in Figure 12.
- Tool the sealant into the voids, and clean off excess sealant.

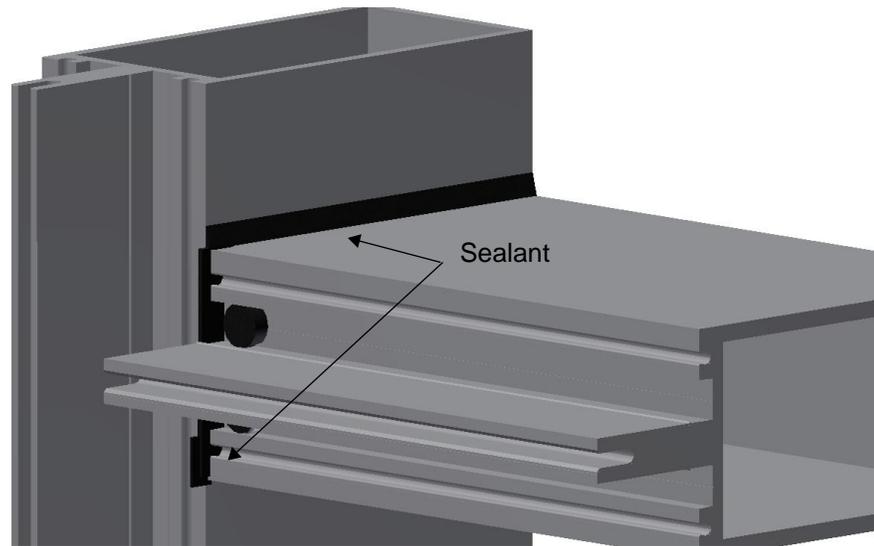


Figure 12: Seal the joints between verticals and horizontals.

Step 17: Install Water Dams

- Wherever a horizontal meets a vertical, apply a bead of butyl sealant across the vertical member, as shown in Figure 13.
- Insert a water dam into the gap between the horizontal and vertical members where the sealant was just applied.

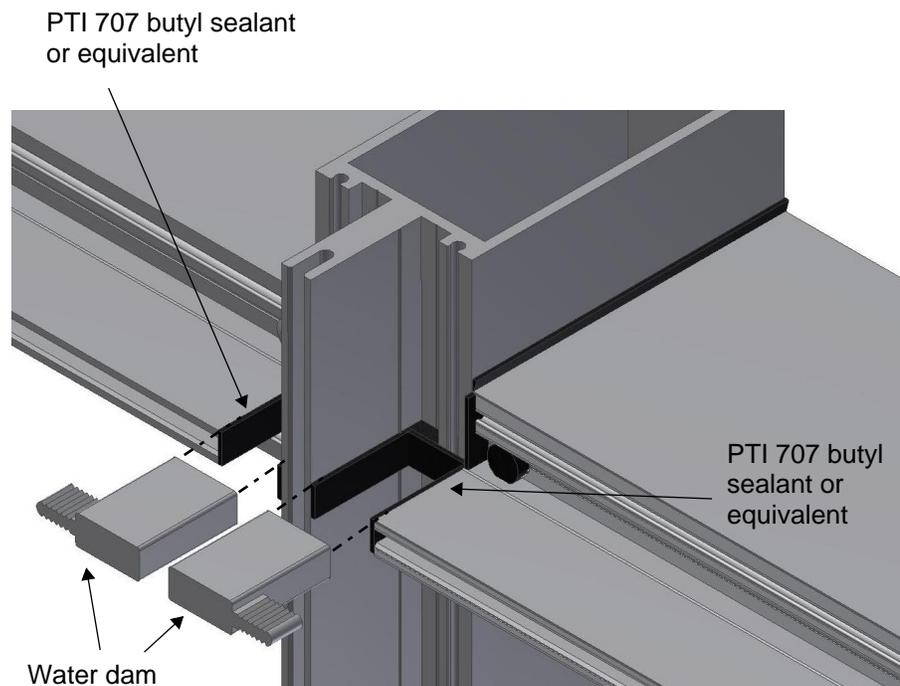


Figure 13: After sealing the gap between the horizontal and vertical, insert a water dam into the gap.

Step 17: Install Water Dam (SSG)

- Wherever a horizontal meets an SSG vertical, apply a bead of butyl sealant across the vertical member, as shown in Figure 14.
- Insert a water dam into the gap between the horizontal and vertical members where the sealant was just applied.

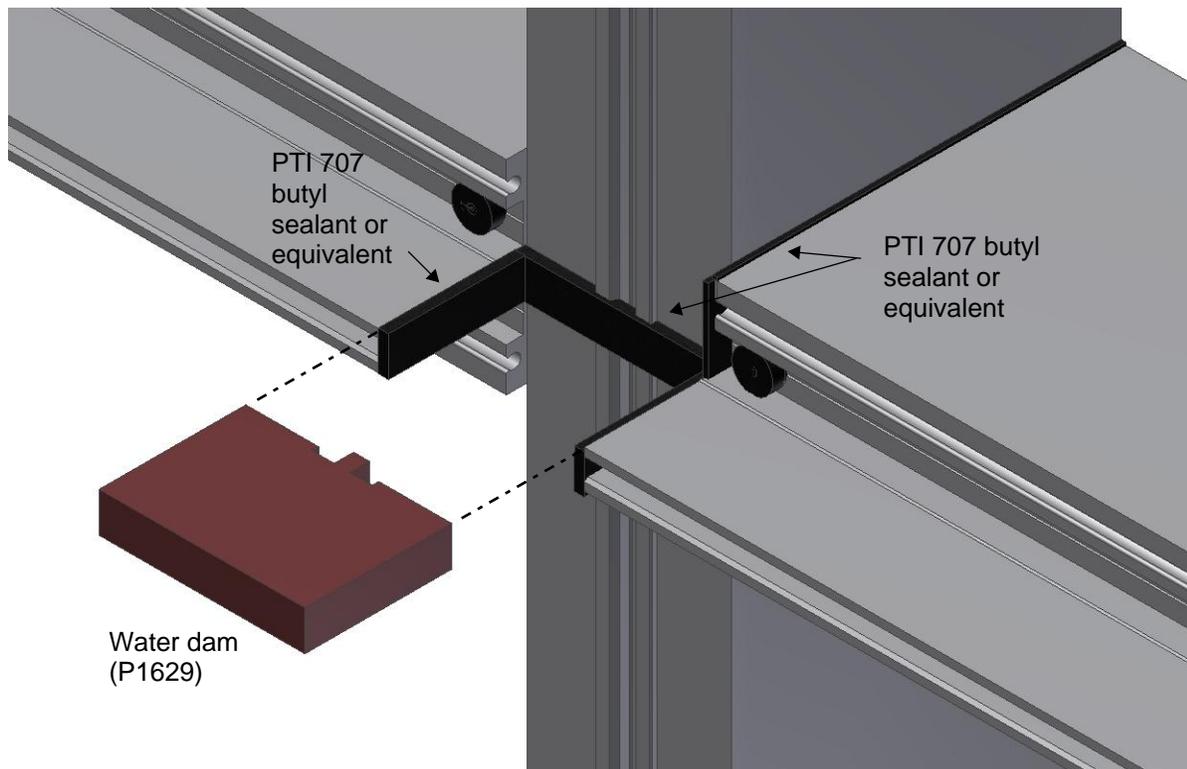


Figure 14: After applying sealant to the gap between the horizontal and vertical, insert a water dam into the gap.

Step 18: Apply Sealant Around Water Dam

- Apply a bead of butyl sealant around the perimeter of each water dam. Also apply sealant across the front of the water dam stretching across the tongue of the vertical member, as shown in Figure 15.
- Tool the sealant into all voids and tool to ensure the sealant will not contact the edge of the glass.
- Infiltrated water must also be able to pass freely around the glass and out the weep hole.

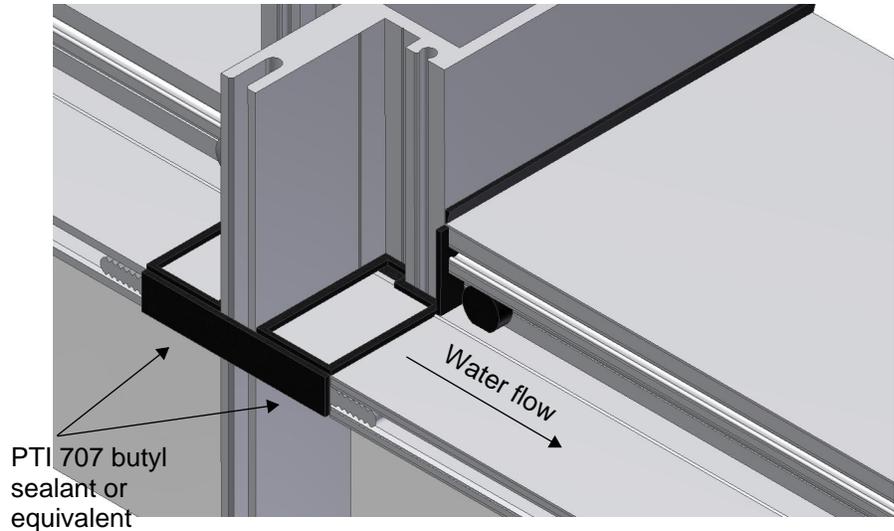


Figure 15: Apply a bead of sealant around the perimeter of each water dam.

Step 19: Press Vertical Gaskets Into Vertical Members

- Seal the heads of the S270 fasteners on the horizontal member.
- Press the vertical gaskets into their reglets on the vertical member, as shown in Figure 16. Press the ends of the gaskets into the sealant around the water dams.

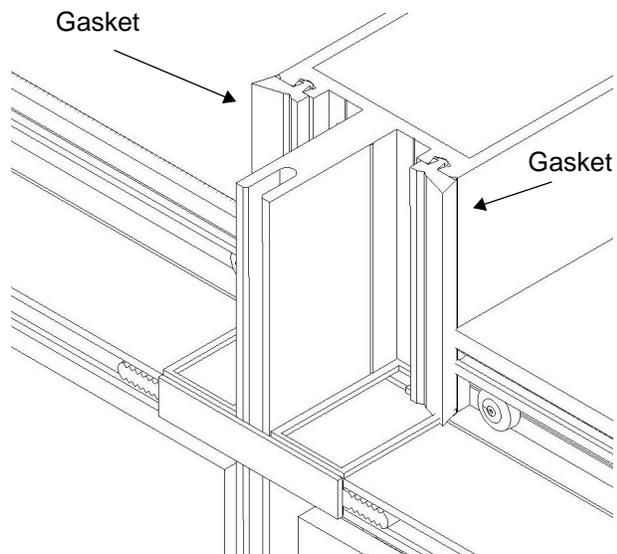


Figure 16: Press the vertical gaskets into their reglets on the vertical member.

Step 20: Press Horizontal Gaskets Into Horizontal Members

- Apply butyl sealant where the vertical gaskets will meet the horizontal gaskets as shown in Figure 17.
- Press horizontal gaskets into their reglets on the horizontal back members as shown in Figure 18. Press the ends into the sealant.

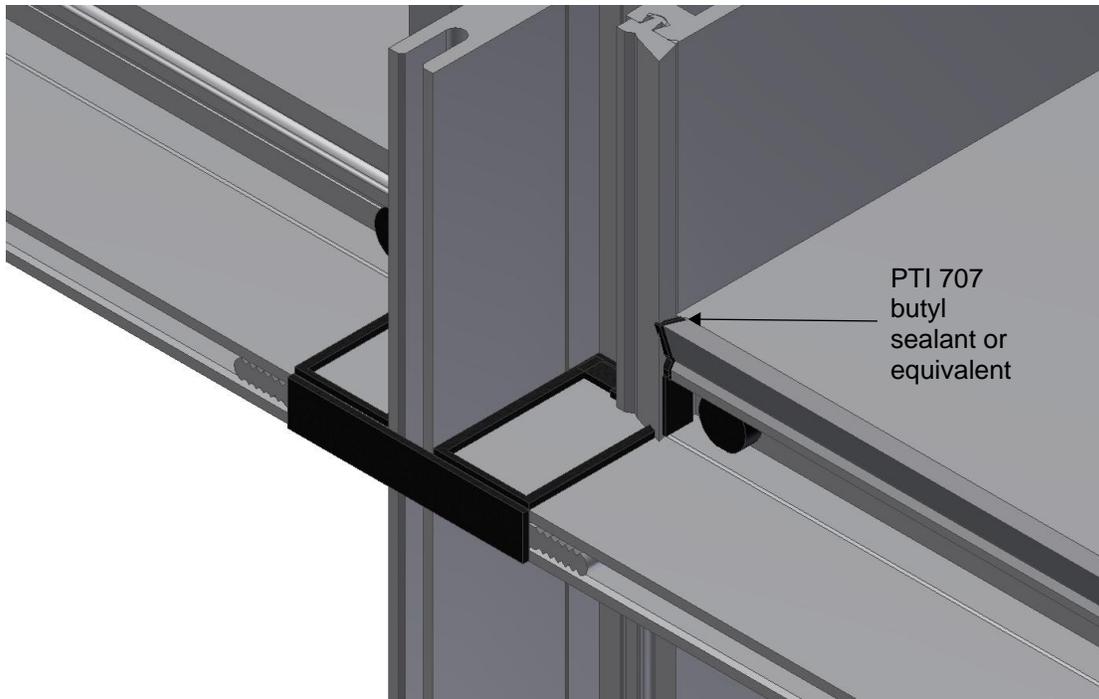


Figure 17: Apply butyl sealant where the vertical gaskets will meet the horizontal gaskets.

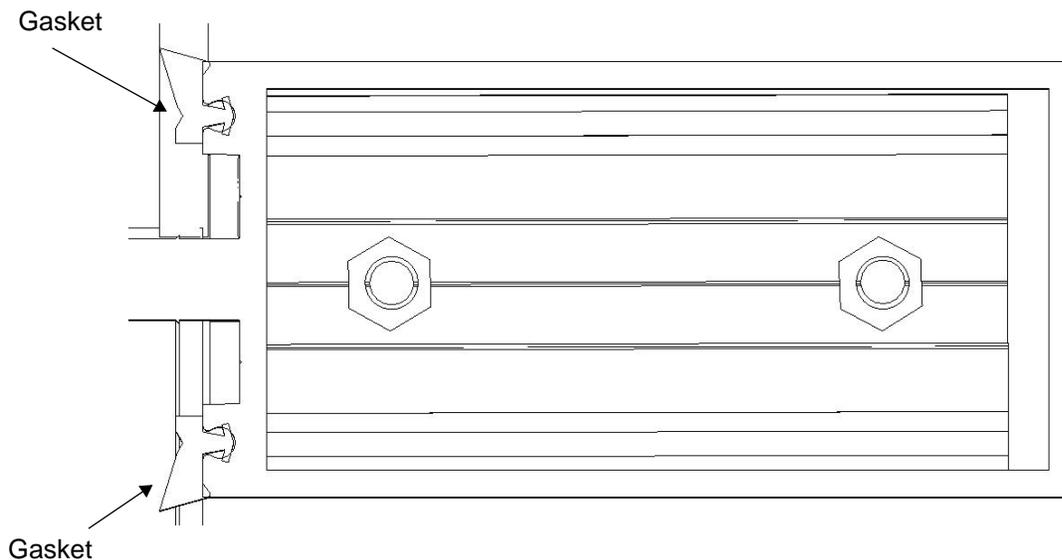


Figure 18: Press the horizontal gaskets into their reglets on the horizontal member.

Step 21: Place Setting Blocks

- Place setting blocks at the quarter points of each light (two setting blocks per light) or as required by shop drawings, as shown in Figure 19.
- Use P946 for 1" glass and P948 for 1/4" glass.

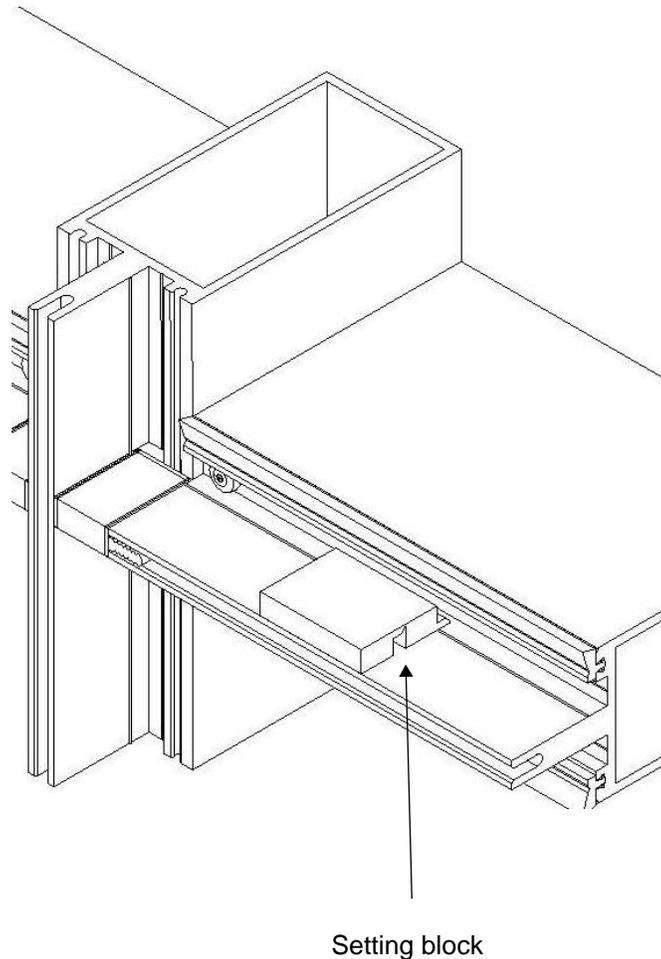


Figure 19: Place setting blocks at the quarter point of the light or as required by shop drawings.

Step 22: **Install Glass**

- Glass size is calculated as daylight opening + 1" horizontally and vertically.
- Place glass on setting blocks, as shown in Figure 20.

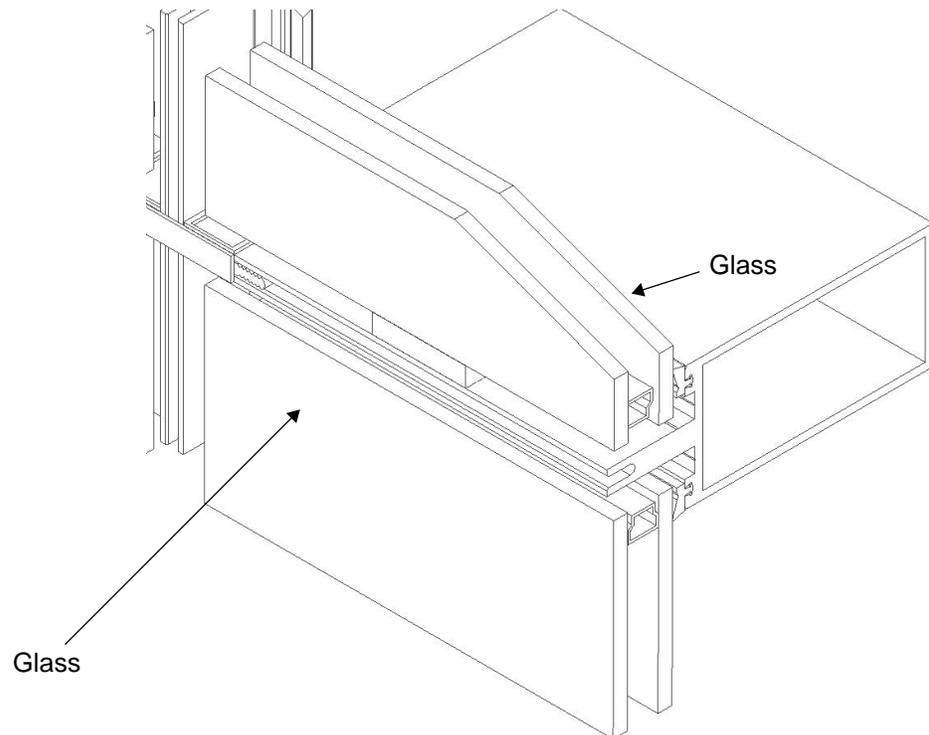


Figure 20: Place glass on setting blocks.

Step 23: Press **Glazing Gaskets** **Into Vertical** **Pressure Plate**

- Press glazing gaskets (PTB28) into the reglets of the vertical pressure plate, as shown in Figure 21.

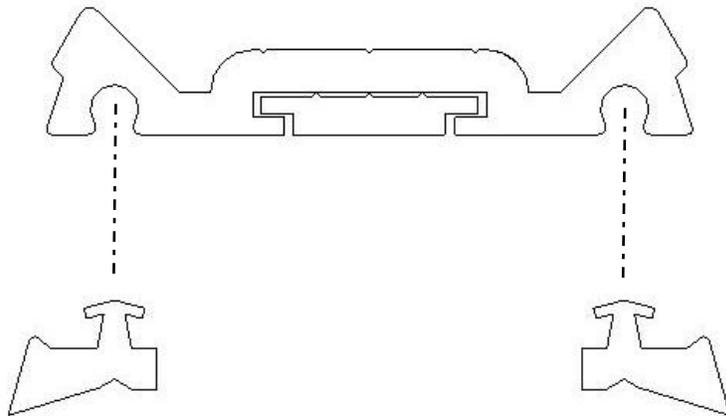


Figure 21: Press glazing gaskets into the reglets of the vertical pressure plate.

Step 24: Fasten Vertical Pressure Plate and Snap-on Cover

- Fasten the vertical pressure plate to the mullion as shown in Figure 22 with an S357 fastener and glazing gaskets (PTB28).
- Torque of 30-40 in.-lbs. should be used to fasten the pressure plate.
- Install the vertical snap-on cover as shown in Figure 22.

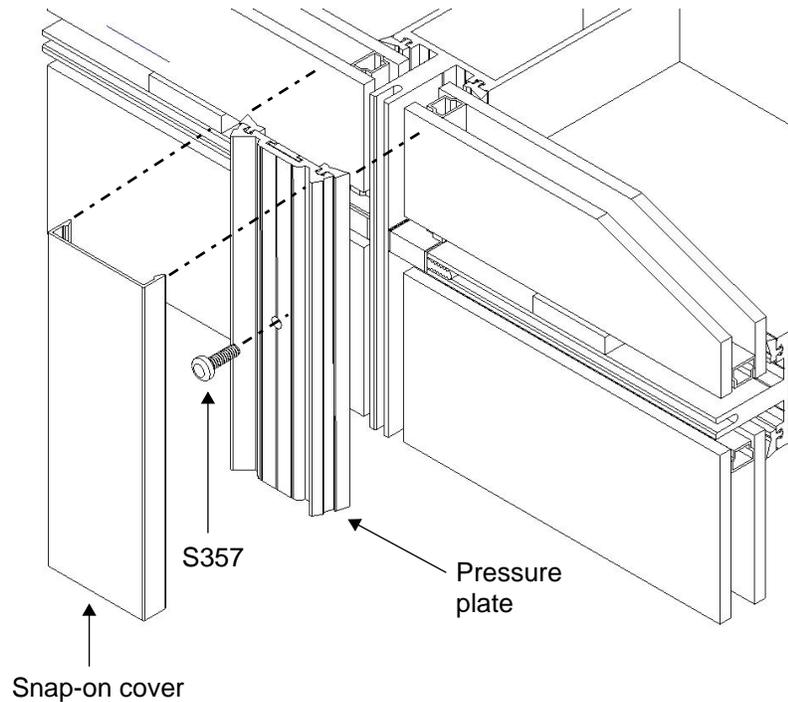


Figure 22: Place the vertical pressure plate and snap-on cover.

Step 25: Press Glazing Gaskets Into Horizontal Pressure Plate

- Press glazing gaskets (PTB28) into the reglets of the horizontal pressure plate.
- Butter the ends of the gaskets in the horizontal pressure plate with butyl sealant as shown in Figure 23.

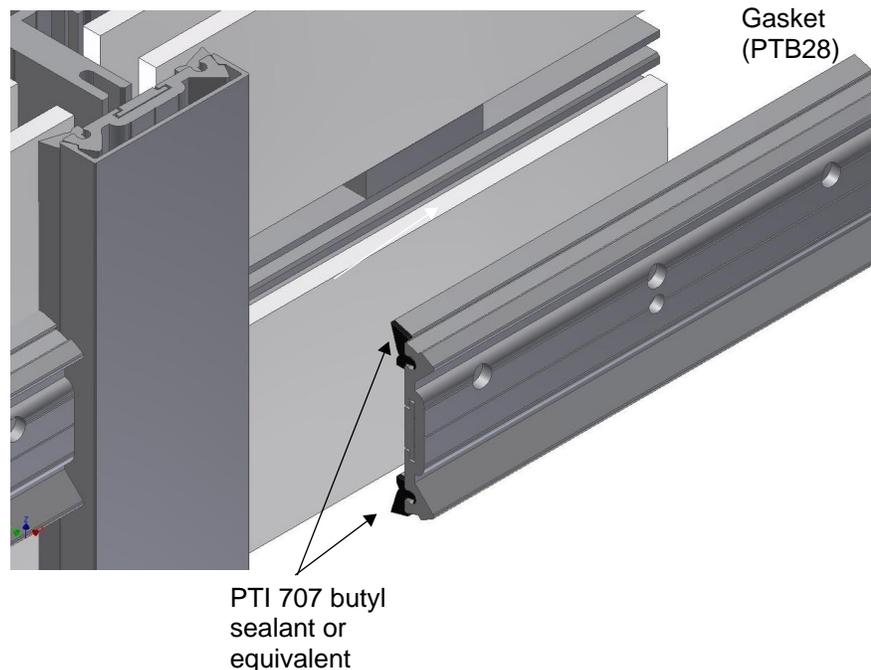


Figure 23: Butter the ends of the gaskets in the horizontal pressure plate with butyl sealant.

**Step 26: Fasten
Horizontal Pressure
Plate Into Place**

- Fasten the horizontal pressure plate in place with an S357 fastener as shown in Figure 24.
- Torque of 30-40 in.-lbs. should be used to fasten on the pressure plate.
- Seal the joint between the horizontal pressure plate and the vertical snap-on cover, and tool the sealant into the void, as shown in Figure 25.

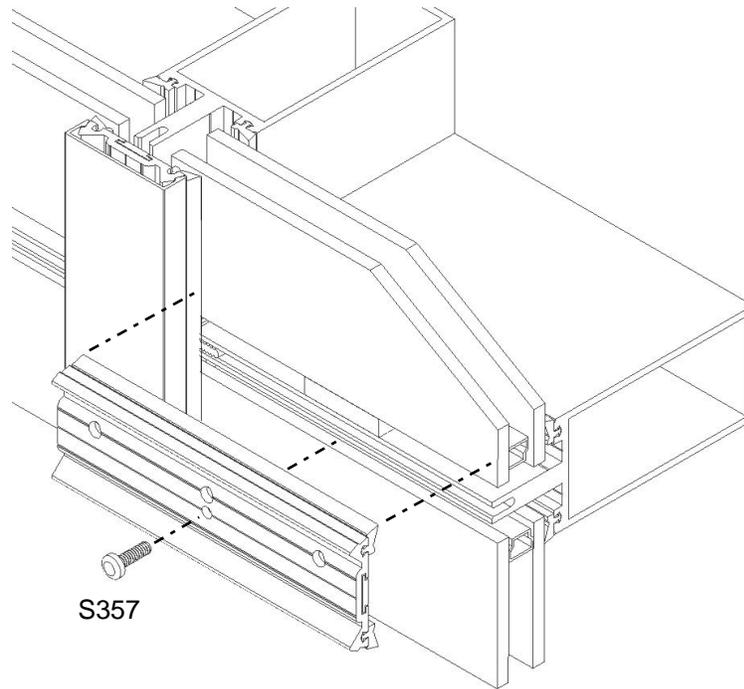


Figure 24: Fasten the horizontal pressure plate into place.

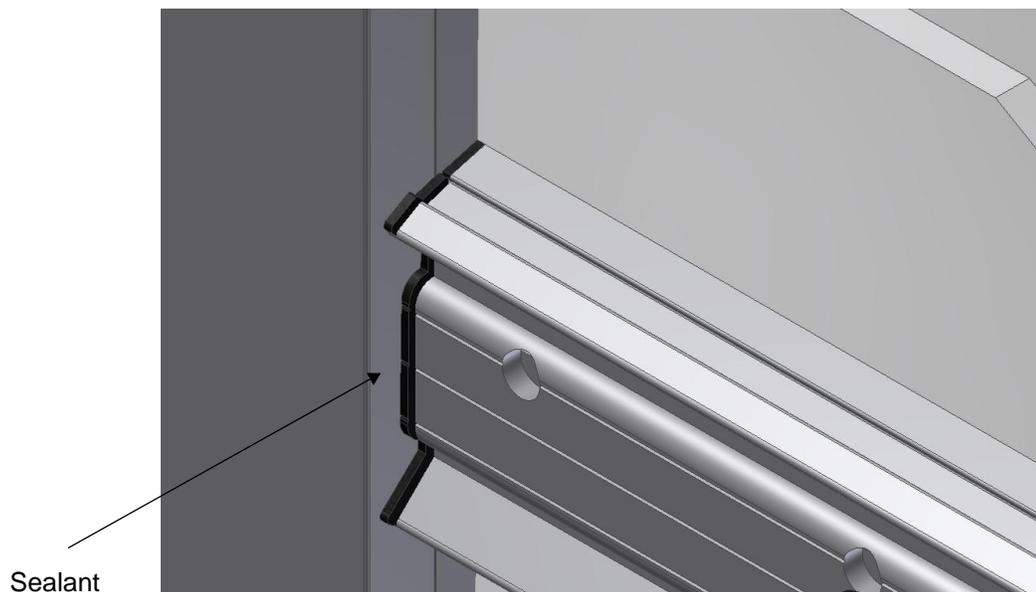


Figure 25: Seal the joint between the horizontal pressure plate and vertical snap-on cover.

**Step 27: Seal
Horizontal
Pressure Plate
Fastener**

- Seal the head of the fastener holding the horizontal pressure plate, as shown in Figure 26.

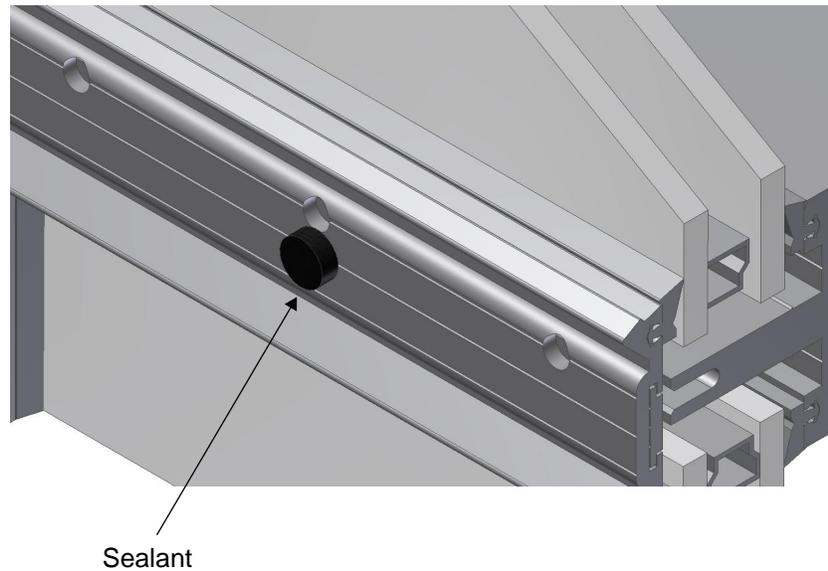


Figure 26: Seal the head of the fastener holding the horizontal pressure plate.

**Step 28: Install
Horizontal
Snap-on Cover**

- Install the horizontal snap-on cover as shown in Figure 27.

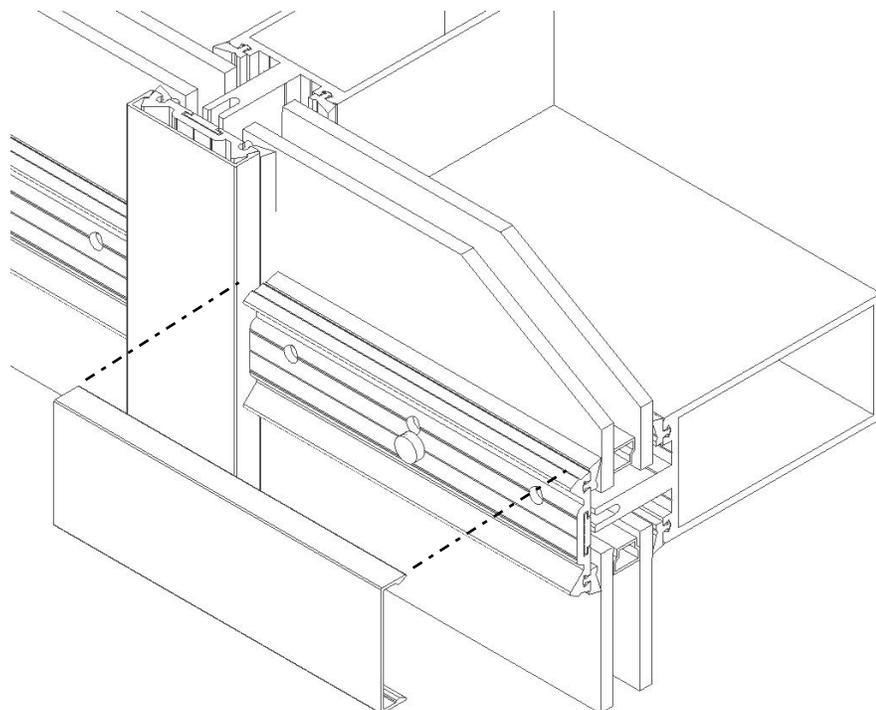


Figure 27: Install the horizontal snap-on cover.

Step 29: Seal the Perimeter

- Insert a backer rod into the gap between the frame and the building substrate on the top, sides and bottom of the installation as shown in Figure 28.
- Apply sealant to fill the void.
- Tool the sealant smooth.

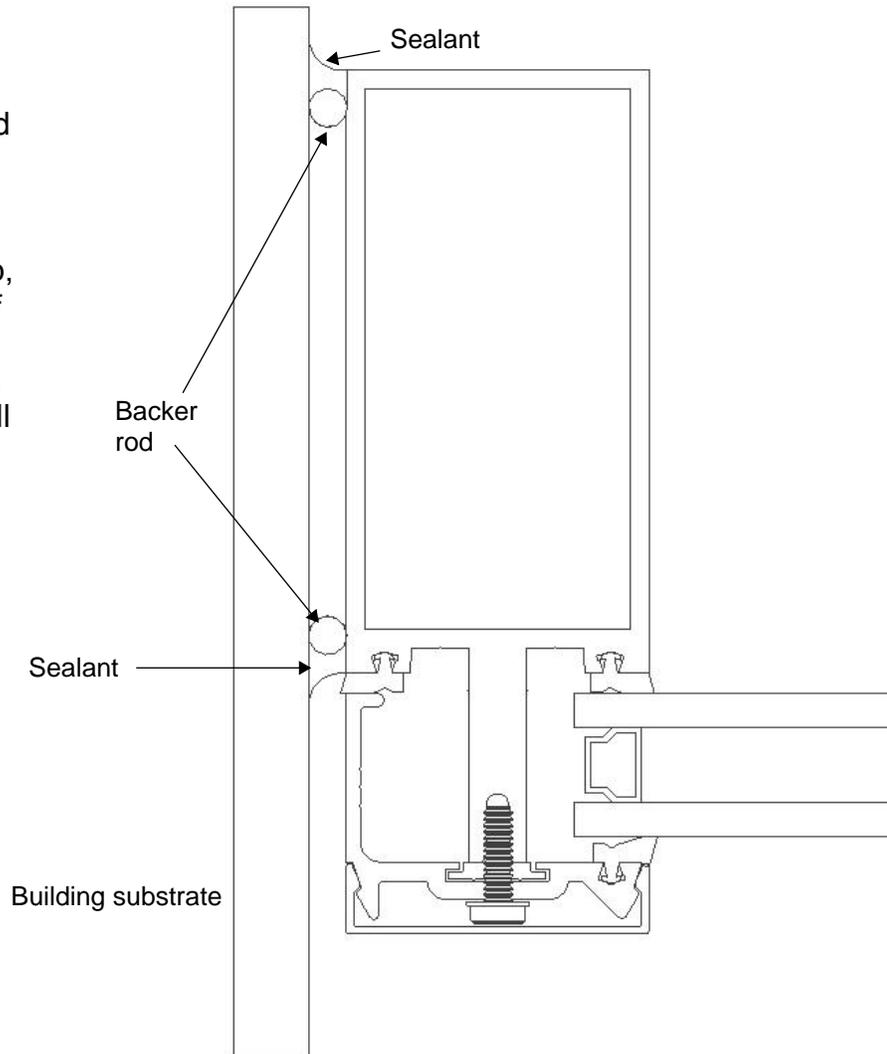
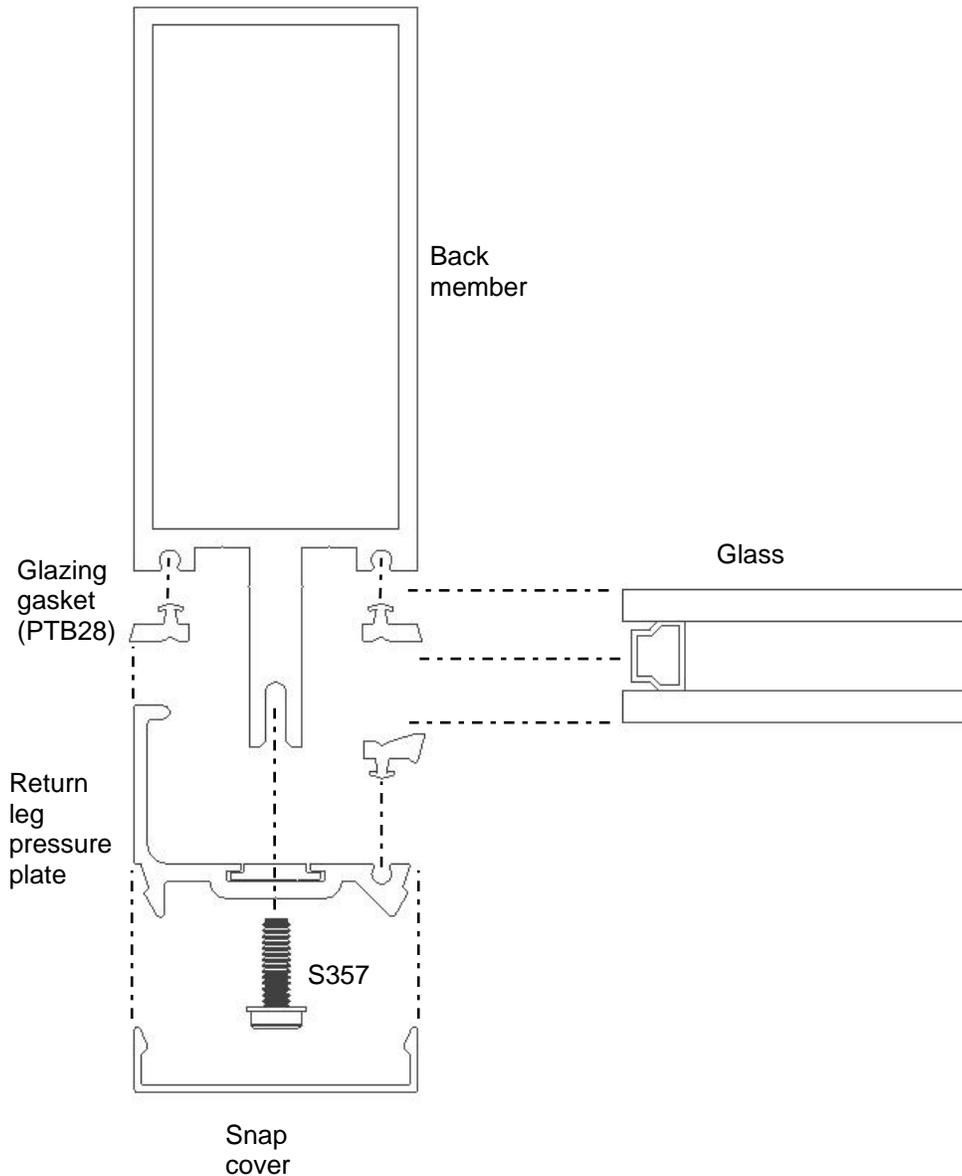


Figure 28: Insert a backer rod into the gap between the frame and the building substrate.

CONNECTION AT PERIMETER

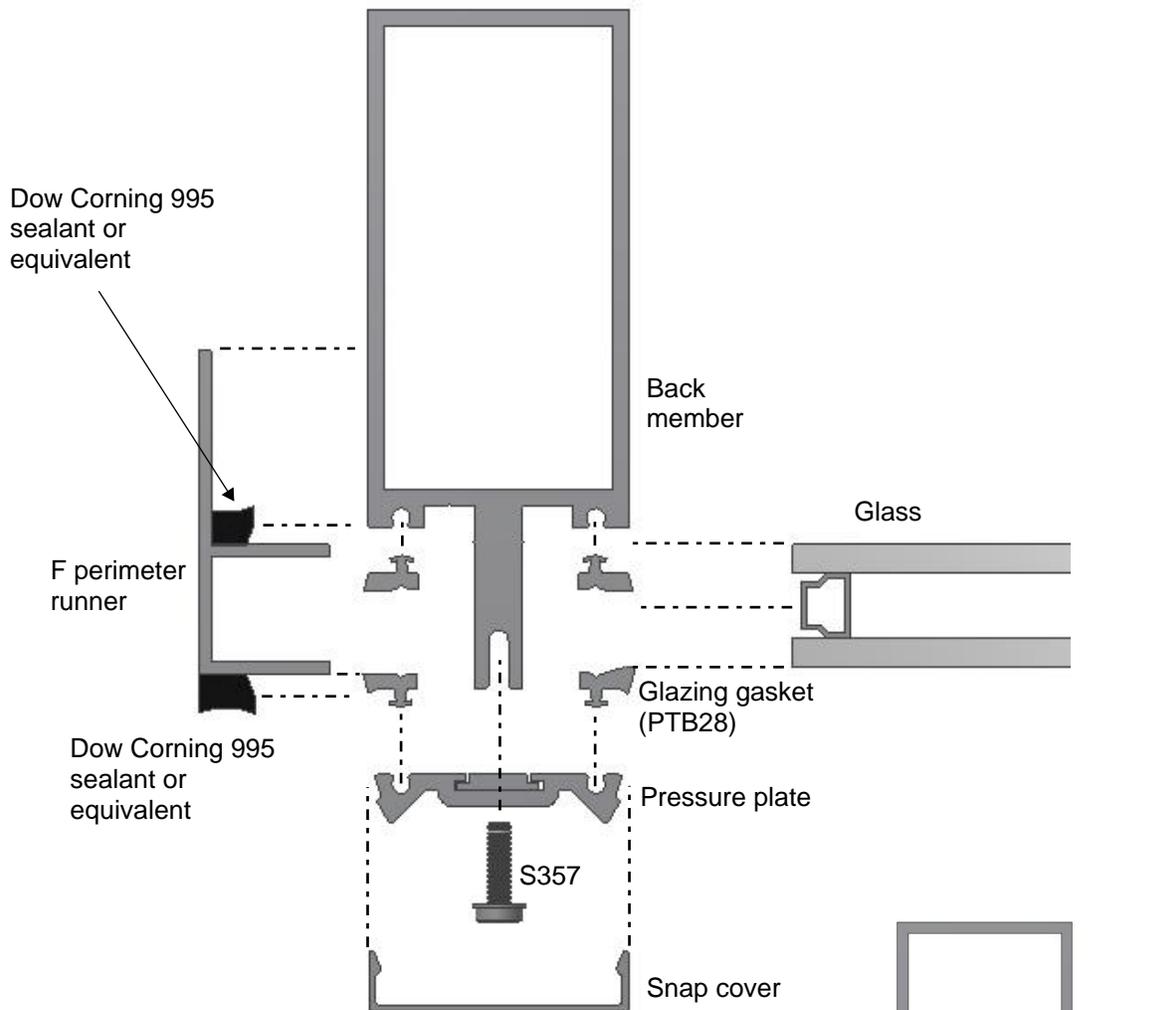
Return Leg Pressure Plate Option



Assembly

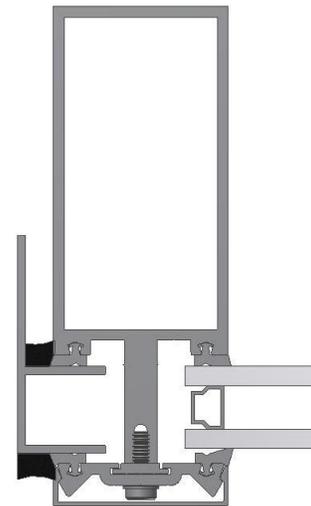
- Install glazing gaskets (PTB28) in the reglets of the vertical mullion.
- Install the glass.
- Attach glazing gasket to pressure plate.
- Install the return leg pressure plate to the vertical mullion using S357 fasteners.
- Install the snap cover to the pressure plate.

F Perimeter Runner Option



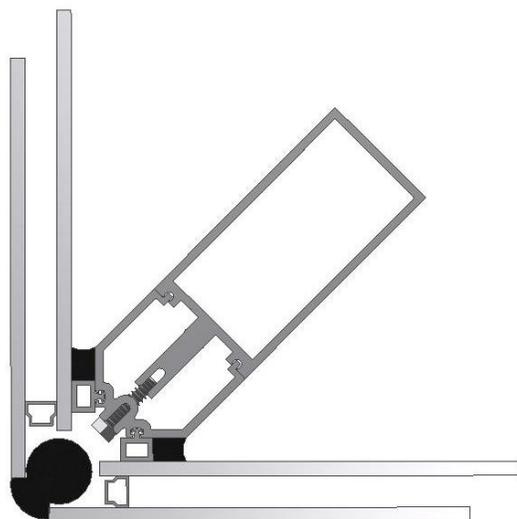
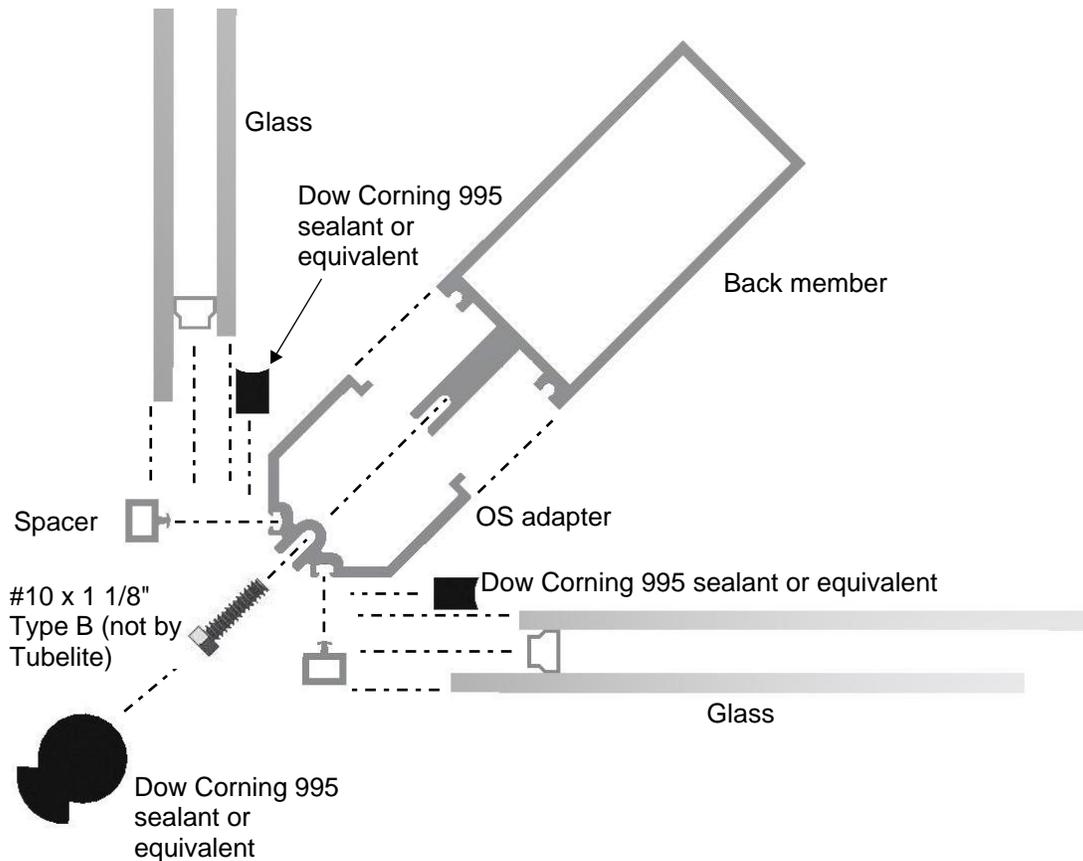
Assembly

- Install an F perimeter runner in the frame opening.
- Install glazing gaskets (PTB28) in the reglets of the vertical mullion.
- Apply structural sealant in corner between F perimeter runner, vertical mullion and glazing gasket, as well as where the F perimeter runner will meet the pressure plate.
- Install the vertical mullion next to the F perimeter runner.
- Install the glass.
- Attach glazing gaskets to pressure plate.
- Install the pressure plate to the vertical mullion using S357 fasteners.
- Install the snap cover to the pressure plate.



CORNER CONDITIONS

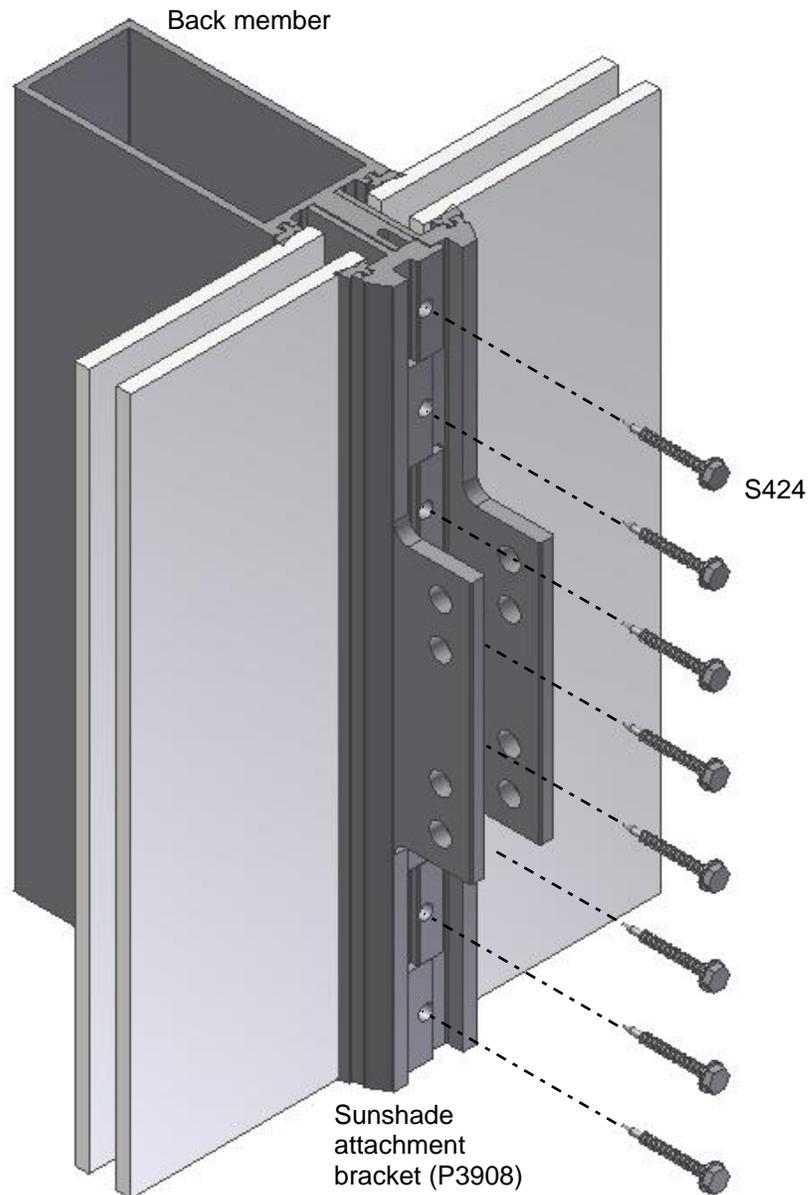
Outside 90 Degree Corner



Assembly

- Attach an OS adapter (E2101) to the back member.
- Attach a pair of modified spacers (PTB75) to the OS adapter.
- Apply structural sealant beside the spacers.
- Set the glass.
- Apply structural sealant between glass.

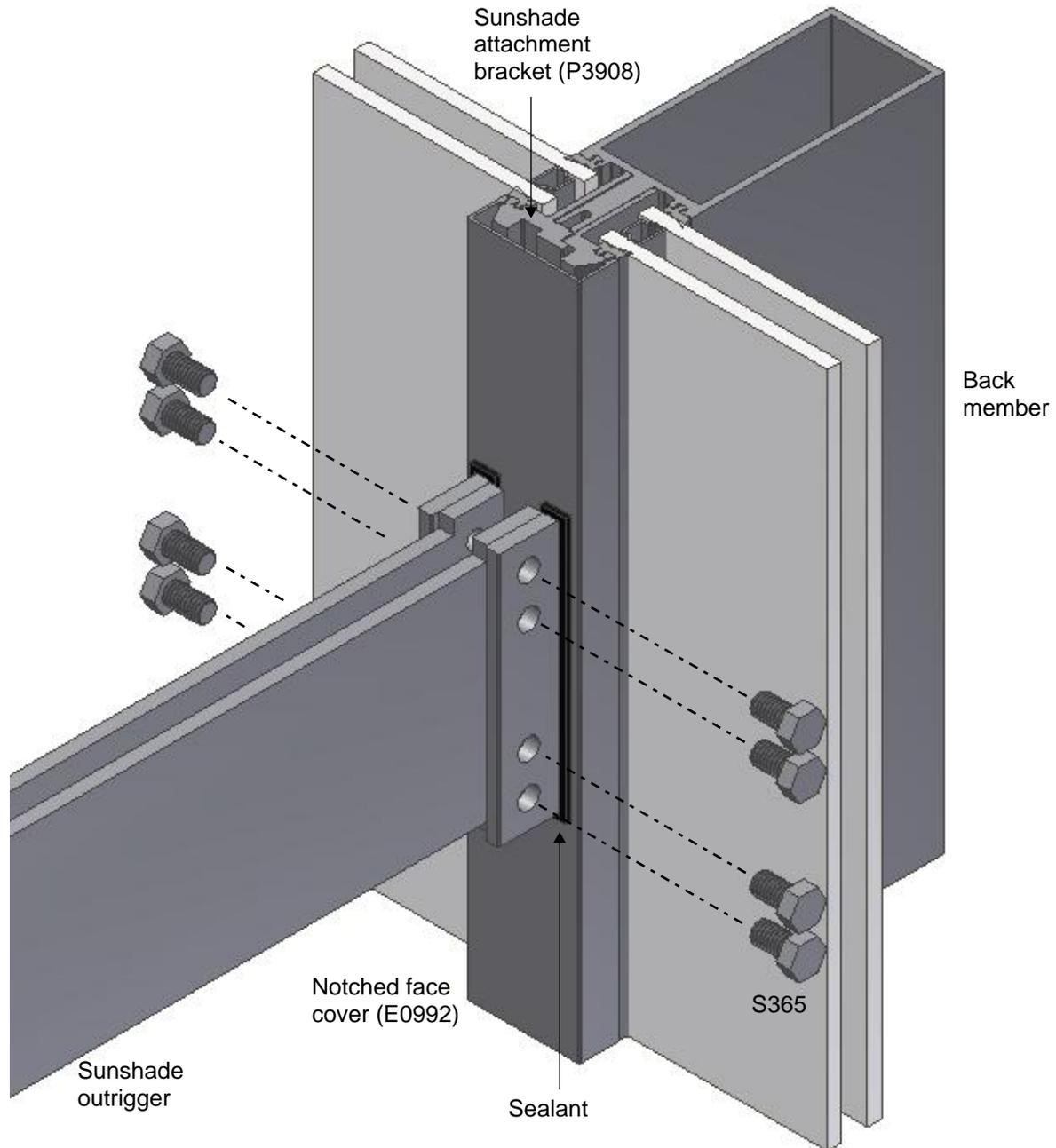
SUNSHADE ATTACHMENT



Assembly

- Pre-drill holes at least 3/4" deep into the tongue of the back member where the S424 fasteners will go.
- Attach sunshade attachment brackets (P3908) to vertical mullion using eight S424 fasteners.

SUNSHADE ATTACHMENT



Assembly

- Notch a face cover (E0992) to fit around the sunshade attachment brackets, then install the face cover to the vertical. Seal perimeter of notch when face cover is installed.
- Using eight S365 fasteners, attach the sunshade outrigger to the sunshade attachment brackets.