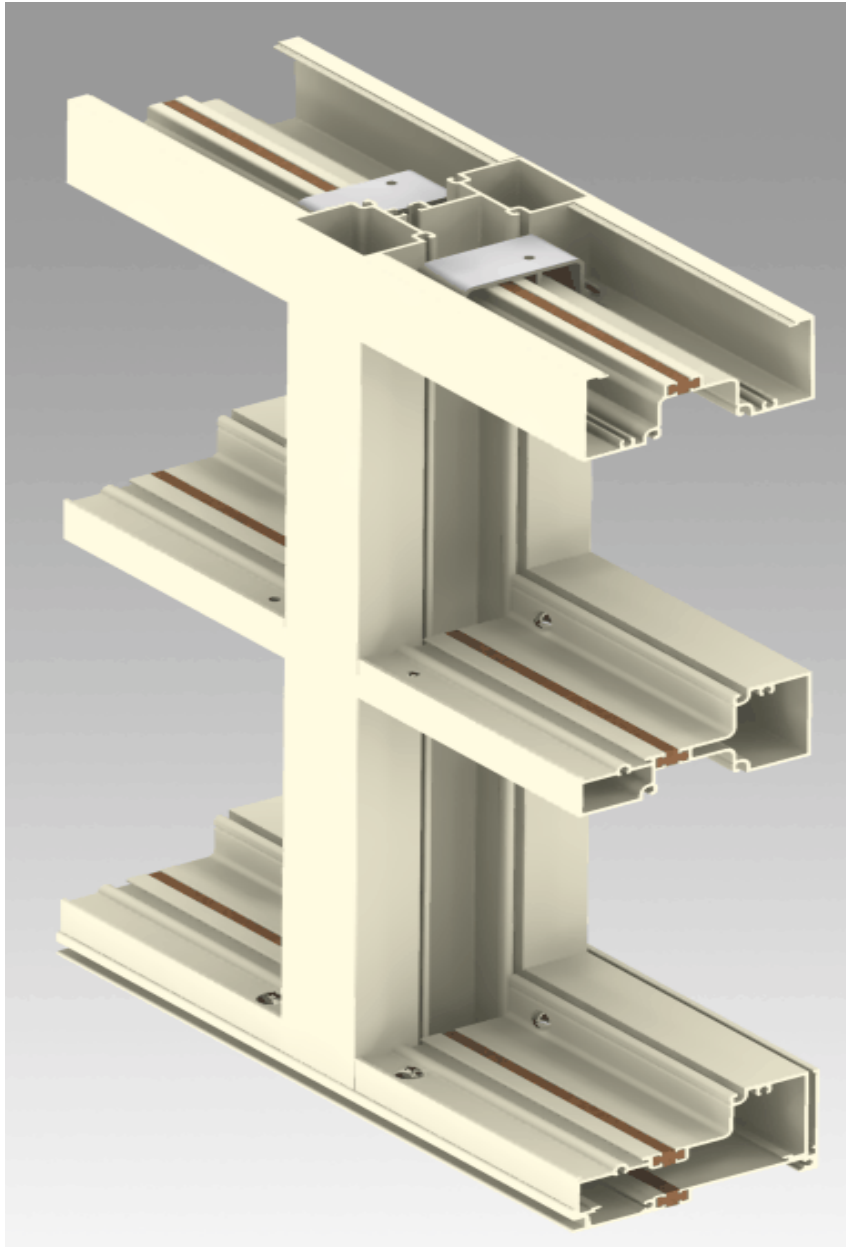


# 14000 Series

## Fabrication and Installation Instructions



**TUBELITE**®  
STOREFRONT, CURTAINWALL & ENTRANCES  
*DEPENDABLE*



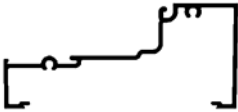
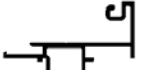


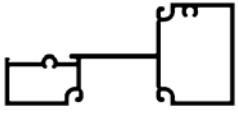



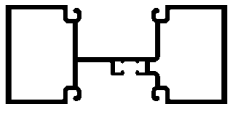
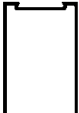

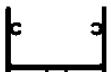

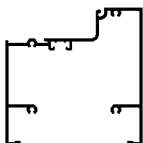



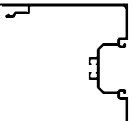
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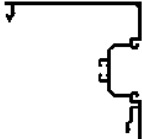

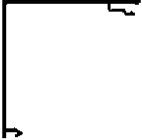


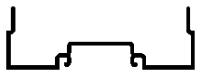

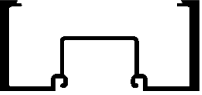

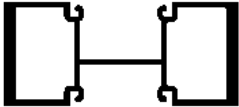
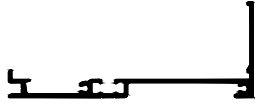



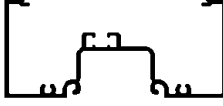


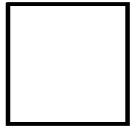



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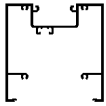


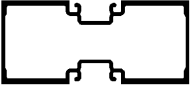
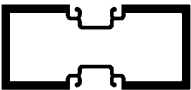
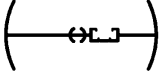
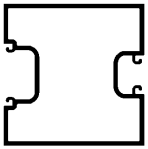
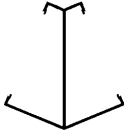
# GENERAL CONSTRUCTION NOTES


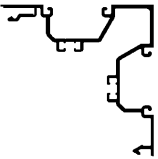

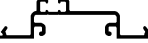
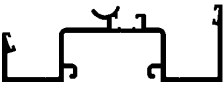


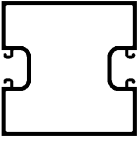
1. These instructions cover typical product application, fabrication, installation and standard conditions and are general in nature. They provide useful guidelines, but the final distribution drawings may include additional details specific to this project. Any conflict or discrepancies must be clarified prior to execution.
2. Materials stored at the job site must be kept in a safe place removed 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, ceiling, mechanical ducts, convectors, 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 and option 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 cannot 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 1/4" 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.

# EXTRUDED ALUMINUM PARTS






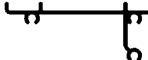



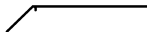











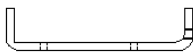
Shape	Description	Part No.	Shape	Description	Part No.
	Open back head/jamb/vertical	E-14141		Screw applied 1" gutter	E-1414
	Open back sill/horizontal	E-14140		Snap-in 1" gutter	E-4013
	Glazing stop	E-14104		1" high glass stop	E-4015
	Intermediate horizontal	E-14103		1 1/4" high glazing gutter	E-14024
	Closure pocket	E14142 (T-14142)		1 1/4" high glass stop	E-14025
	Intermediate vertical	E-1400 (T-1400)		4" sidelight base	E-14026
	1/2" door stop	E-4531		Sidelight base anchor channel	E-14027
	1 3/8" x 1 3/4" offset closer arm cover	E-2298		4 1/2" x 4 1/2" sidelight base/horizontal	E-14047 (T-14047)
	Open back door jamb	E-14144		Smooth closure plate	E-4543
	2" x 4 1/2" door jamb	E-14021		One pocket corner half	E-14118 (T-14118)






Shape	Description	Part No.	Shape	Description	Part No.
	Door header	E-14124		One pocket corner half	E-14119 (T-14119)
	Open back door jamb	E-1438		Smooth corner post half	E-45110
	2" x 4 1/2" tube	E-1451		Expansion female half	E-14106 (T-14106)
	Expansion vertical half	E-14107 (T-14107)		Head receptor male	E-14130
	Heavy open back vertical	E-1435 (T-1435)		Head receptor female	E-14129 (T-14129)
	Heavy vertical	E-1430 (T-1430)		Recommended extruded sill flashing	E-14259 (T-14259)
	Deep pocket closure	E-14022 (T14022)		Alternate extruded sill flashing	E-14159
	Snap-in 1" pocket filler	E-1411		Open back head/jamb/vertical (thermal system)	T-14241
	Snap-in 1/4" pocket filler	E-4011		Open back sill/horizontal (thermal system)	T-14240
	4 1/2" x 4 1/2" tube	E-0133		Intermediate horizontal (thermal system)	T-14143
	Glazing adapter for 1/4" glass	E-14036		Snap in Filler w/ fin	E4553






Shape	Description	Part No.
	4 1/2" x 4 1/2" Mullion	T14052
	Glazing adapter for 1/2" glass	E14061
	Heavy Wall Door Jamb	E14121
	Back to back doors mullion	E14145
	Back to back doors heavy wall mullion	E14245
	Inner rotational mullion	T14247
	4 1/2" square door jamb	E14250
	135° Corner mullion	E/T45005

Shape	Description	Part No.
	Extruded sill flashing	T14055
	Corner Mullion	T14110
	Door Header	E14125
	Closure Pocket	T14242
	Outer rotational mullion	T14246
	Snap in sidelite base adaptor	T14248
	Open back mullion	T14261
	4 1/2" square mullion for back to back doors	E45009

# ACCESSORIES

Shape	Description	Part No.	Shape	Description	Part No.
	Roll-in glazing gasket – 1" glass	P-2728		1 1/4" long frame clip	P-1133
	Roll-in glazing gasket – 1 1/8" glass	P-487		1 1/4" long frame clip	P-1134
	Gasket for E/T14129/ E14130	P-2511		1 1/4" long frame clip	P-1141
	Gasket for E45116 & E/T14246	P-1221		4" long Setting block	P-1132
	#10-24 x 1" Type 23 Phillips hex head	S-202		Water diverter	P-1135
	#10 x 1 3/4" Type B Phillips pan head	S-009		End dam for E45159 sill flashing	P-1142
	#10 x 1/2" Phillips truss head	S-191		.040 formed aluminum splice for E45159 flashing	P-1143
	#12-24 x 5/8" Phillips flat head	S-286		.040 formed aluminum splice for E14159 & T14259 flashing	P-1144
	#12 x 3/4" Phillips flat head	S-149		Steel reinforcing 12' – 0" primed	P-1437
	Pile weathering for door stop	P-1098A		Clip for sidelight base	P-1137
	Door stop header filler – 2 required for E-14124	P-503		Drill fixture for clip joint and screw spline	P-1139

Shape	Description	Part No.
	Back-up for shimming at anchor points for jambs & heads	P-1745
	Back-up for shimming at anchor points for jambs & heads	P1768
	Rigid PVC perimeter caulk backup	P4543A
	#10 x 5/8" type B Phillips flat head	S192
	#8 x 3/8" type A Phillips Pan Head	S196

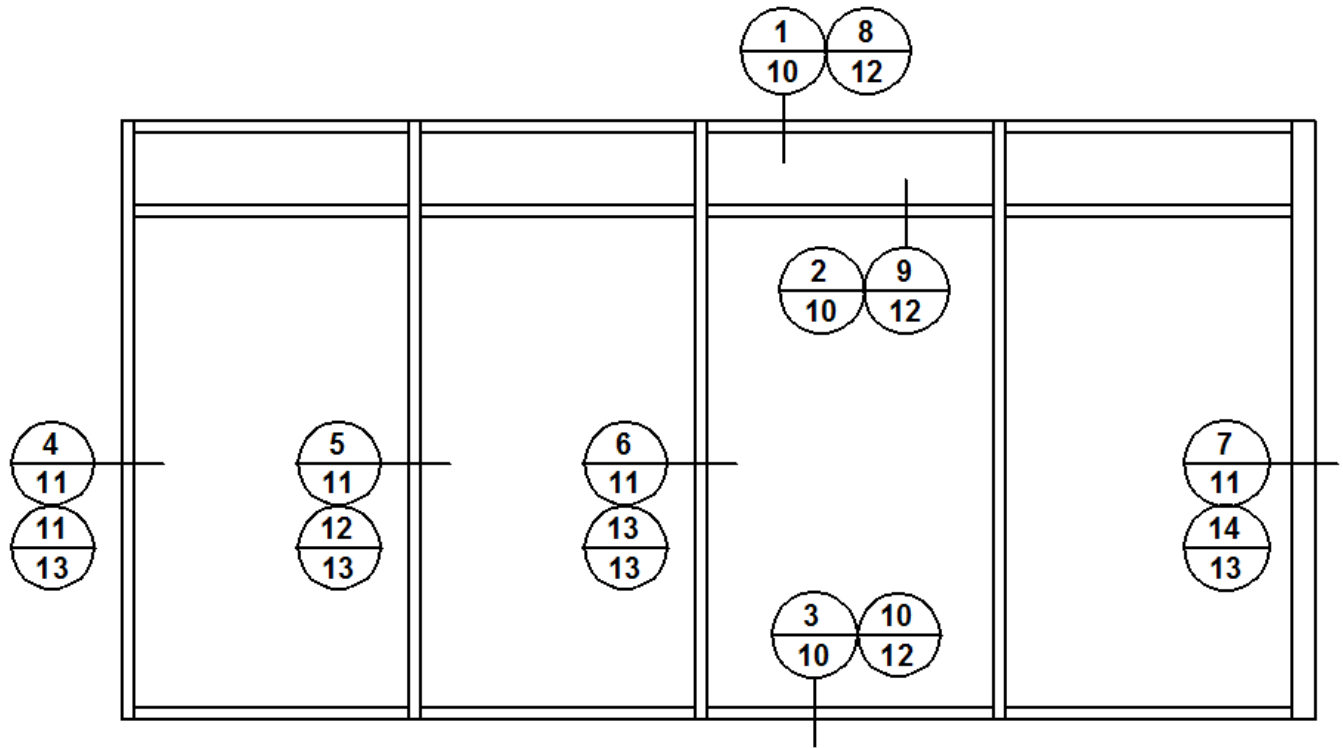
Shape	Description	Part No.
	5/16" - 18 threaded swivel pad thumb screw w/ delrin tip for P1139	P1682
	3/16" thick setting block	P2400
	Rigid PVC pocket filler	P4563
	End Dam for E14159, T14250 & T14055	P1153
	3" long weep baffle	PTB42



# OVERVIEW

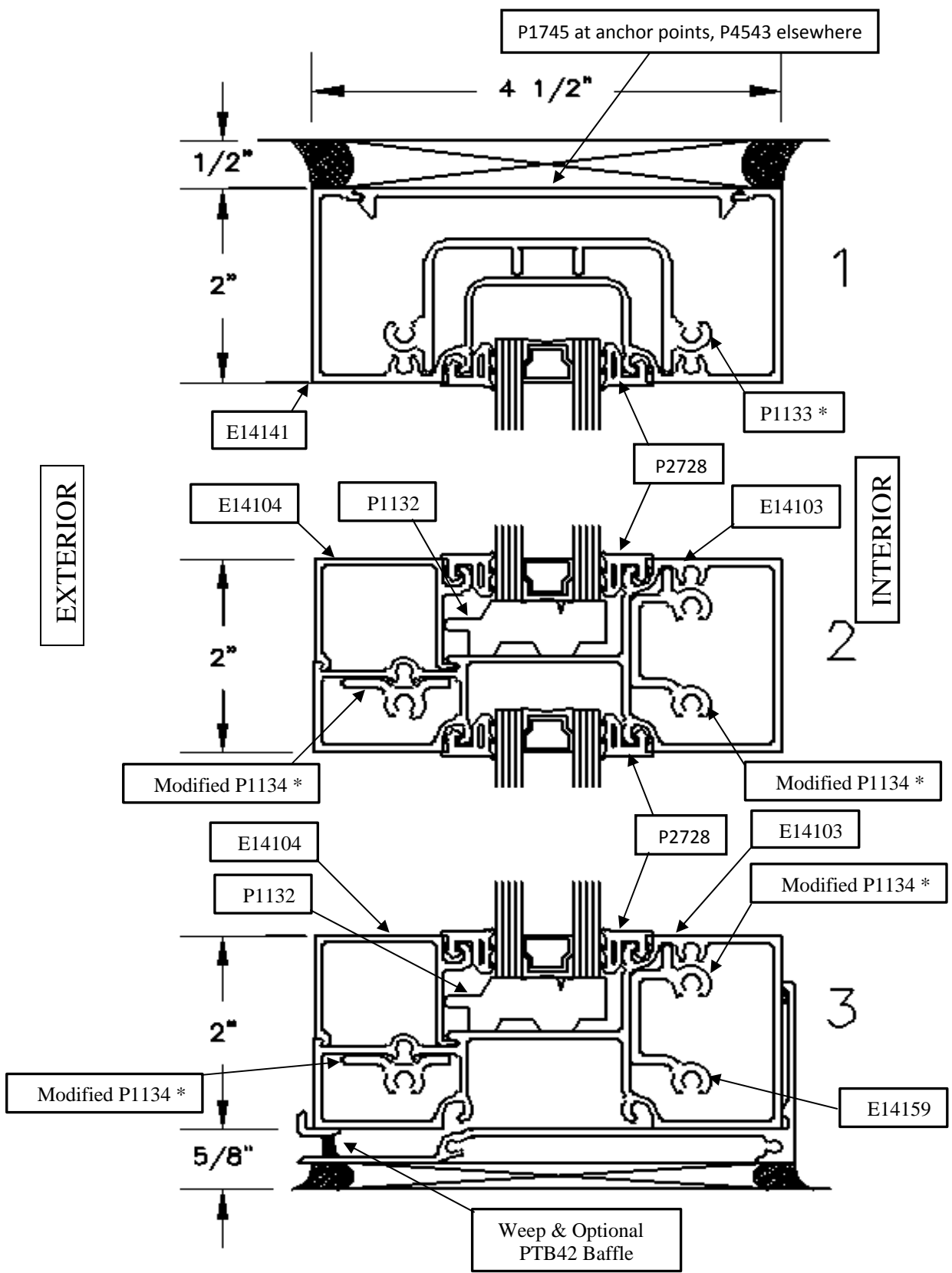
Tubelite's 14000 Series is available in thermal as well as non-thermal versions. There are also two distinct methods for assembling the 14000 Series: screw spline assembly, and shear block (frame clip) assembly.

The illustration below shows the elevation view of a typical 14000 Series installation. The number in the top half of each circle is the number of a figure showing details of the associated system component; the number in the bottom half of each circle gives the page number on which that figure appears.



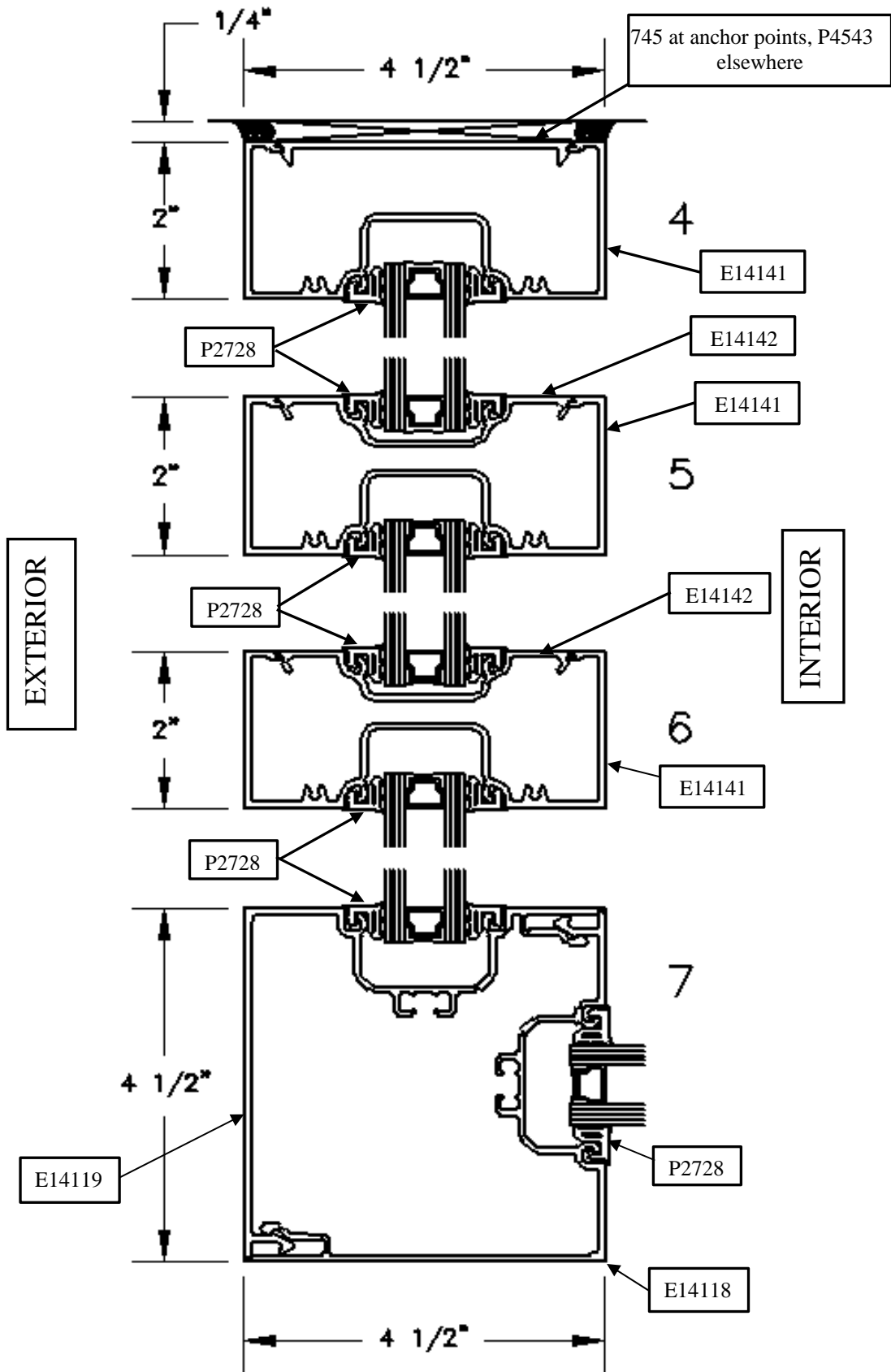
**Elevation of a typical 14000 Series installation**

The circles on this illustration come in pairs. The first circle in each pair gives the location of a drawing of the non-thermal product; the second circle shows where you can find a drawing of the assembly details for the corresponding thermal product. The drawings of horizontal details show the shear-block method of assembly.

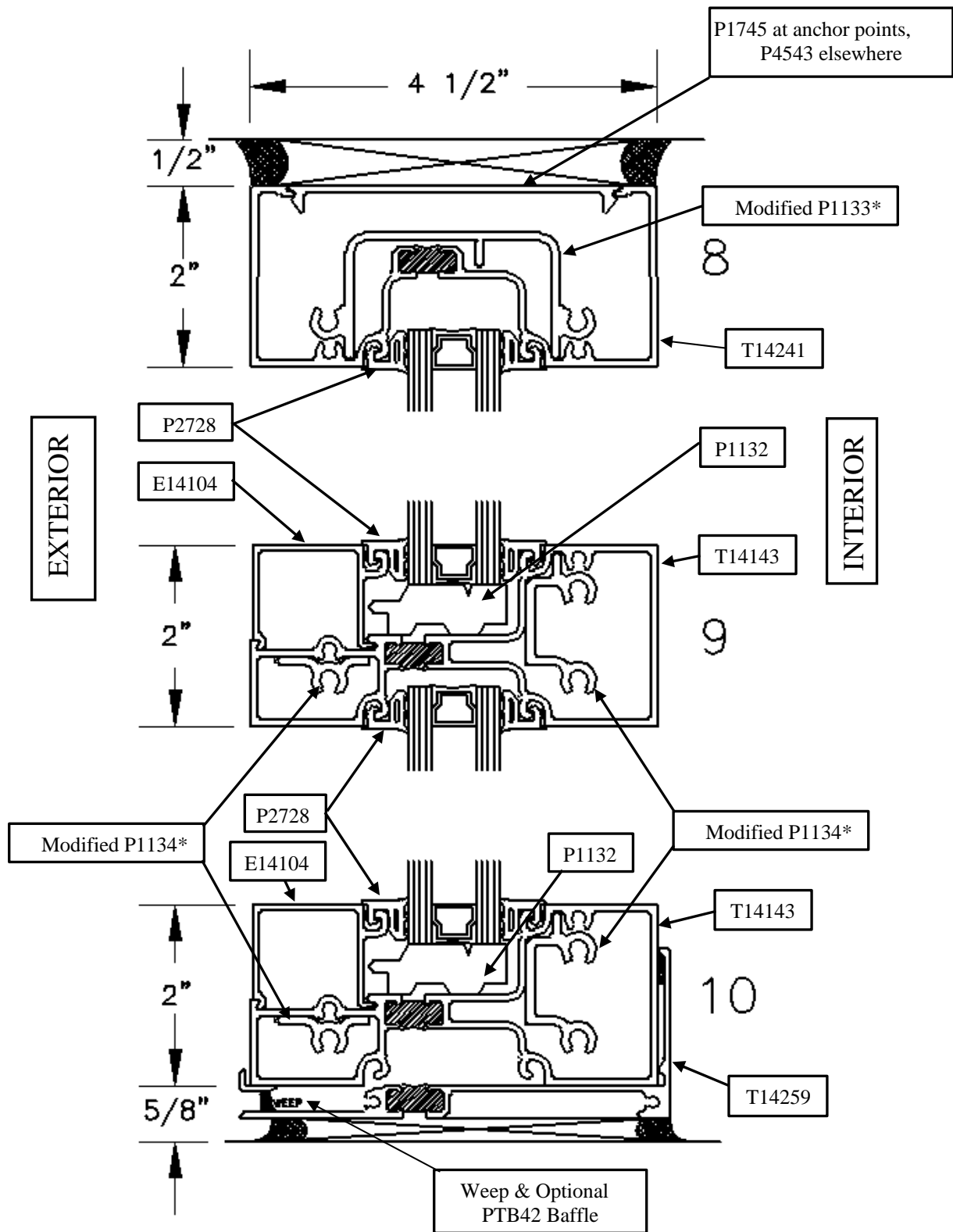


Typical horizontal details – Non-Thermal

- Clips used with closed shape verticals

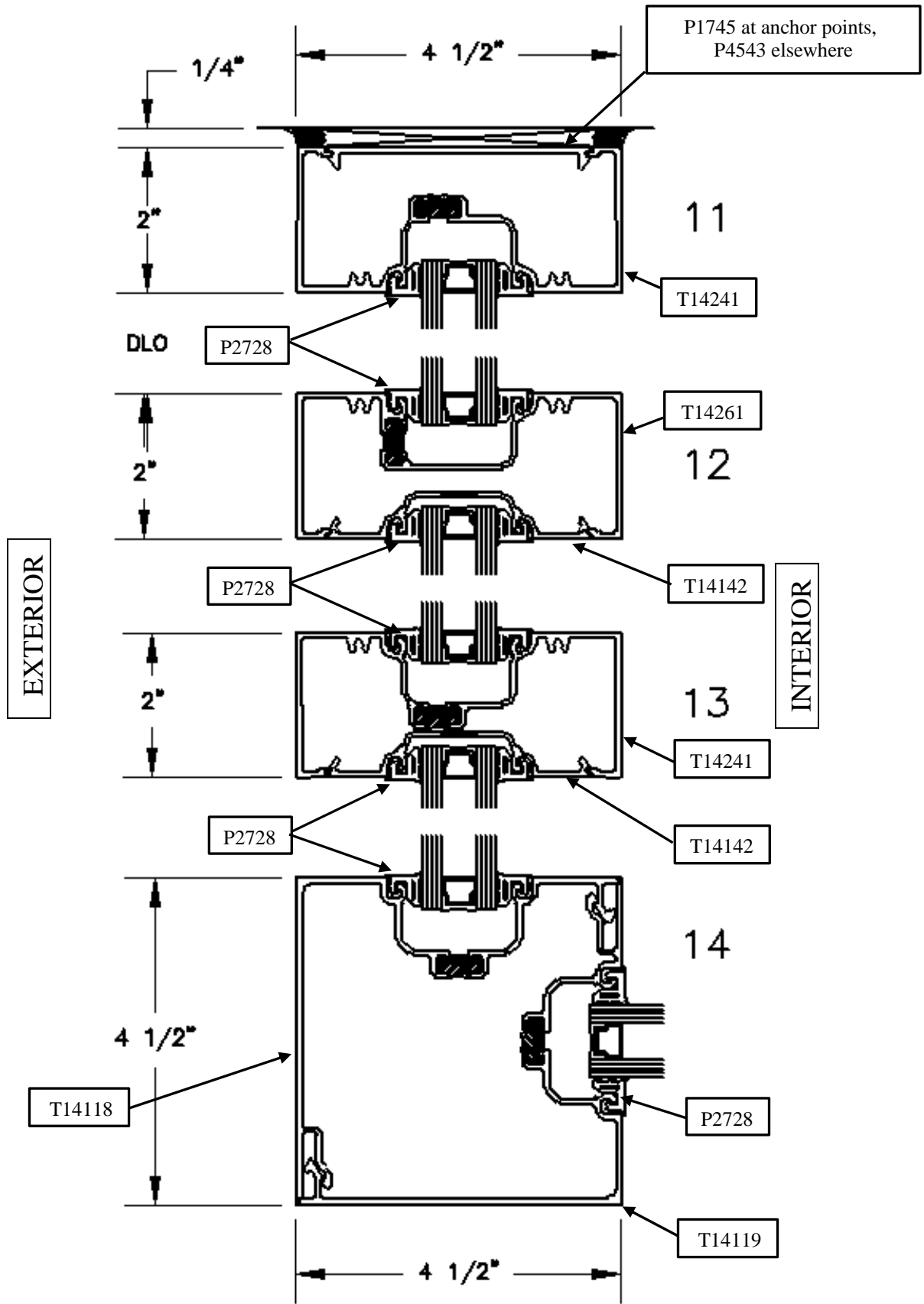


Typical vertical details – Non-Thermal



Typical horizontal details – Thermal

\* Clips used with closed shape verticals



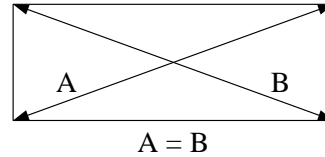
Typical vertical details – Thermal

# FRAME FABRICATION

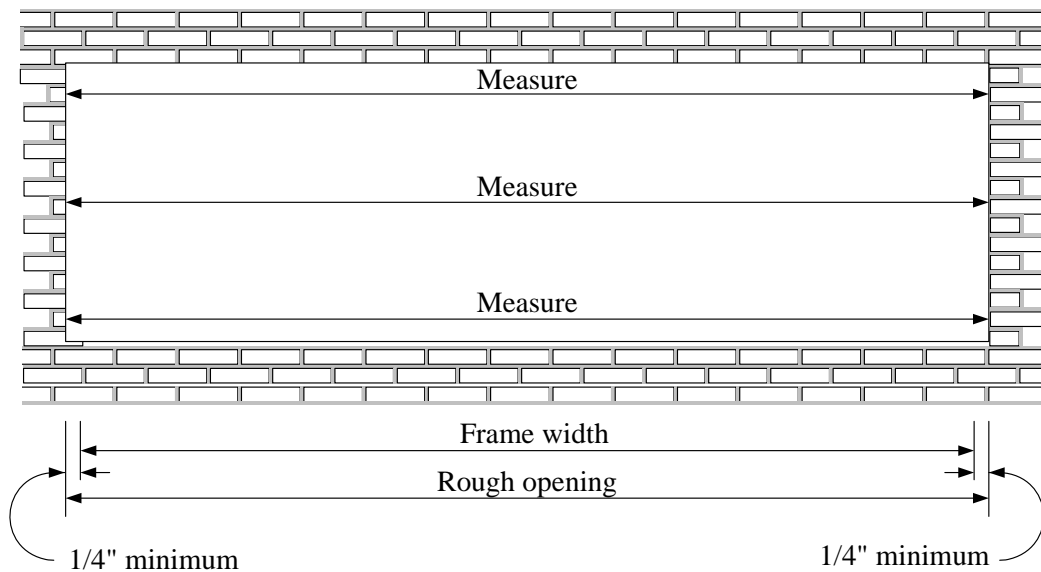
## *Step #1: Determine frame size*

### **Determine frame width**

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

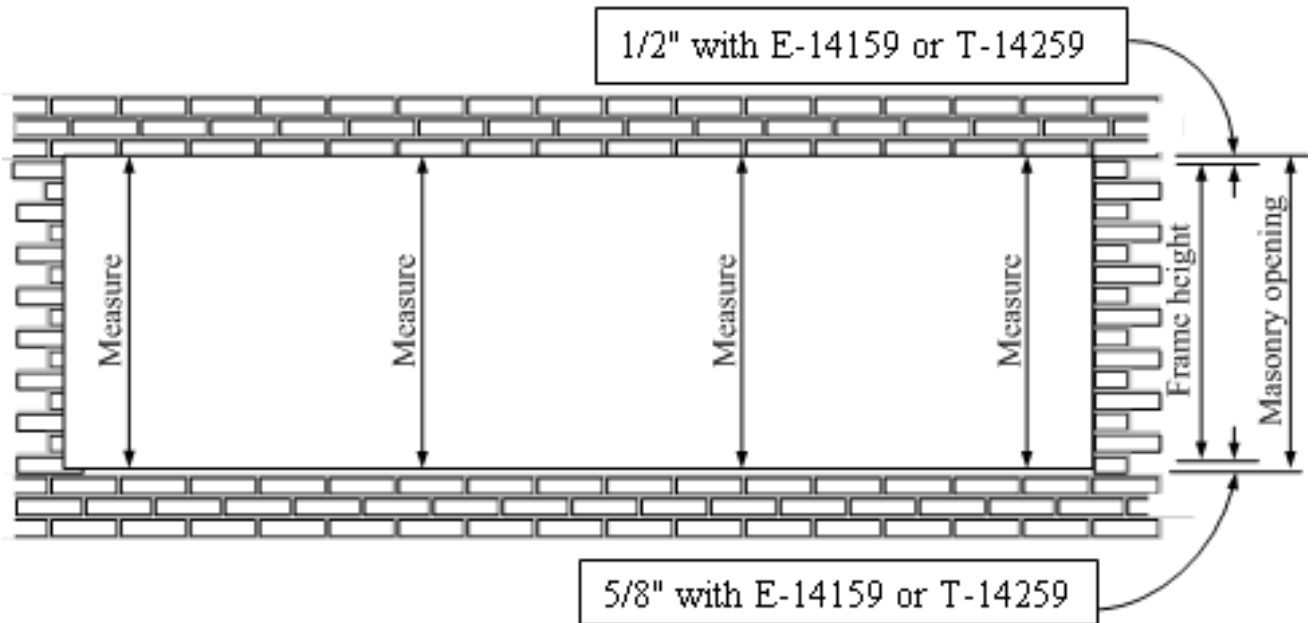


- Measure the width of the masonry opening at the top, middle and bottom.
- Select the smallest dimension measured. To determine the frame width to be used, subtract a minimum of 1/2" from the smallest measured width, to allow a minimum of 1/4" at each jamb for shimming and caulking. Allow a larger clearance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



## Determine frame height

- Measure the height of the masonry 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" at head for shimming and caulking and to accommodate E-14159 or T-14259 extruded flashing, building tolerances, an out-of-square opening, and/or anticipated thermal expansion within the unit.



### ***Step #2: Cut sill flashing to size***

- Cut flashing (E-14159 or T-14259) to frame width determined in Step #1 above (rough opening minus clearances). If the installation is to include an entrance, the flashing should butt against the back of the door jamb (no clearance).
- Flashing longer than 24' in length must be spliced using part number P-1144 for E14159 or T14259 flashing. If flashing must be spliced, allow 3/8" to 1/2" for the width of the splice.

### ***Step #3: Cut vertical framing members to size***

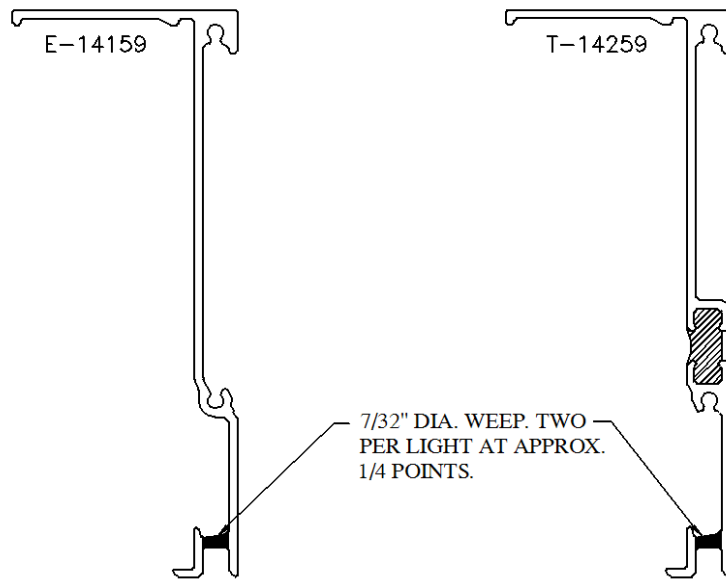
- Verticals should be the frame height found in Step #1 above (rough opening height minus clearances).
- As shown in the elevation overview on page 9 above, vertical framing members run through.

### ***Step #4: Cut horizontal framing members to size***

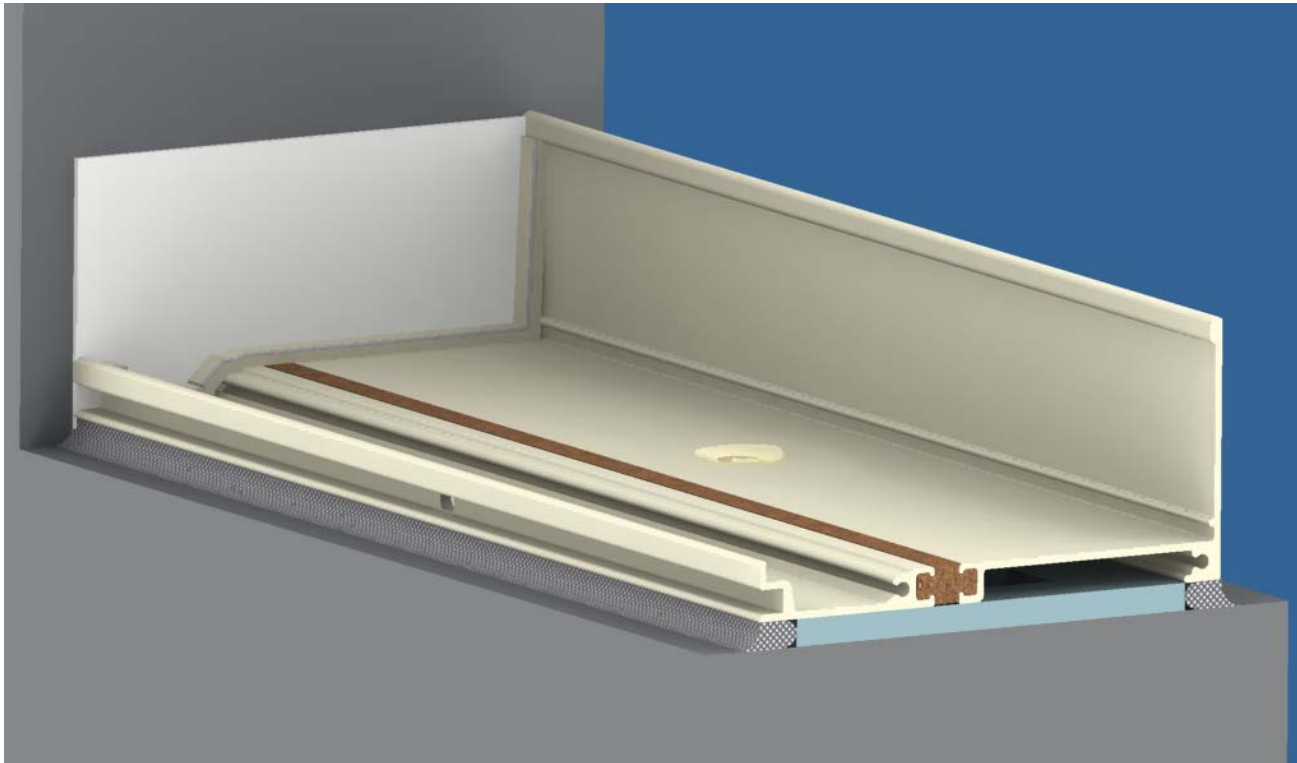
- Cut horizontal framing members to the daylight opening (the distance between verticals).
- For easier installation, cut horizontal glazing beads 1/32" shorter than the horizontal framing member.

### *Step #5: Field drill weep holes in extruded sill flashing*

- E-14159 (and T-14259) extruded sill flashing requires two weep holes in each light, at the quarter points. As shown in the illustration below, the weep holes should be  $7/32$ " in diameter.



### **Weep holes in extruded sill flashing**



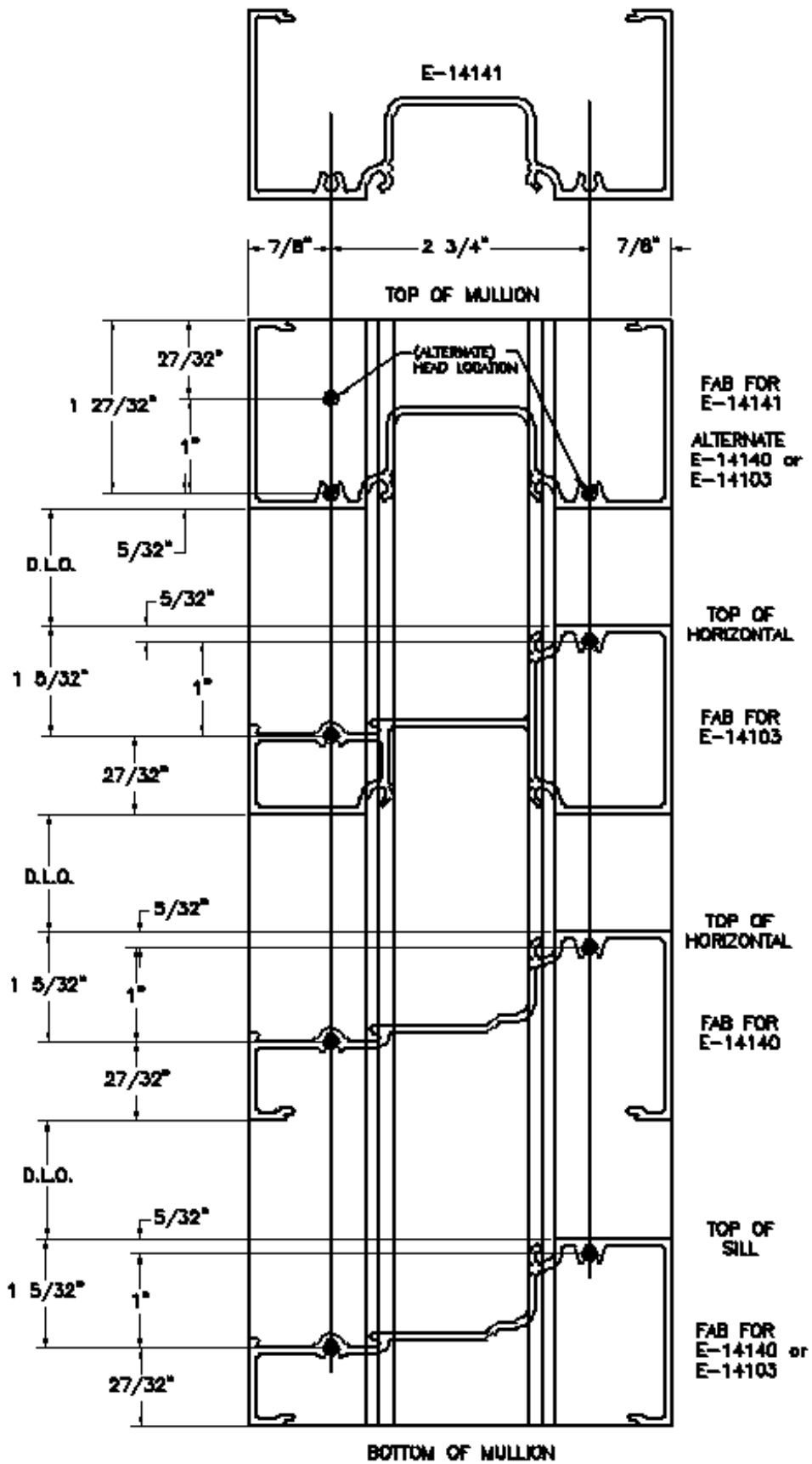
**3D view showing installed flashing with weep hole**



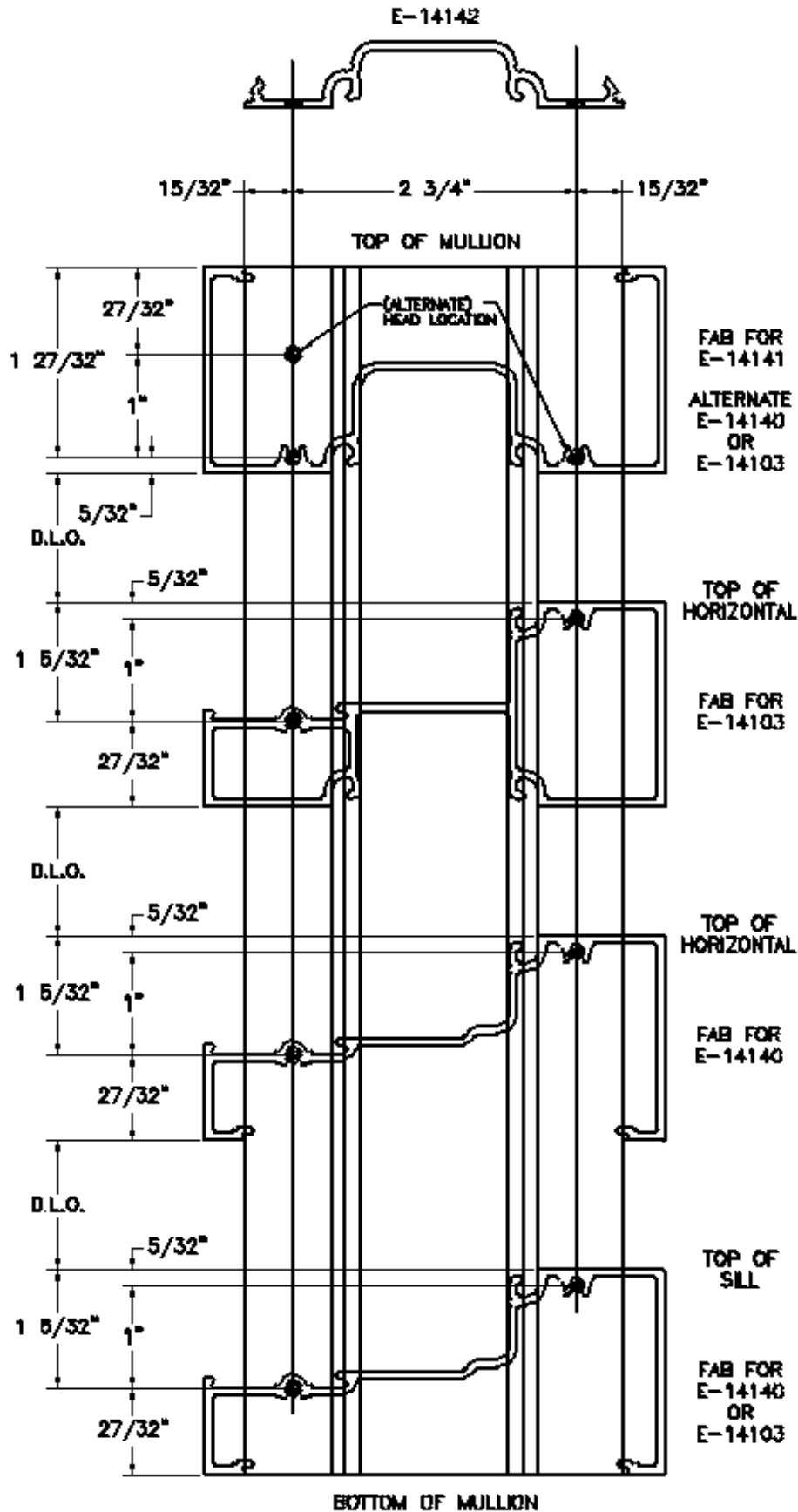
### ***Step #6 (screw spline assembly): Drill holes in vertical framing members***

In screw-spline assembly, screws are driven through holes in the vertical members, directly into screw splines on the horizontal members. These screws are what support the horizontal members and the glass. The six drawings in this section show where to drill the holes in the vertical members so that they line up with the screw splines on the horizontals.

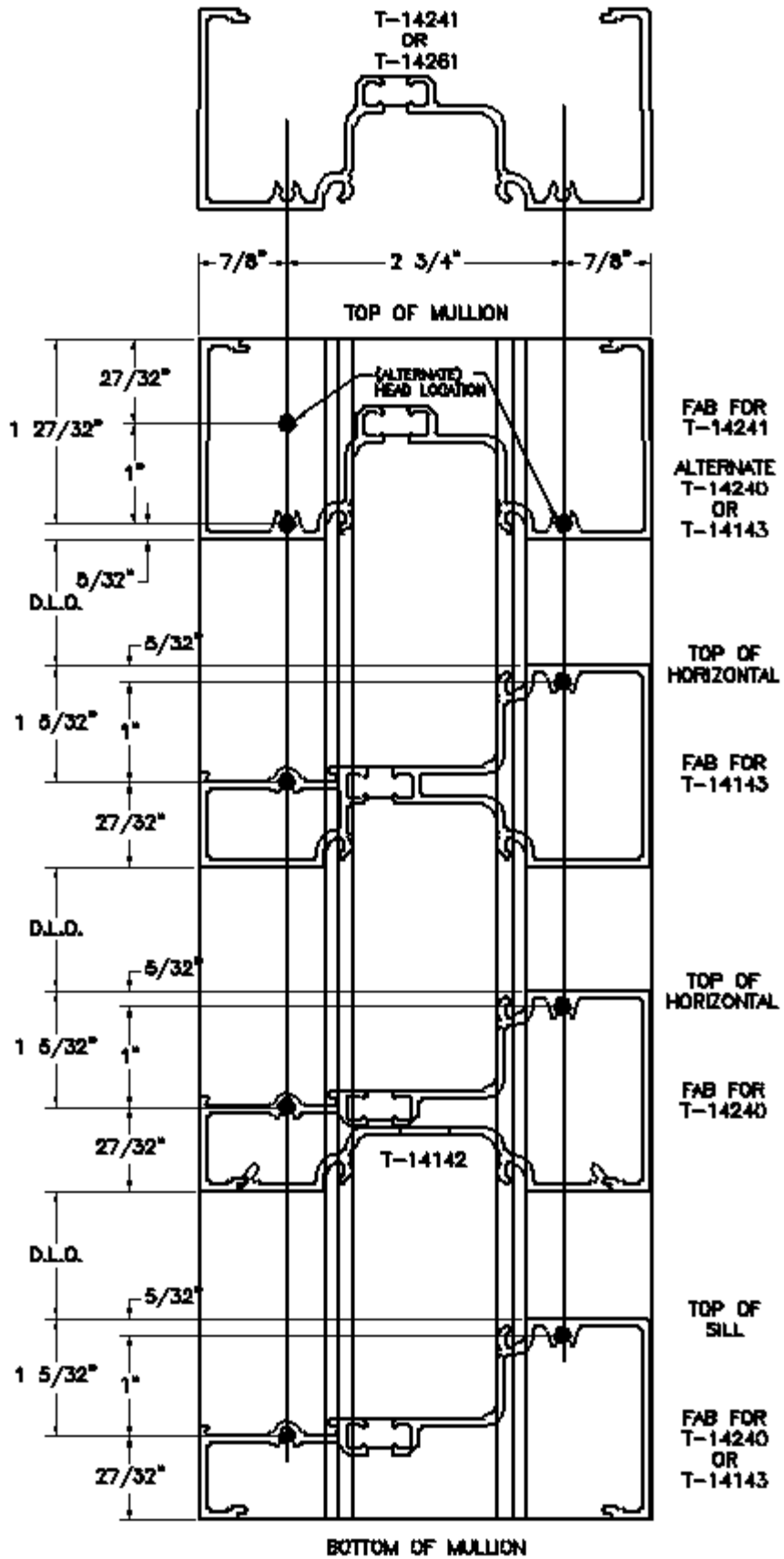
- The screw used for screw-spline assembly is #10-24 x 1" type 23 phillips hex head (S-202). To accommodate this type of screw, the holes in the vertical framing members must be .201" in diameter, corresponding to a #7 drill.
- Tubelite offers a drill fixture (P-1139) to help locate the correct hole locations quickly and accurately. This fixture is designed for use on both screw-spline and shear-block projects.



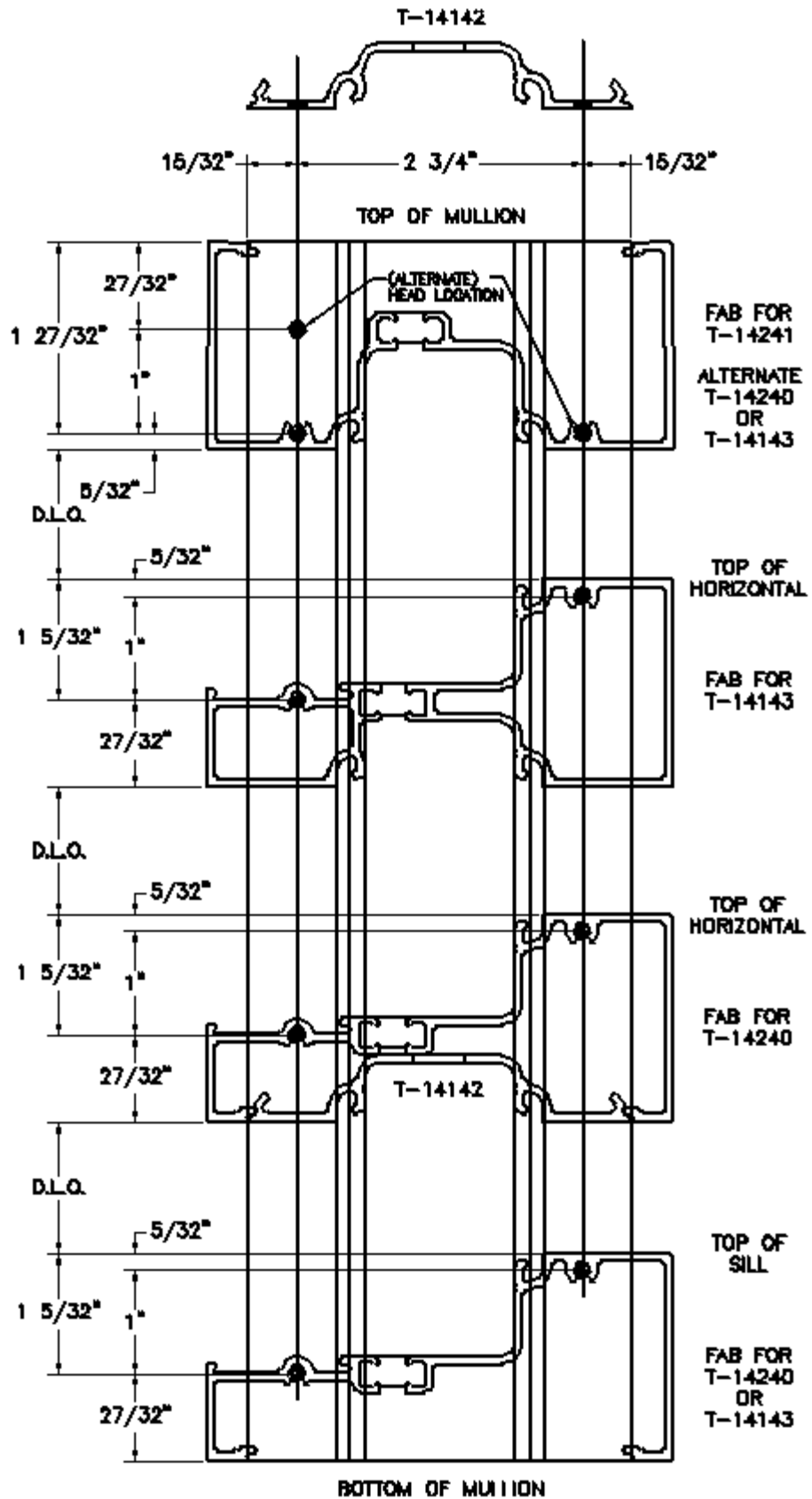
Drilling open-back vertical (E-14141) Screw-spline, non-thermal, no door or sidelight



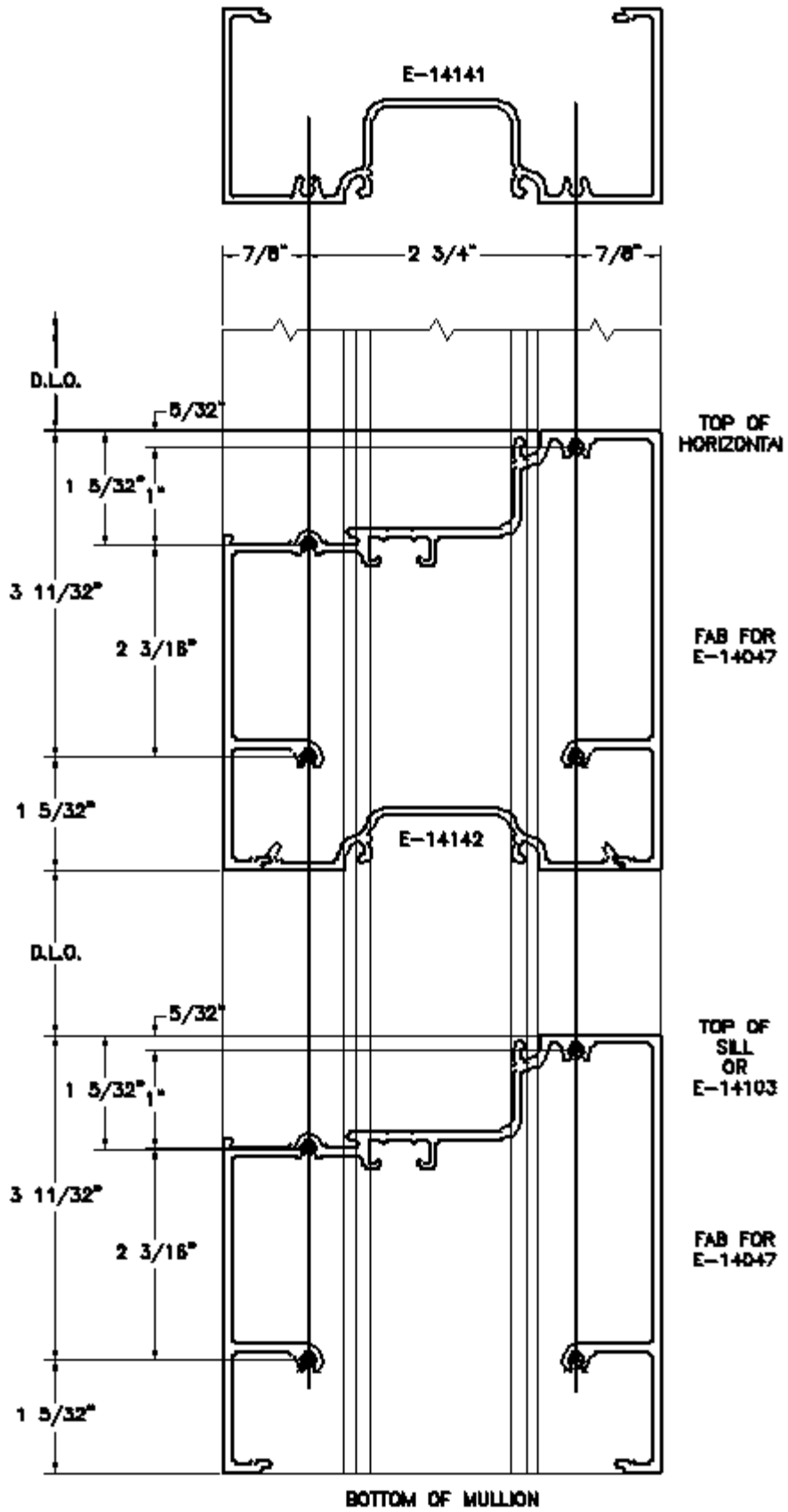
Drilling a closure pocket (E-14142) -- Screw-spline, non-thermal, no door or sidelight



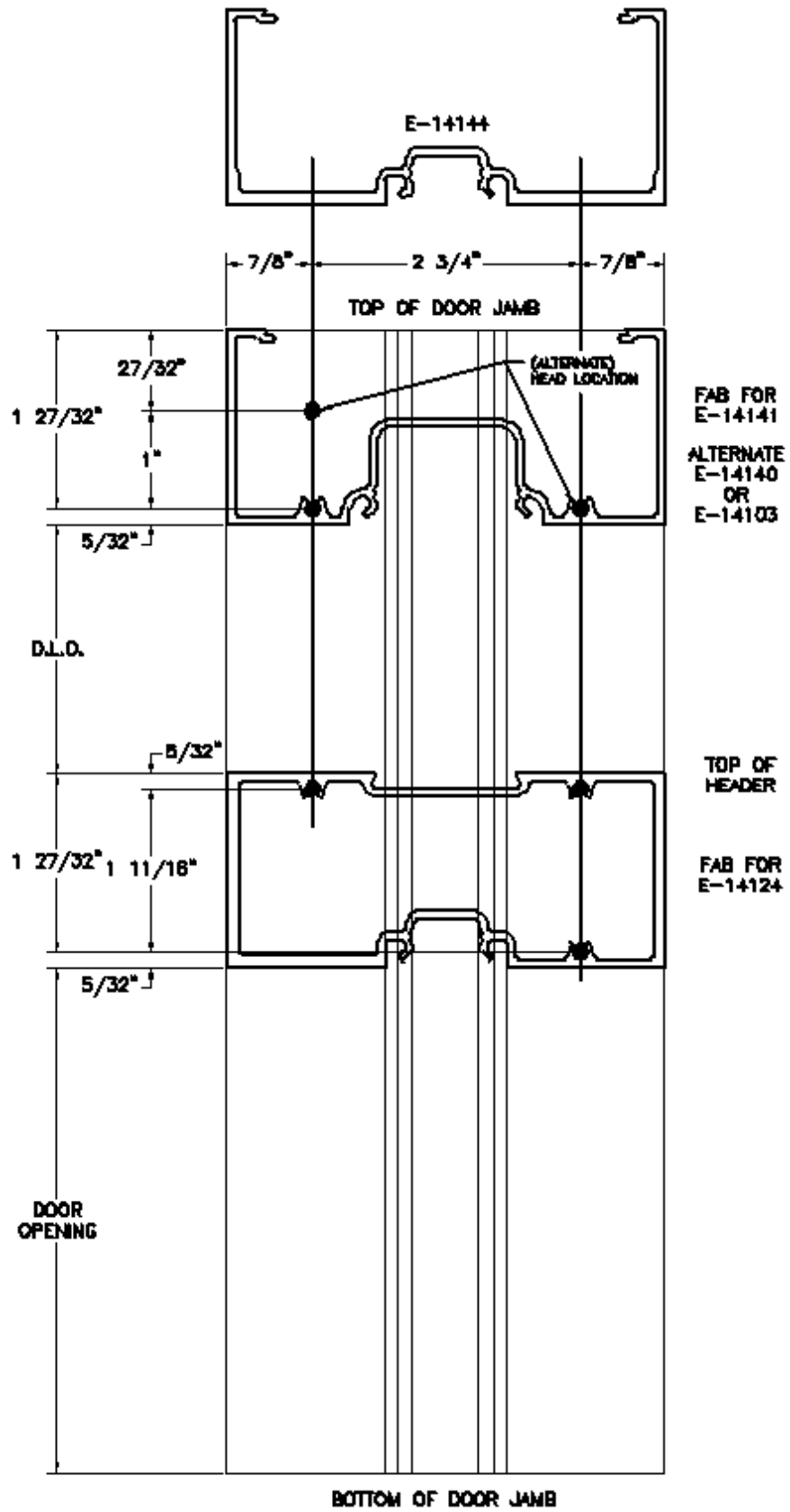
Drilling an open back vertical (T-14241 or T-14261) Screw-spline, thermal, no door or sidelight



Drilling a closure pocket (T-14142) -- Screw-spline, thermal, no door or sidelight



Drilling an open-back vertical (E-14141) Screw-spline, non-thermal, next to a sidelight



**Drilling an open-back door jamb (E-14144) Screw-spline, non-thermal, next to a door**

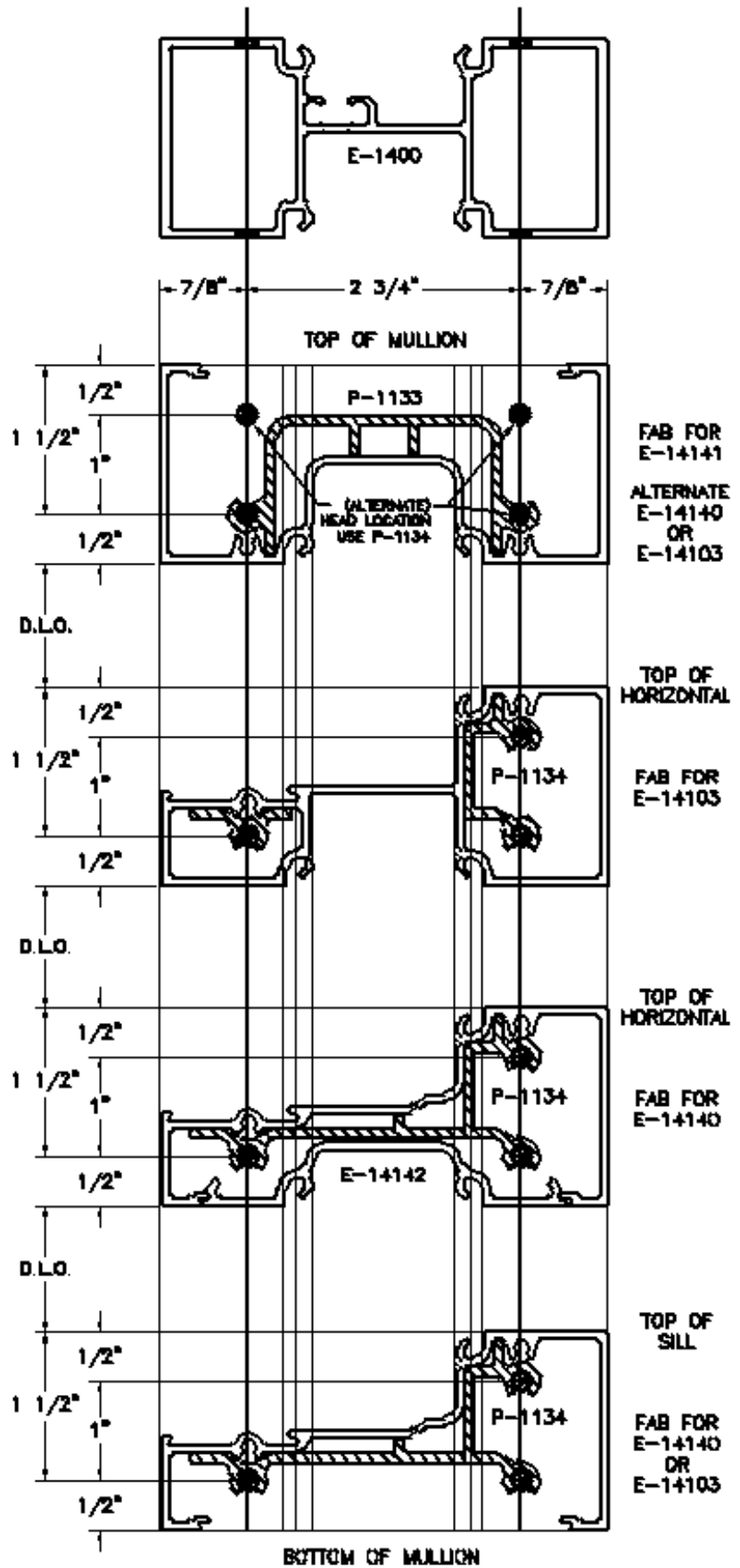
### ***Step #6 (shear block assembly): Drill holes in vertical framing members***

In screw-spline assembly, screws pass through holes in the vertical members, connecting them directly to the horizontal members. In shear-block assembly, the installer

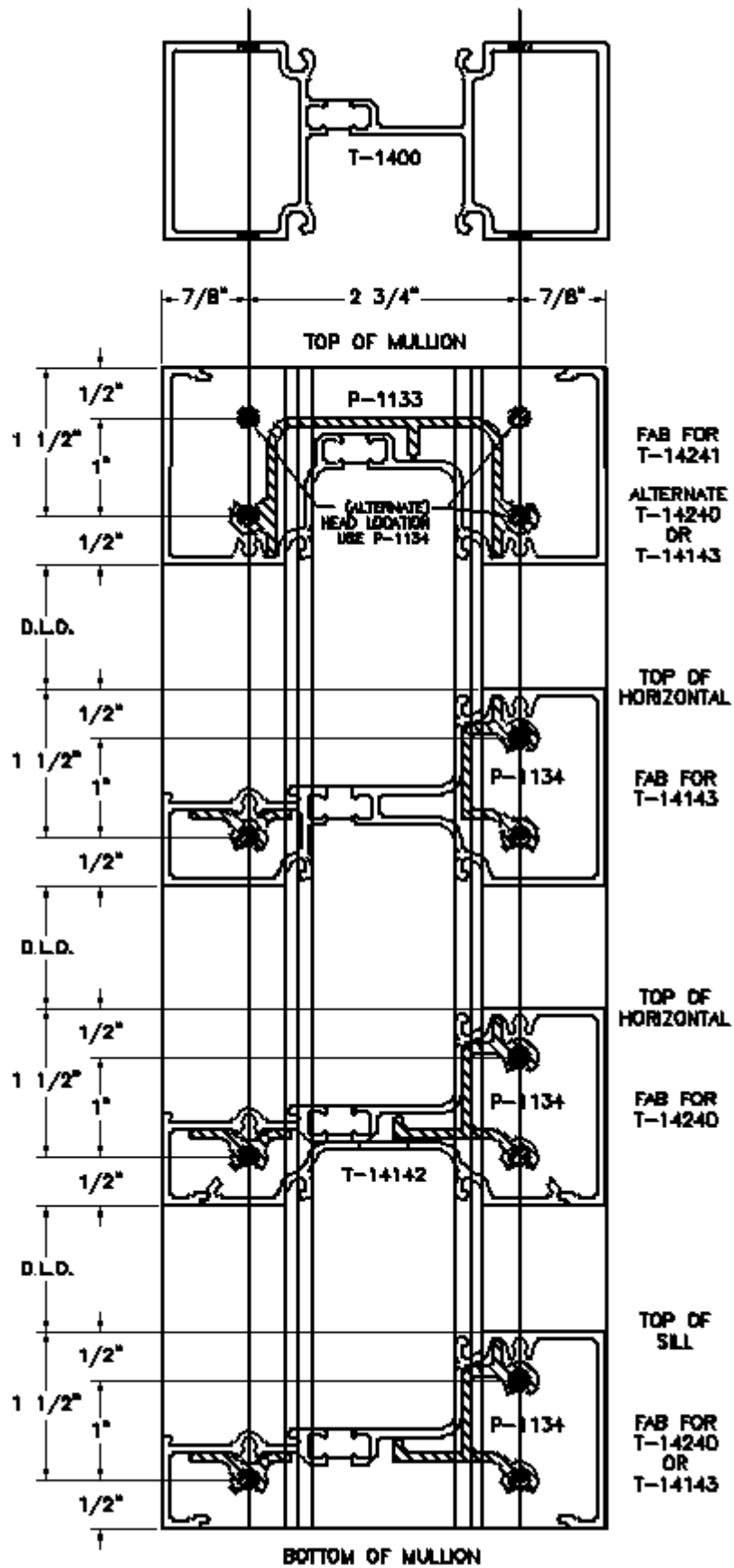
- Secures frame clips (also known as shear blocks) to the vertical members with screws;
- Slides the horizontal members over the frame clips; and finally
- Secures the horizontal members to the frame clips with screws.

The screws used to secure frame clips to verticals require use of a #25 drill (.149" diameter). Tubelite recommends using a drill fixture (P-1139) to facilitate quick and accurate drilling of holes in verticals for shear-block assembly projects. The following four illustrations show where to drill shear-block verticals to accommodate various types of horizontal framing members.

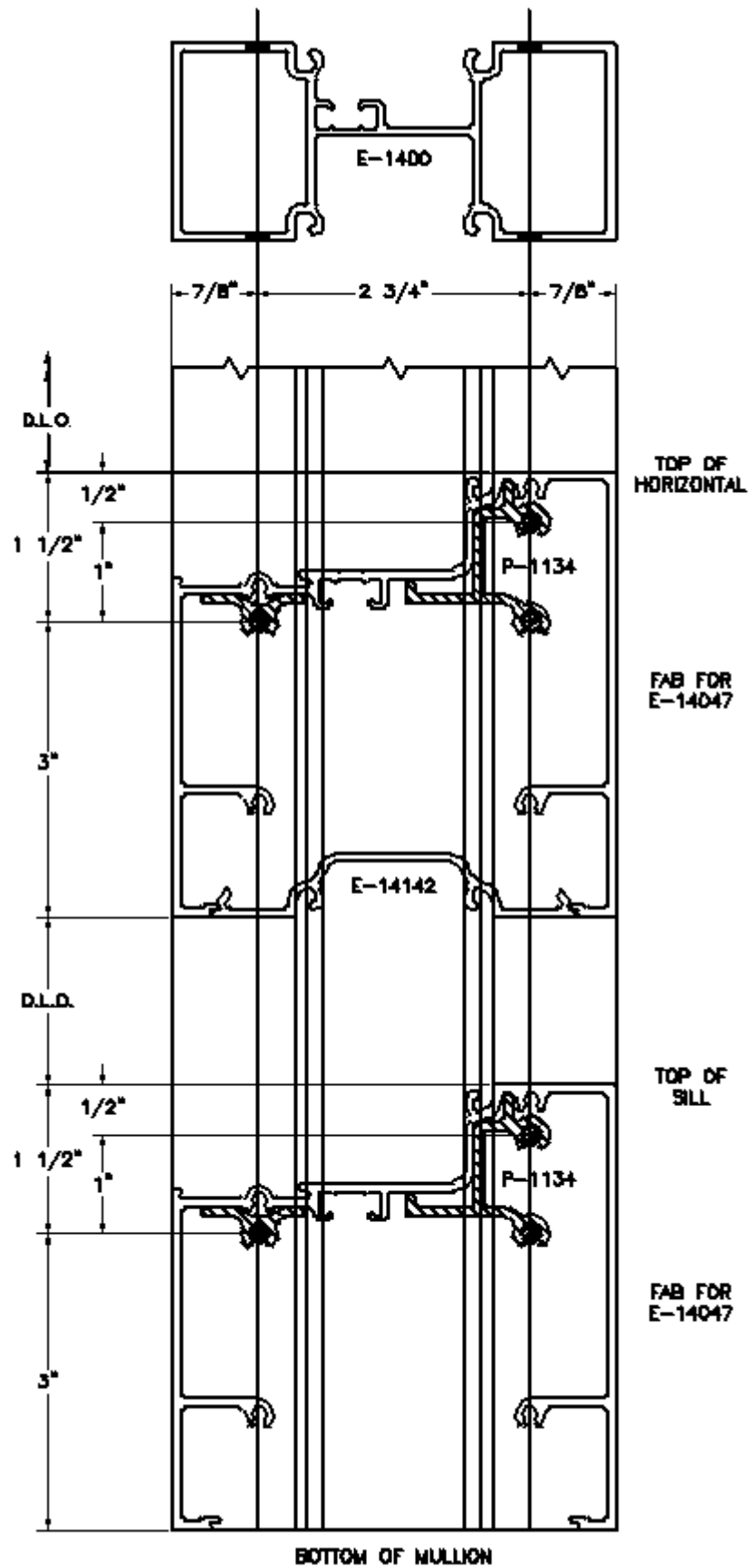




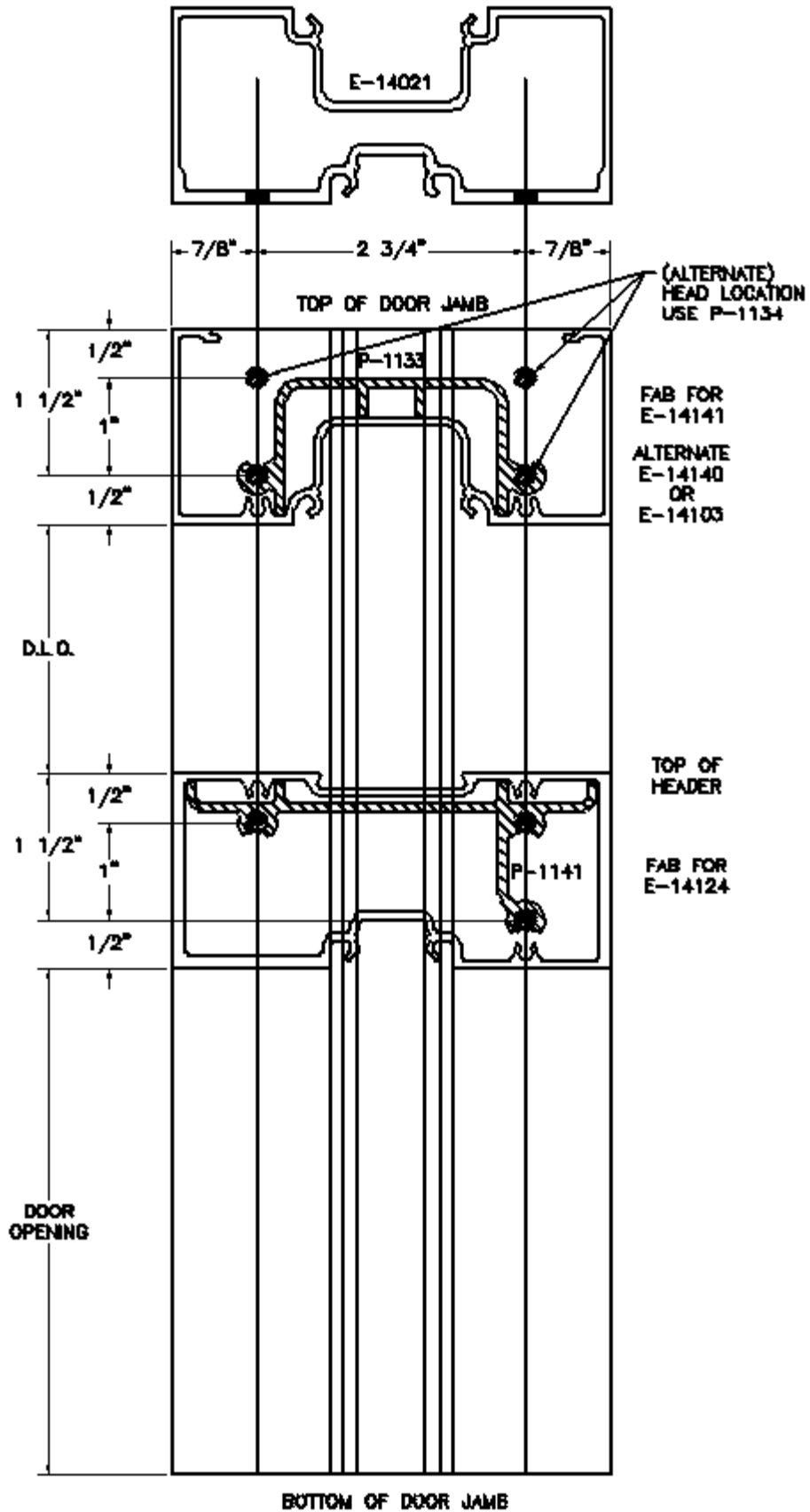
Drilling an intermediate vertical (E-1400) Shear-block, non-thermal, no door or sidelight



Drilling an intermediate vertical (T-1400) -- Shear-block, thermal, no door or sidelight



**Drilling an intermediate vertical (E-1400) Shear-block, non-thermal, next to a sidelight**

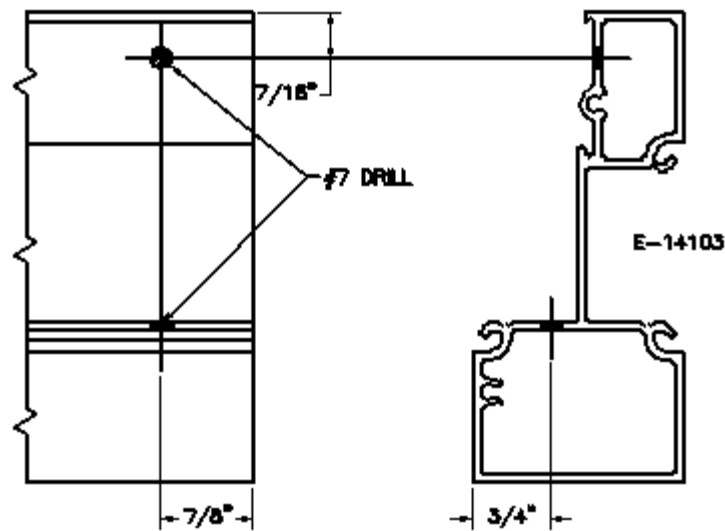
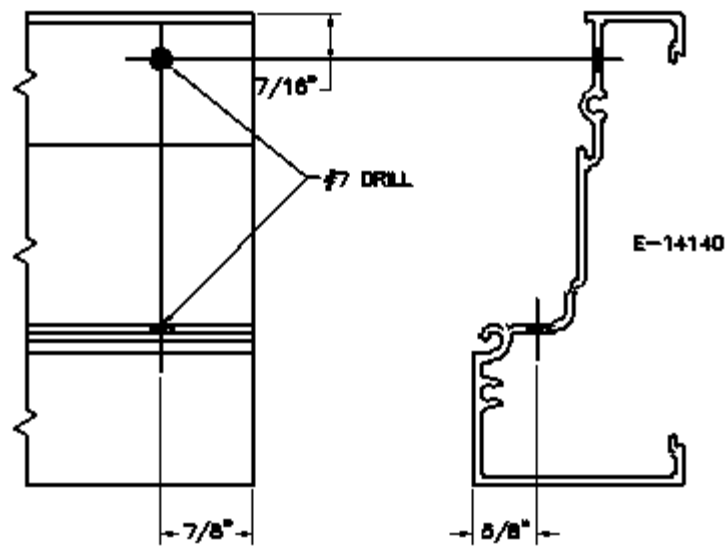
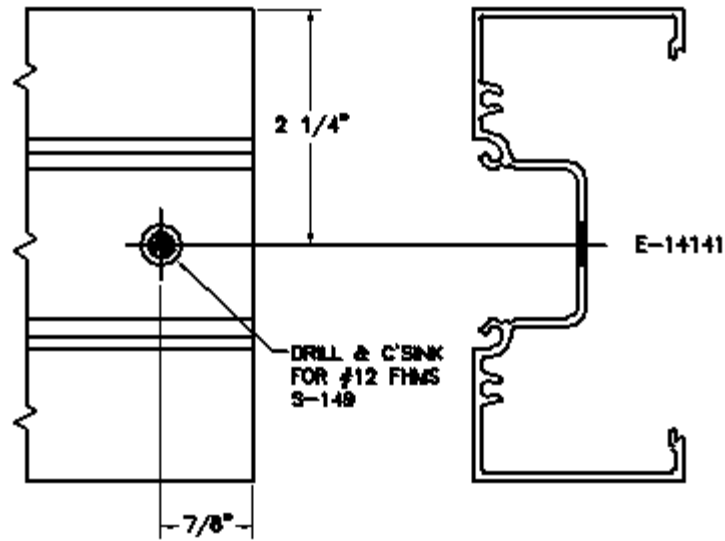


Drilling a door jamb (E-14021) -- Shear-block, non-thermal, next to a door

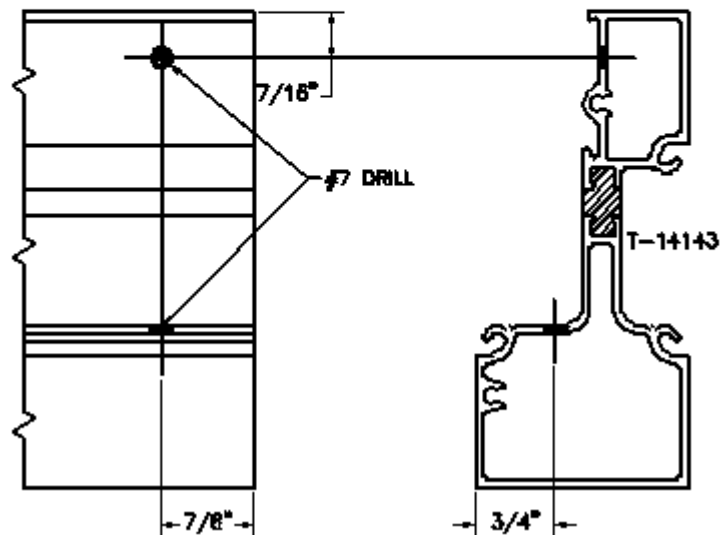
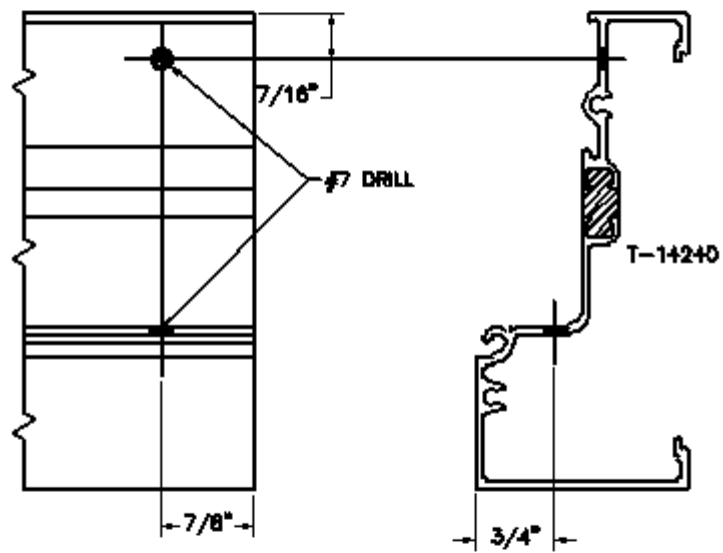
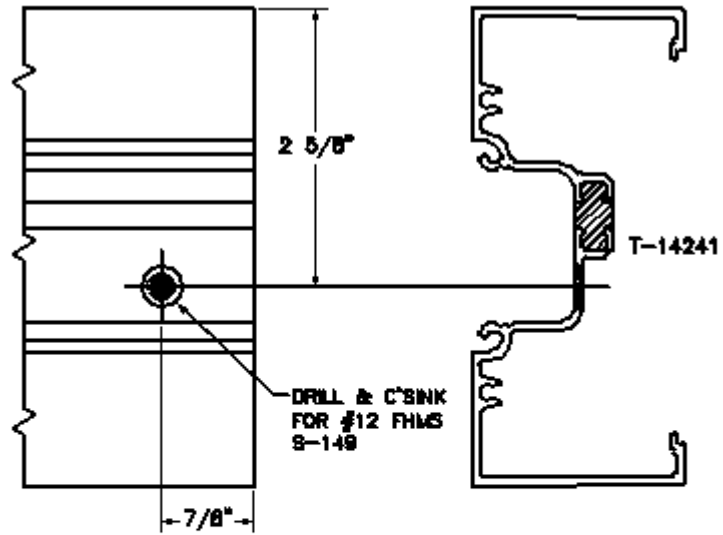
***Step #7 (shear-block assembly): Drill holes in horizontal framing members***

Screw-spline assembly does not require drilling of horizontal framing members, because screw splines are integral to the extrusions for horizontals. The shear block assembly method, on the other hand, requires drilling of horizontals, so that they can be fastened to frame clips (shear blocks).

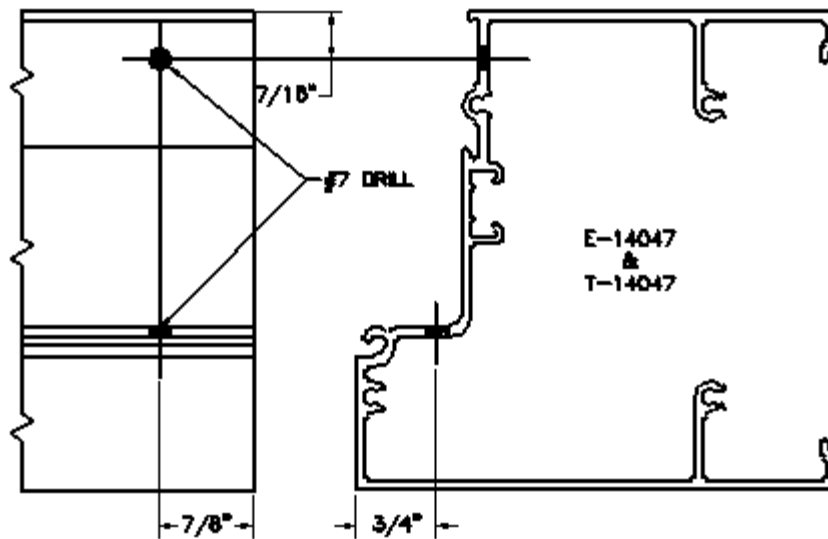
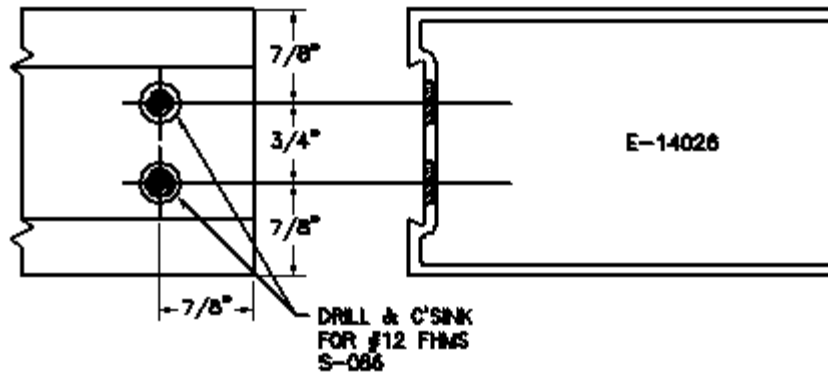
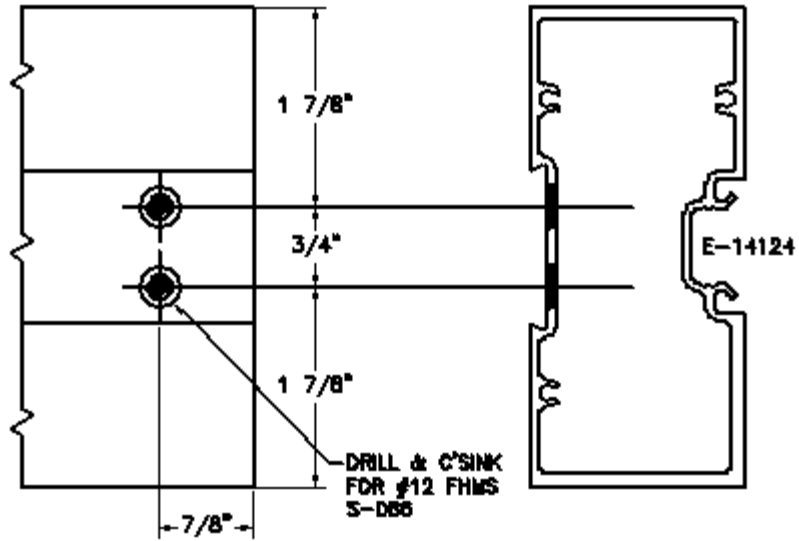
The illustrations in this section show the locations where holes must be drilled in the various kinds of horizontals for use in shear-block assembly. The illustrations also show the required drill sizes, because the shear-block assembly method uses screws of two different diameters to secure horizontals to frame clips.



**Drilling horizontals -- Shear-block, non-thermal, no door or sidelight**



**Drilling horizontals Shear-block, thermal, no door or sidelight**



**Drilling horizontals -- Shear-block, non-thermal, for doors & sidelights**



***Step #8 (if needed): Cut glazing adapters to length***

For installations that use 1/4" or 1/2" glass, it will be necessary to install glazing adapters (E-14036 or E14061 respectively) in the glazing pockets of the vertical and horizontal framing members that surround the lights to be glazed with 1/4" or 1/2" glass.

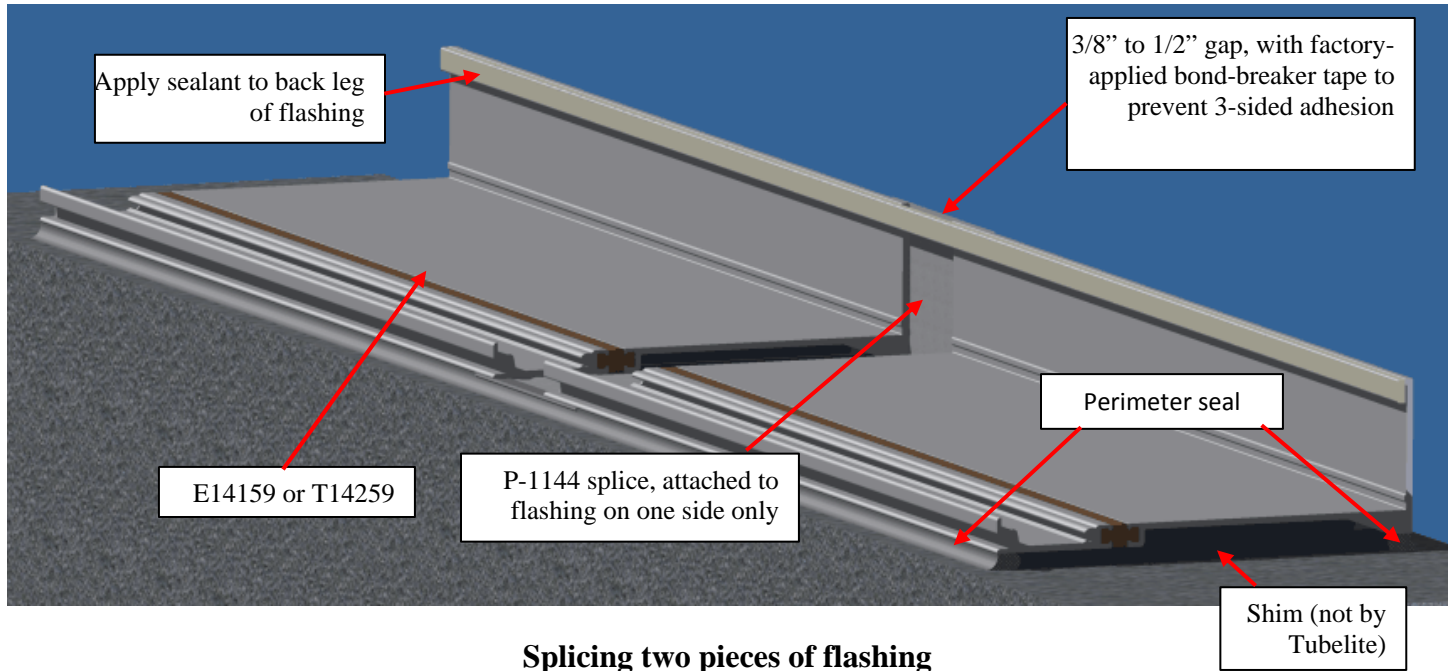
- For verticals, glazing adapters should be 3/32" longer than the vertical daylight opening (DLO) of the light.
- For horizontals, the length of the glazing adapters should equal the horizontal DLO, which is the same length as the horizontal framing members in which the adapters will be installed.

# FRAME INSTALLATION

If there is an entrance, you should install it first, taking care to locate the entrance frame accurately within the opening.

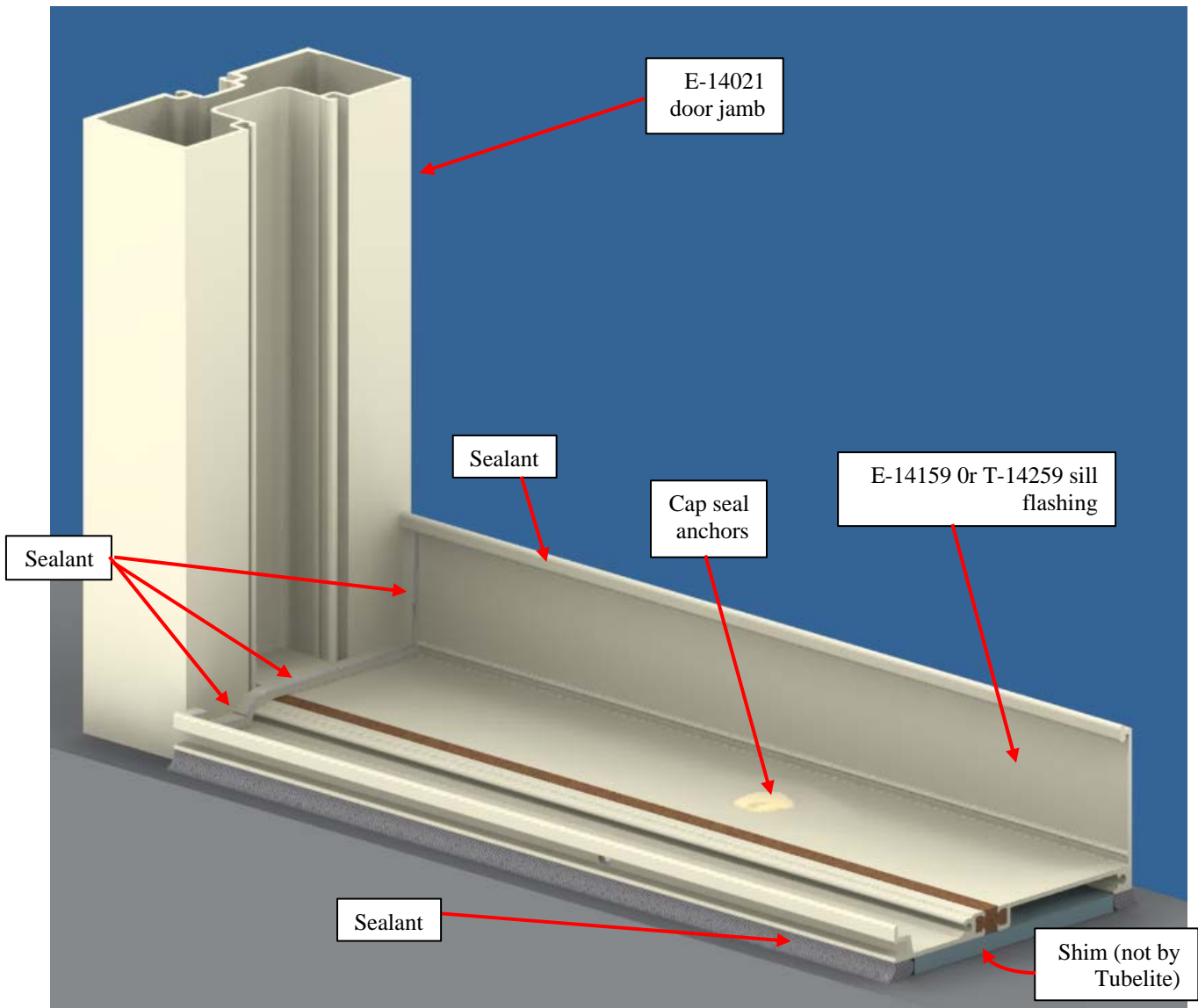
**Step #1 (if needed): Splice the flashing where required per final distribution dwgs.**

- Place the flashing in the opening. The gap between any two pieces of flashing should be 3/8" to 1/2" wide.
- Attach the splice (P-1144) to the back of one piece of flashing with double-faced tape.
- Apply silicone sealant between the two pieces of flashing, spanning the splice.

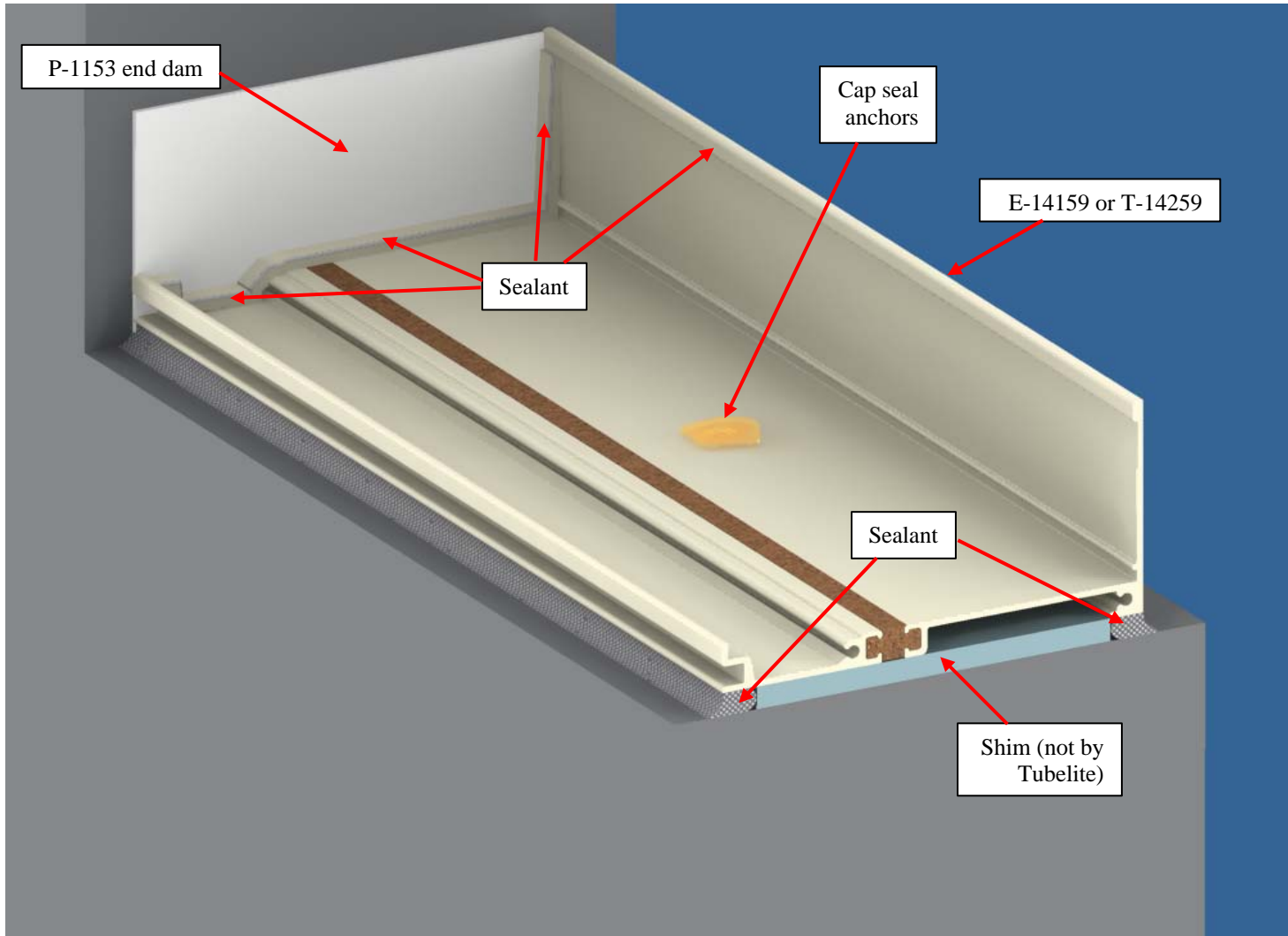


## ***Step #2: Seal and anchor the flashing***

- At jamb conditions attach a P1153 end dam to the end of the sill flashing with two S196 screws and seal the sill flashing to the end dam as shown in the illustration on page 36.
- Butt the flashing up against the back of the door jamb (if present) and seal the flashing to the back of the entrance frame as shown in the illustration below.
- Place shims (not by Tubelite) under the flashing as needed to support the flashing and level it.
- Drill holes for anchor bolts through the flashing and into the masonry, and secure the flashing with bolts, as specified in the approved shop drawings.
- Cap seal all anchor bolts with silicone sealant.



**Sealing sill flashing to a door frame**



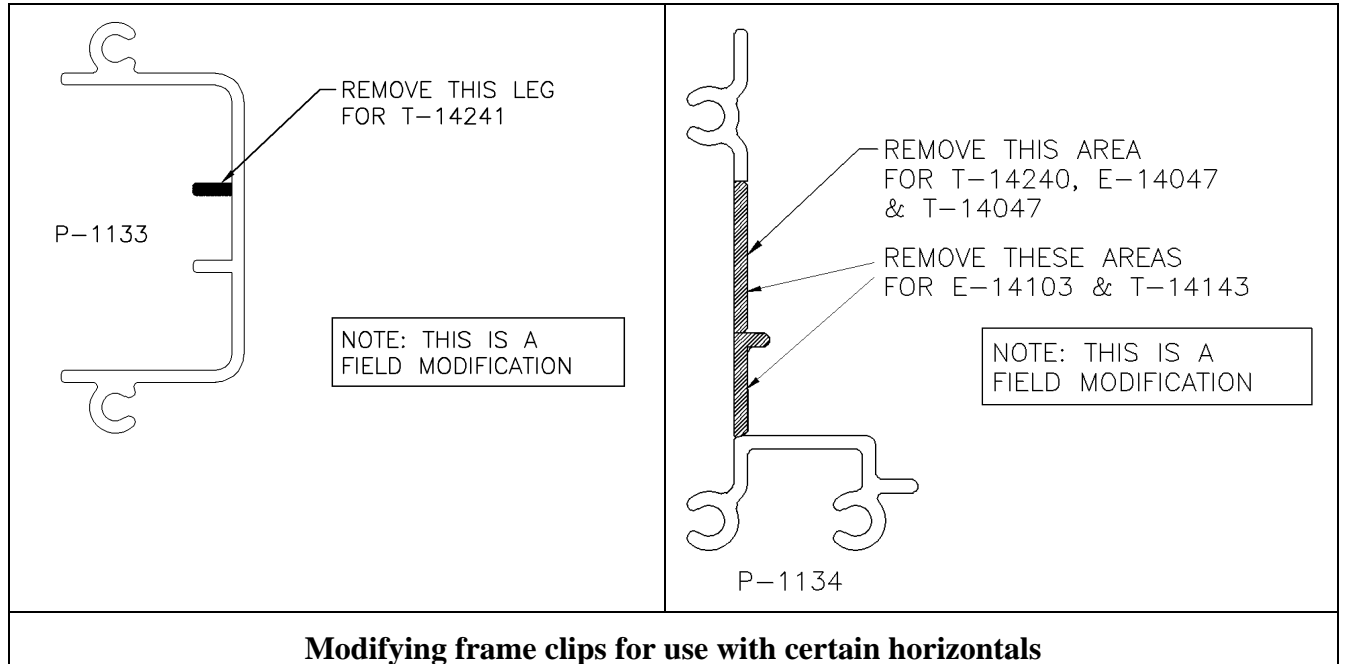
### Sealing sill flashing to an end dam at a masonry wall

- Apply a bead of sealant along the back leg of the flashing from end to end, straight across any splice joint. (See splicing illustration on page 34).

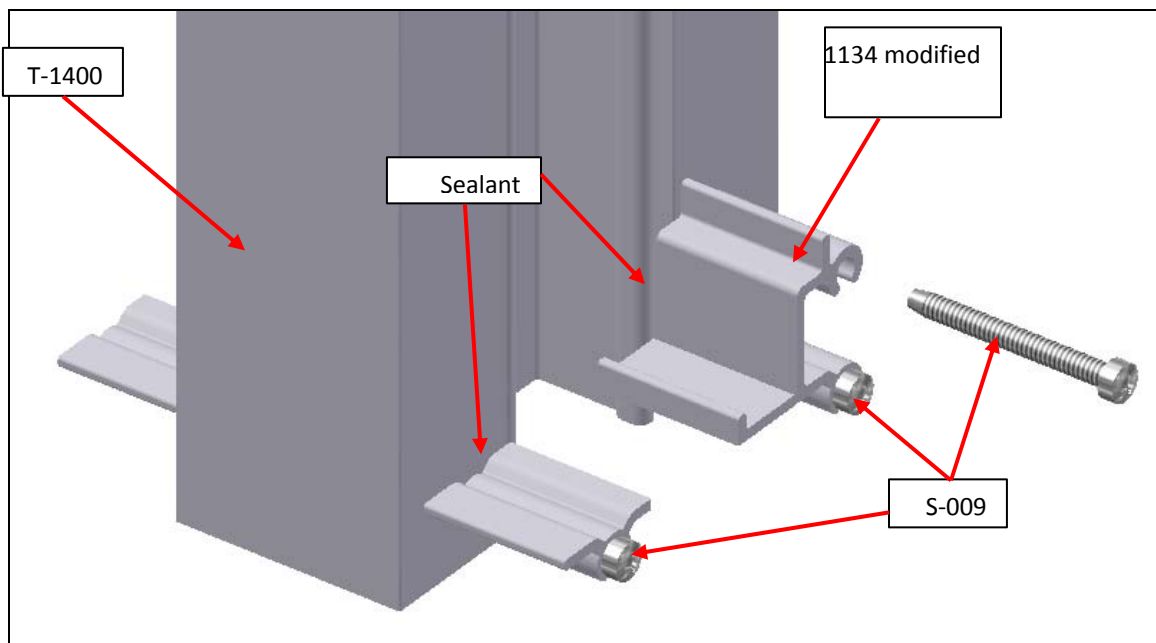
**Step #3 (shear block only): Seal and secure frame clips to verticals**

- Modify frame clips if necessary.

Certain horizontals are not compatible with standard frame clips (shear blocks). These horizontals require the installer to modify frame clips in the field.



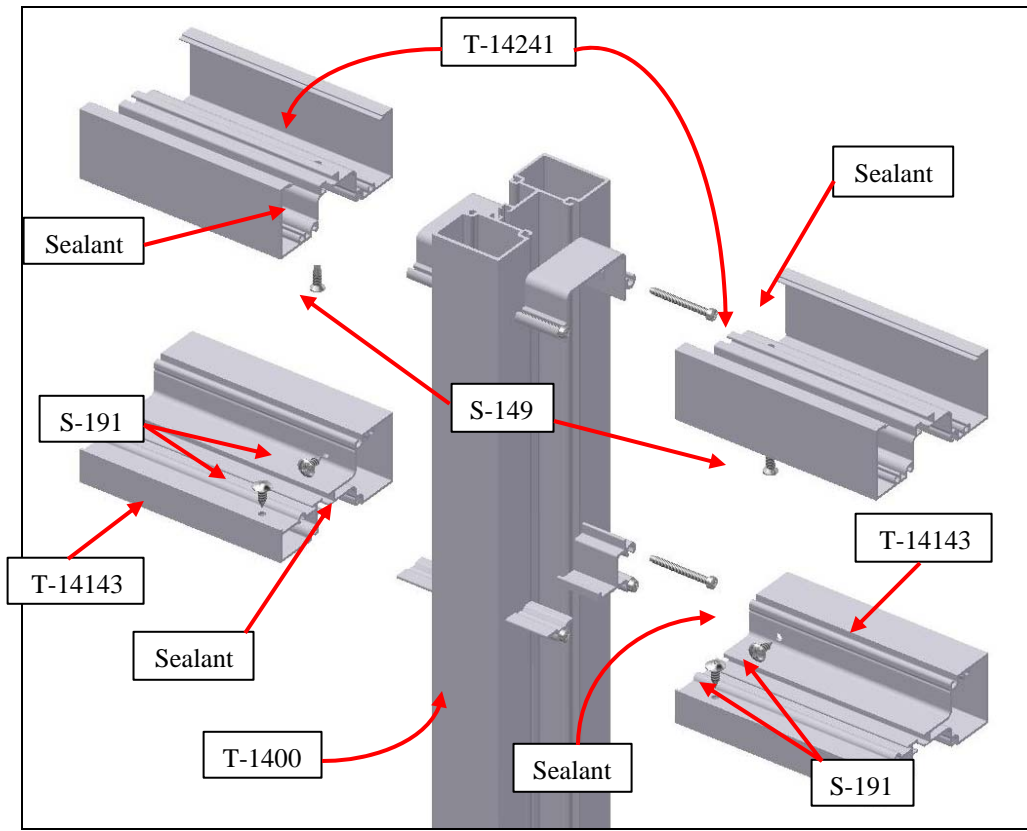
- Apply sealant to shear blocks (frame clips) as shown in the illustration below, and attach to the verticals with #10 x 1 3/4" Type B Phillips pan head screws (S-009).



**Sealing and securing frame clips to verticals**

**Step #4 (shear block only): Attach horizontals to frame clips**

- Apply sealant to the contact edge of the horizontal, as shown in the illustration below.

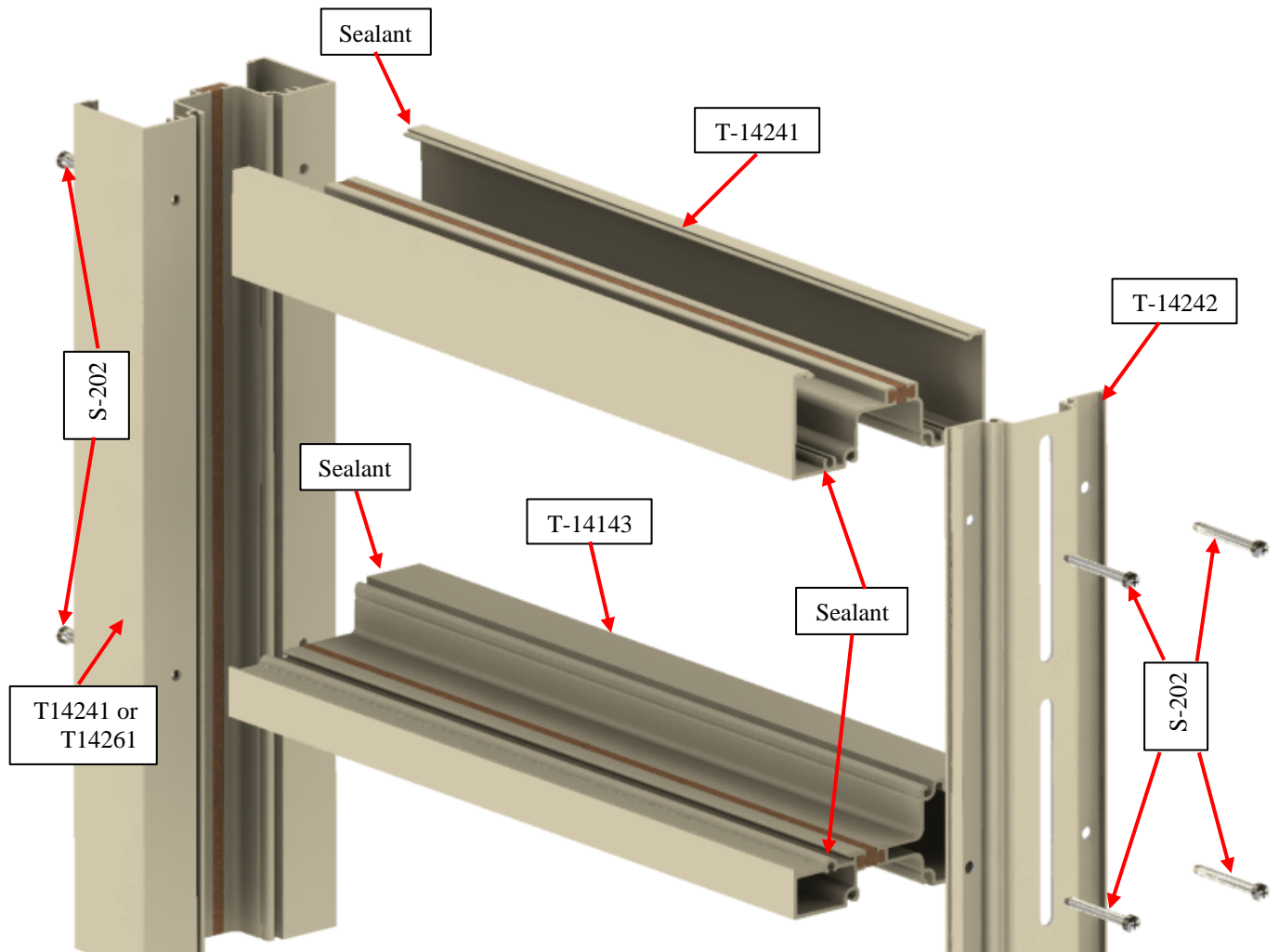


**Attaching horizontals to frame clips**

- Slide horizontals onto shear blocks (frame clips). Match drill tap holes in the shear blocks using holes in horizontals as guides, and secure horizontals to frame clips with applicable screws.
- Apply sealant to the heads of the screws which secure the horizontals to the frame clips.

***(Refer Back to) Step #3 (screw spline only): Attach horizontals to verticals***

- Apply sealant to the contact edges of the horizontal as shown in the illustration below and on page 40.

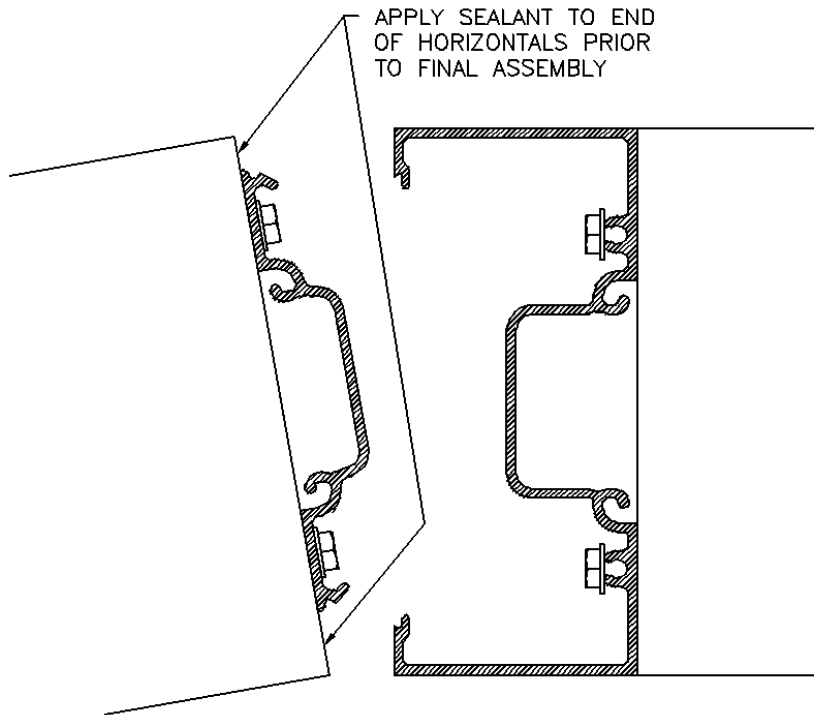


**Attaching horizontals to verticals**

- Secure horizontals to vertical on one side, and to closure pocket on the other side, using #10-24 x 1” Type 23 Phillips hex head screws (S-202).

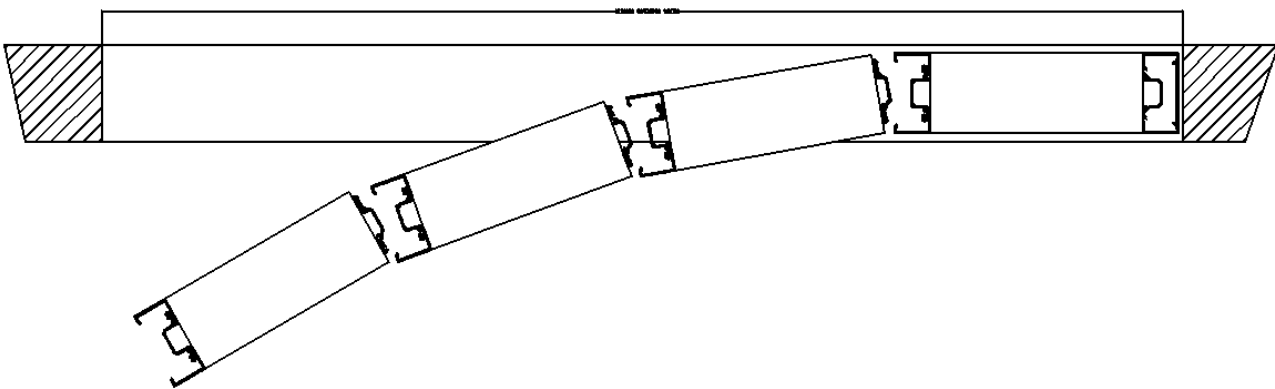
**Step #4 (screw spline only): Install assembled units**

- Apply sealant to end of horizontal as shown in the illustration on page 40.



**Sealing horizontal before final assembly**

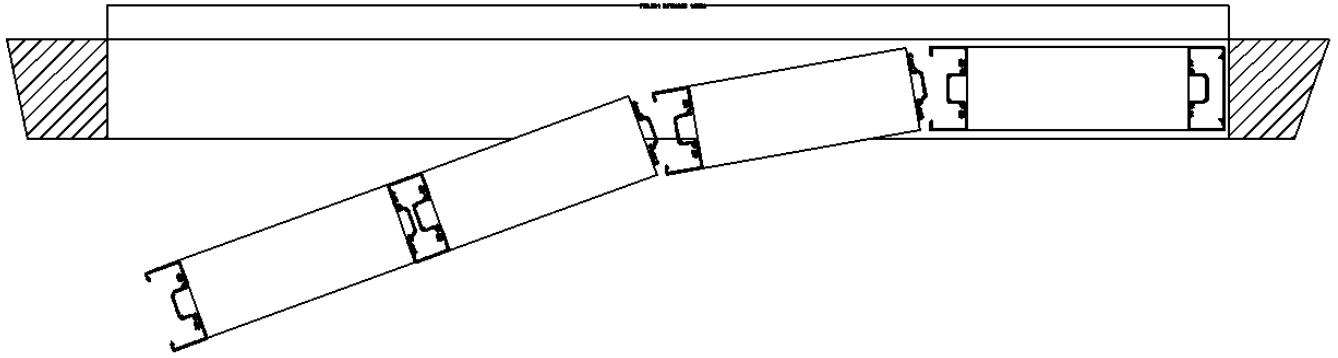
- Install the assembled units beginning at the entrance, and working toward the jamba. If there is no entrance, begin at one jamb and work toward the other, as in the illustration below.



**Installing assembled screw-spline units**

- In the case of smaller units, the last two may need to be snapped together and then pivoted into position together, as in the illustration on page 41.

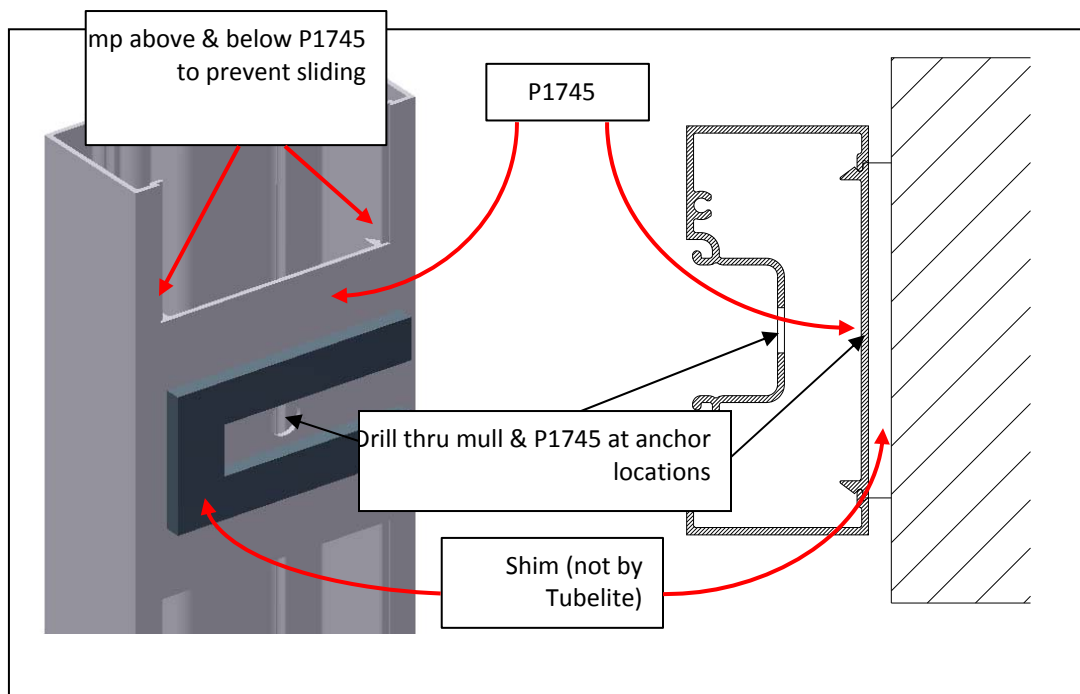




### Installing last two units together

#### ***Step #5: Attach frame to masonry***

- For shear-block assembly, set the assembled unit into the opening. (For screw-spline assembly, this was done in pieces in Step #4 above.)
- Install shims at head and jambs, as shown in the illustration below. Use a P1745 to provide back-up support for shimming. Align oversized holes in P1745's with countersunk holes in the pockets.

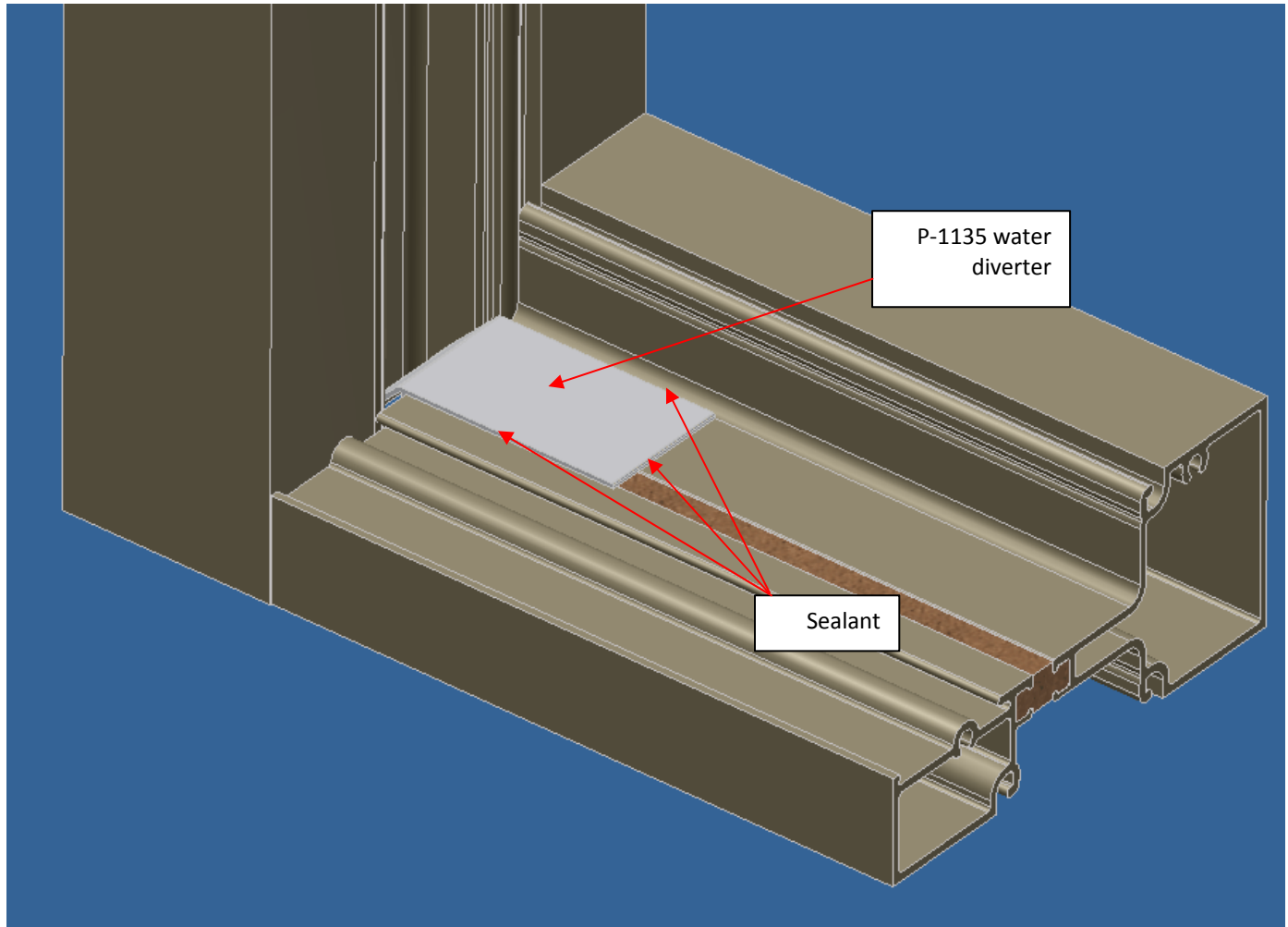


### Shimming and anchoring the head and jambs

- Attach the jambs and head to the perimeter of the opening with suitable fasteners.

### **Step #6: Install P1135 Water Diverters**

- Use MEK and a clean cloth to clean the surfaces of the horizontals where you will install water diverters. Also clean the vertical reglets on both sides to at least 1” above the gasket reglets on the horizontal member.



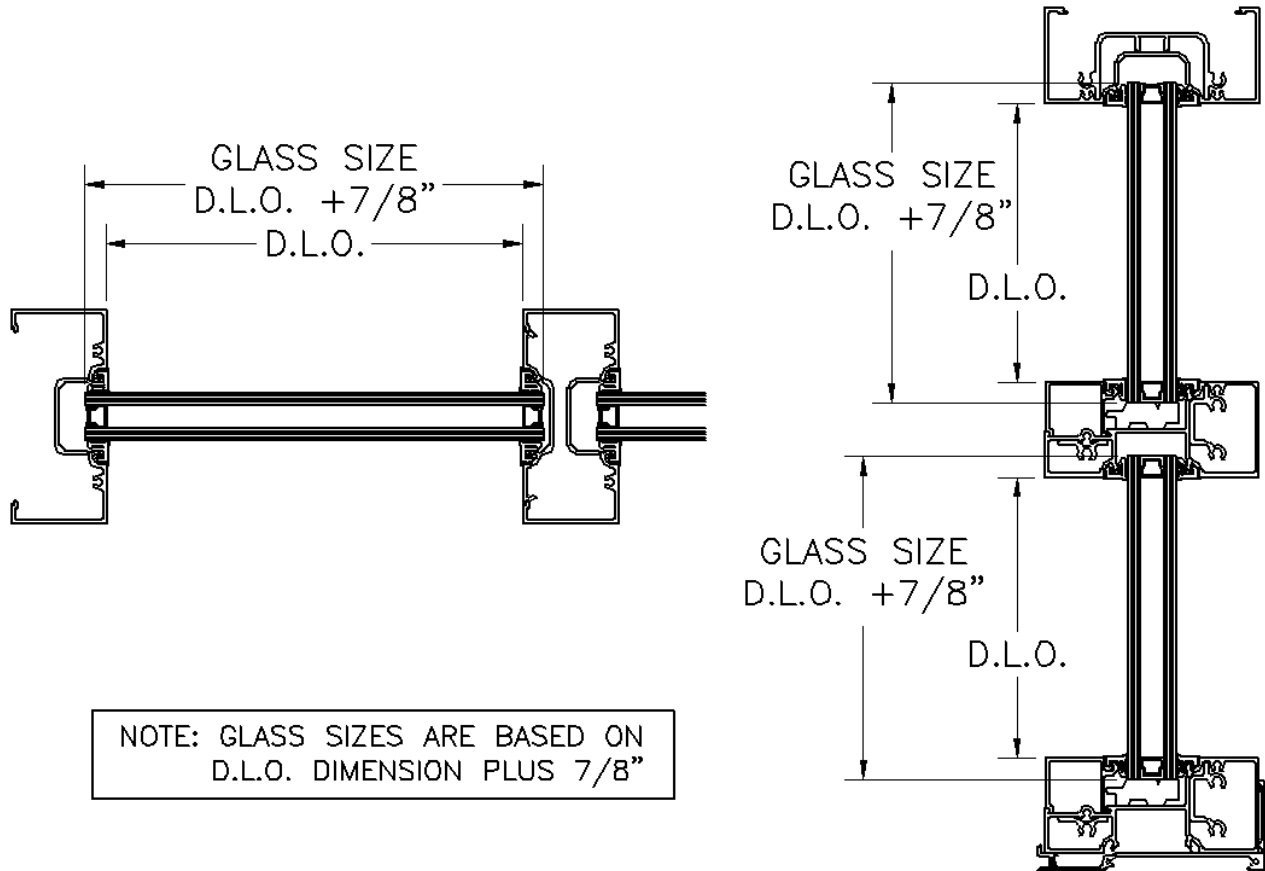
**3D view of a water diverter**

- When the surfaces are dry, butter the underside of the P1135 with sealant and press the diverter to the horizontal in the glazing pocket.
- 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.

# 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 day light opening (D.L.O.) plus 7/8". See illustration below.



## Nominal glass dimensions

This formula does not take into account out-of-square openings or glass tolerances. Consult your glass manufacturer before determining final glass sizes.

When cutting gaskets, you should add 1/16" to 1/8" per foot of daylight opening for shrinkage. (An eighth of an inch per foot is approximately 1%.) Open, unsealed gasket joints are a potential source of leakage, and water damage to interior finishes.

When installing gaskets, always begin at the ends of the gasket and work toward the center.

### ***Step #1: Cut and install the interior gaskets***

- Cut interior vertical gaskets to D.L.O. + 1" + shrinkage allowance (see above).
- Install the interior vertical gaskets, beginning 1/2" beyond the surfaces of the adjacent horizontal framing members.
- Apply butyl sealant to the interior vertical gaskets, where the horizontal gaskets will contact them.
- Cut the interior horizontal gaskets to D.L.O. + shrinkage allowance (see page 43).

- Install the interior horizontal gaskets, pressing their ends into the butyl sealant and up against the vertical gaskets.

### ***Step #2: Install the glass***

- Position the glass in the frame.
- Raise the glass off the bottom horizontal, and place a setting block (P-1132) at each quarter point (2 setting blocks per light).
- Lower the glass onto the setting blocks.

### ***Step #3: Cut and install the exterior gaskets***

- Cut the exterior vertical gaskets to D.L.O. + 1" + shrinkage allowance (see page 43).
- Install the exterior vertical gaskets. The vertical gasket should start 1/2" above the surface of the upper horizontal, and should extend 1/2" below the surface of the lower horizontal.
- Apply butyl sealant to the vertical gaskets where the ends of the horizontal gaskets will contact them.
- Cut the exterior horizontal gaskets to D.L.O. + shrinkage allowance (see page 43).
- Install the exterior horizontal gaskets, pressing their ends into the butyl sealant and up against the vertical gaskets.

### ***Step #4: Seal perimeter of installation***

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

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