

# FORCEFRONT

HURRICANE IMPACT & BLAST RESISTANT

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CURTAINWALL, MONUMENTAL & THERMAL DOORS

## Fabrication & Installation Instructions

(NOTE: THIS DOCUMENT IS INTENDED TO BE SUPPLEMENTAL TO THE HURRICANE & BLAST TEST REPORTS, FLORIDA PRODUCT APPROVALS AND ASSOCIATED DRAWINGS.)



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

Last Revised June 14, 2012

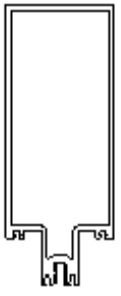
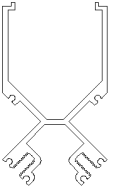
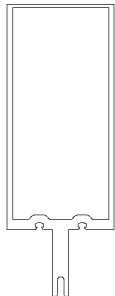


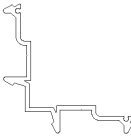



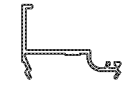
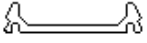
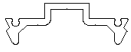
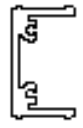

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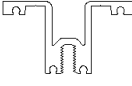
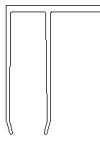

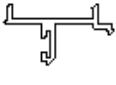
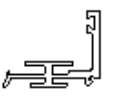

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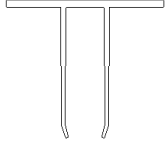




# GENERAL CONSTRUCTION NOTES

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.



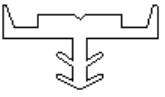


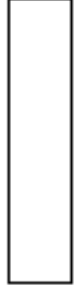

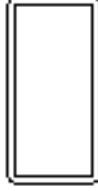


# EXTRUDED ALUMINUM PARTS

Shape	Description	Part No.	Shape	Description	Part No.
	TUBE EXTRUSION	E55TB02		OUTSIDE CORNER CAPTURED	E5TB110
	TUBE SSG EXTRUSION	E5TB252		OUTSIDE CORNER SSG	E5TB67
	TUBE SSG EXTRUSION	E55TB04		OUTSIDE CORNER PRESSURE PLATE	E5TB250
	MULL SPLICE (2) PCS/ASSY	P1627D & P1627J		F PERIMETER ANCHOR	E6613
	FILLER PRESSURE PLATE	E4TB225		OUTSIDE CORNER FILLER PRESSURE PLATE	E5TB251
	PRESSURE PLATE 2-1/2"	E4TB63FB		PRESSURE PLATE 1-5/16	E4TB102
	CLIP, FRAME	PTB60		FILLER, GLASS POCKET	E4011







Shape	Description	Part No.
	SCREW APPLIED HORN	E4TB170
	ANCHOR - F	P6515
	ANCHOR - U (modified PTB83H 'F' anchor)	P6516
	STOP, BASE, DOOR	E6500
	BASE - GLASS STOP - DOOR	E6502
	COVER, SNAP	E4TB64FB

Shape	Description	Part No.
	FILLER POCKET SNAP IN	E4011
	ANCHOR - T	P6514
	STOP, DOOR, INNER	E6504
	CAP, DOOR STOP	E6501
	STOP, DOOR, OUTER	E2298
	CLIP, REMOVABLE MULLION	E3826

# PARTS, FASTENERS & ACCESSORIES

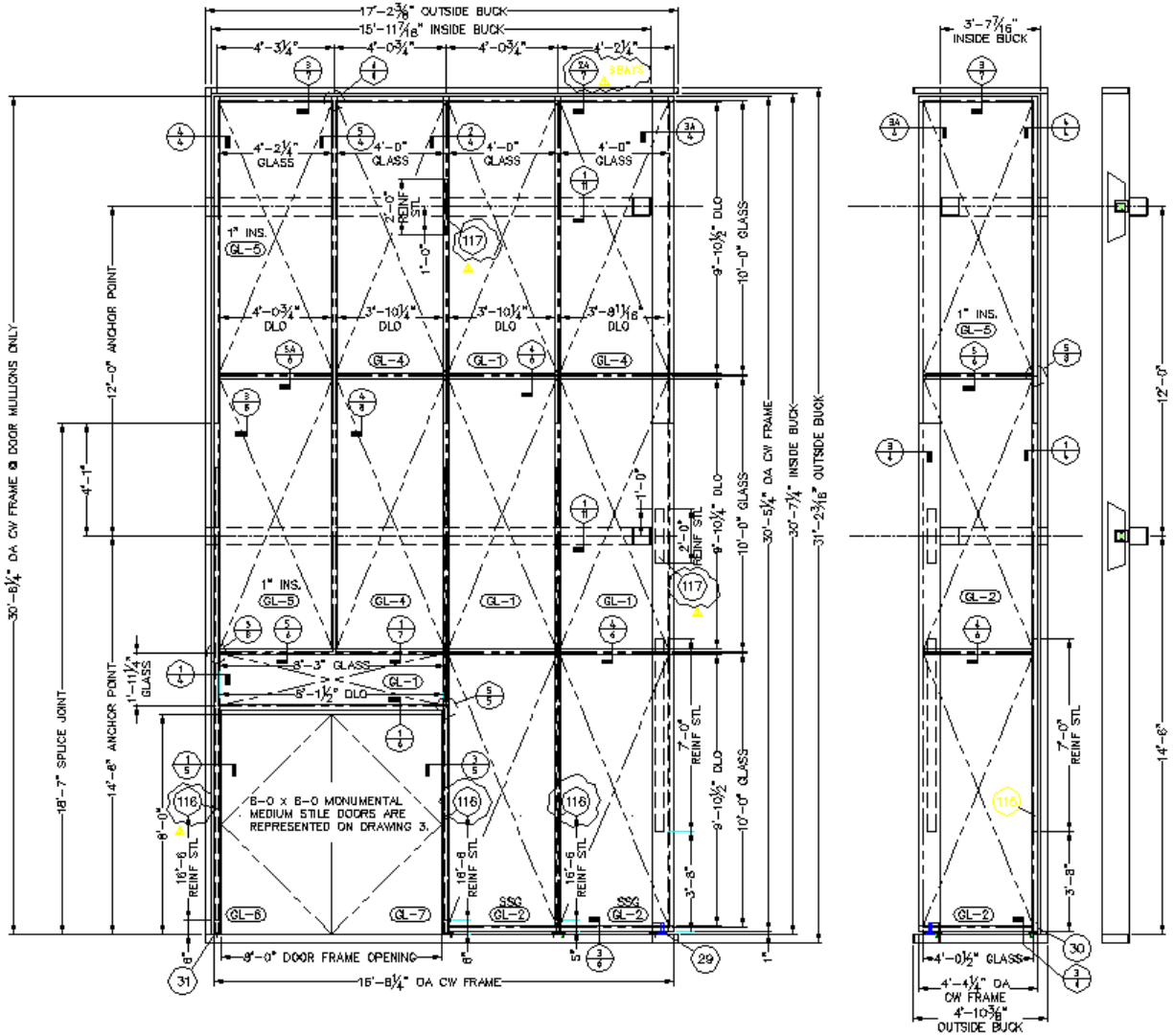
Shape	Description	Part No.	Shape	Description	Part No.
	WATER DAM	PTB93		REINFORCING STEEL - CHANNEL C4 X 5.4 PRIMED	P6507
	GASKET, INSULATOR	PTB94		REINFORCING STEEL - BAR 1-1/4 X 4-1/2 PRIMED	P6504
	GASKET, GLAZING CURTAIN WALL	PTB28		REINFORCING STEEL - BAR 1 X 4-1/2 PRIMED	P6505
	PILE WEATHERING W/VINYL FIN	P1098A		REINFORCING STEEL - TUBE 1-1/2 X 3 X 11 GA. PRIMED	P6506
	SETTING BLOCK W/ADHESIVE BACK	P1912		FILLER BLOCK - DOOR STOP HEADER	E3192FB

Shape	Description	Part No.
	SCREW, 1/4-20 X 1/2 HH TYPE F	S139
	SCREW, 1/4-20 X 1-1/2 HHCS CLASS 2A	S359
	SCREW, 3/8-16 X 2 HHCS CLASS 2A	S6501
	SCREW, 1/4-20 X 1-1/2 FH PH	S092
	SCREW, #6-32 X 1 FH PH F CLASS 2A	S6504
	SCREW, #10-24 X 1/2 FH PH	S161
	SCREW, #12 X 3 FH PH WOOD SCREW	S055

Shape	Description	Part No.
	SCREW, 1/4-20 X 1 HH TYPE 23	S403
	#10-24 X 1/2 TRUSS HEAD PH TYPE B CLASS 2A	S191
	SCREW, 1/4-20 X 3 FH PH	S155
	SCREW, 1/4-20 X 1-1/2 FH PH F CLASS 2A	S6506
	SCREW, #10-24 X 3/4 PAN HD PH	S270
	SCREW, #12-24 X 1/2 FH	S070

# INSTALLATION OVERVIEW

Shear Block Assembly is the method for assembling Hurricane or Blast Curtainwall. The illustration below is a typical elevation view of Hurricane or Blast Curtainwall with Monumental or Thermal Door installation. On the drawing, the number in the top half of each circle identifies the number of a figure showing details of the associated system component; the number in the bottom half of the circle is drawing page number where the detail appears.



**Typical Elevation of Hurricane or Blast Curtainwall, Monumental or Thermal Door**

**IMPORTANT - NOTE: See Hurricane or Blast Test Reports, Florida FPA & Associated Drawings for specific requirements.**

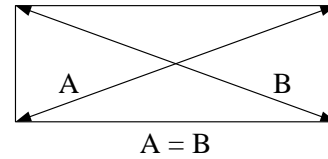


# FRAME FABRICATION

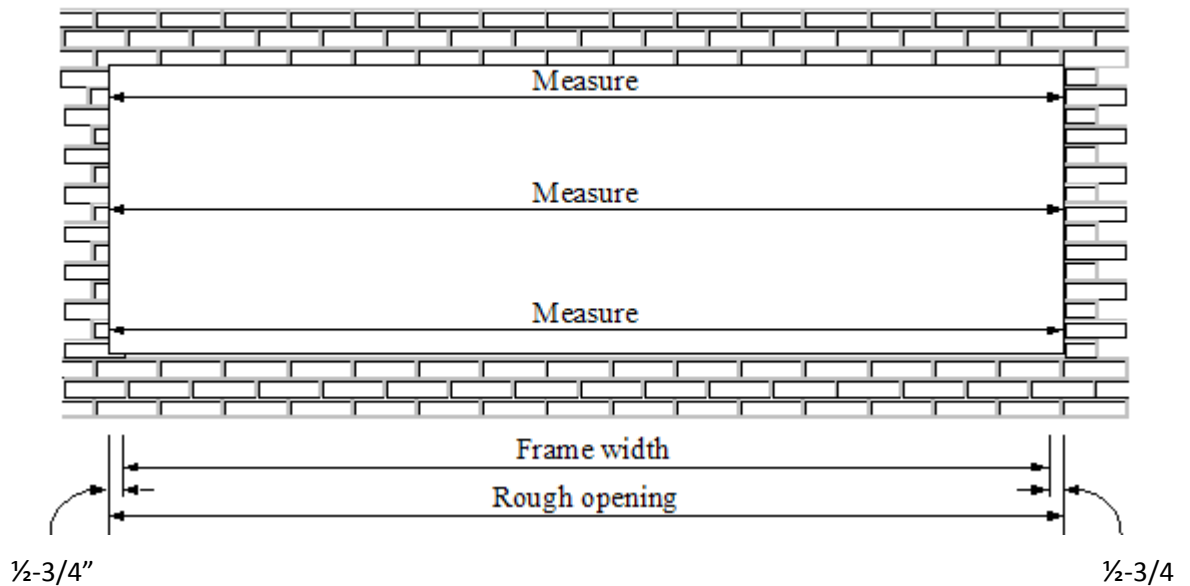
## Step #1: Determine Frame Size

### Determine Width

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



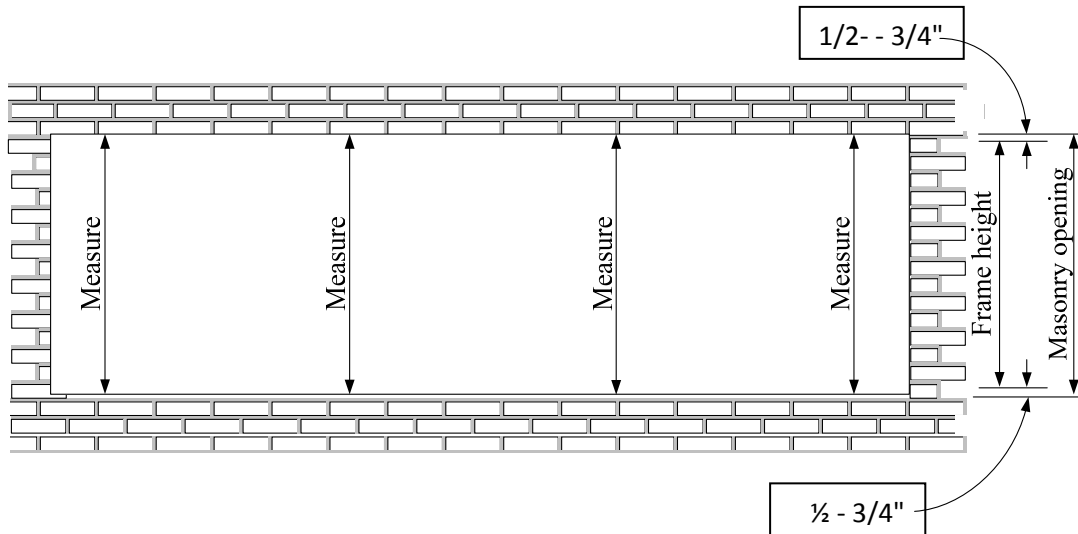
- Measure the width of the opening at the top, middle and bottom.
- Select the smallest dimension measured. To determine the frame width to be used, subtract a minimum of 1" from the smallest measured width, to allow a minimum of 1/2" at each jamb for shimming and caulking. Allow a larger clearance if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



## 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  $\frac{1}{2}$  -  $\frac{3}{4}$ " at sill and  $\frac{1}{2}$  -  $\frac{3}{4}$ " at head 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.



### ***Step #2: Cut Sill Flashing to Size***

- Field cut flashing to frame width determined in Step #1 (rough opening minus clearances). If the installation includes an entrance, flashing should butt against back of door jamb (no clearance).
- Flashing longer than 24' in length must be spliced and allow  $\frac{3}{8}$ " -  $\frac{1}{2}$ " for the width of splice.
- At quarter points of each light, drill  $\frac{7}{32}$ " diameter holes in the sill flashing. Install a weep baffle in the gutter of the extruded sill flashing behind each weep hole.

### ***Step #3: Cut Vertical 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.

### ***Step #4: Cut Horizontal Mullions to Size***

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

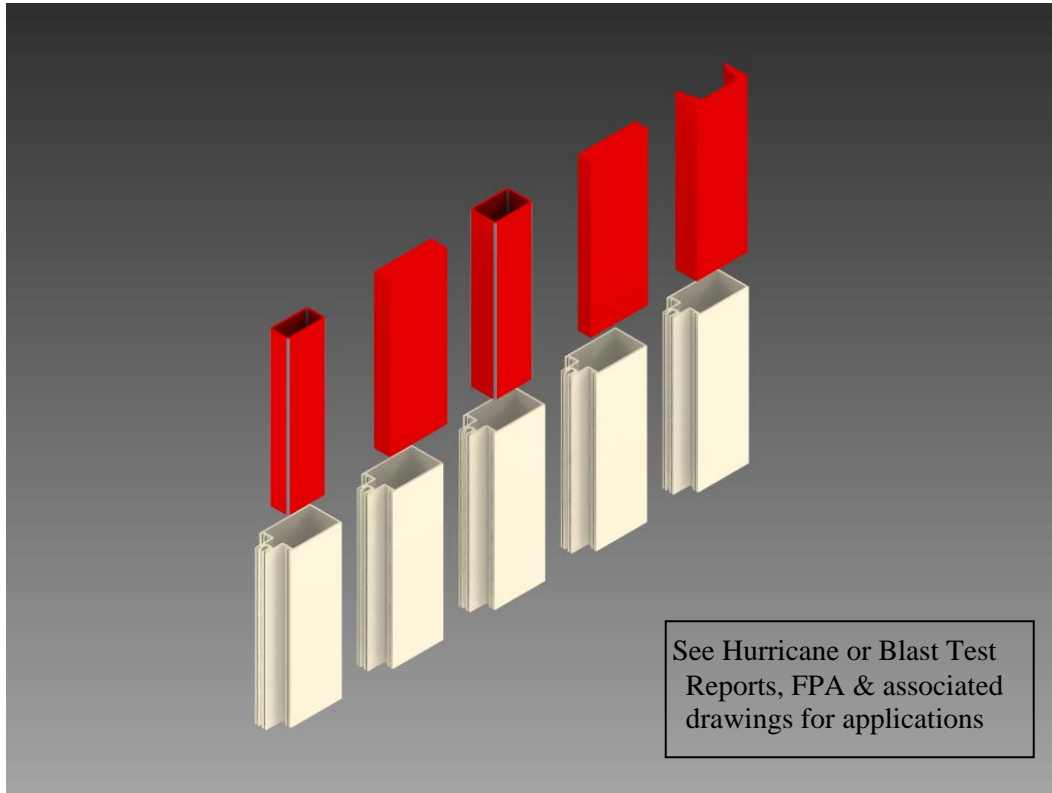
### ***Step #5: Drill Holes in Vertical Mullions***

In shear-block assembly, the installer secures frame clips/shear blocks to the vertical members with screws; slides the horizontal members over the frame clips and secures the horizontal members to the frame clips with screws. Tubelite recommends using a drill fixture (P796B) to facilitate quick and accurate drilling of holes in verticals for shear-block assembly projects.

## **CURTAINWALL FABRICATION & INSTALLATION**

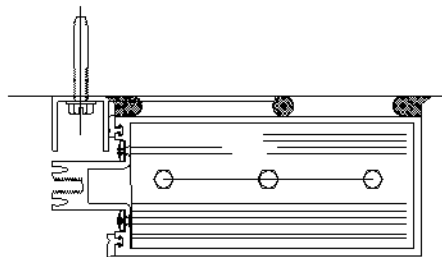
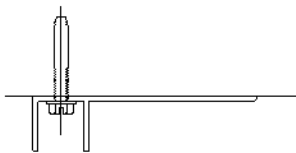
### **VERTICAL REINFORCEMENT**

Reinforcing Steel - attach appropriate reinforcing steel into vertical mullion using prescribed fasteners and spacing as specified per Hurricane or Blast Test Report or FPA.



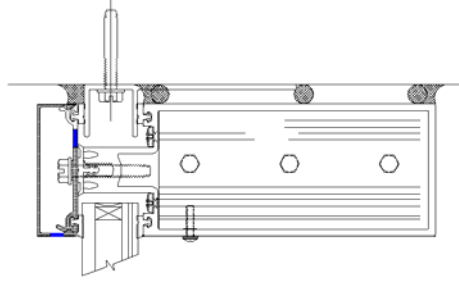
### **HORIZONTAL/VERTICAL ANCHORING**

Attach horizontal F perimeter channel to building substrate – fastener spacing will be specified by engineered calculations and blast test report & associated drawings.



Application and fastener spacing specified by engineered calculations in hurricane impact test report, FPA & associated drawings

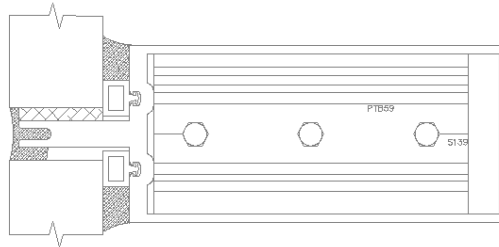
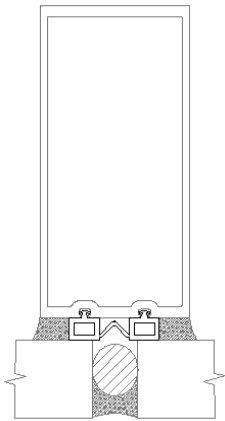
Notch horizontal mullion, locate and attach horizontal mullions to vertical mullion shear blocks & building substrate.



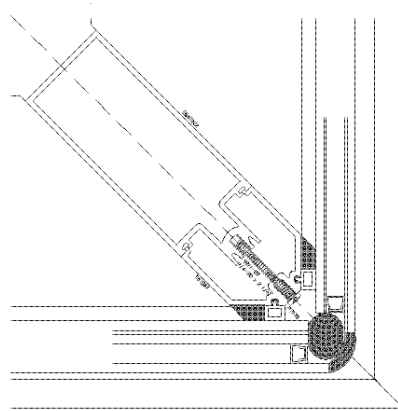
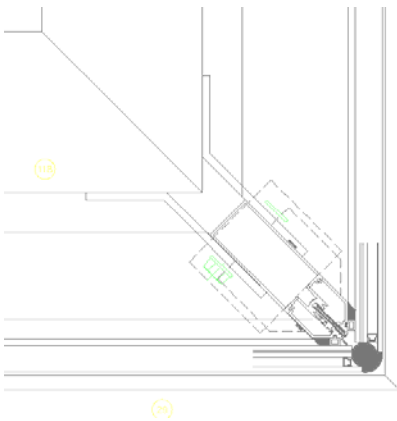
Install glass with setting blocks and pressure plates; tighten pressure plate bolts to prescribed setting; fastener spacing will be specified by blast test report or engineered calculations. Apply snap cover and caulk perimeter.

### **SSG CURTAINWALL FABRICATION & INSTALLATION**

Refer to Hurricane or Blast Test Reports, FPA and specimen drawings for specific applications.



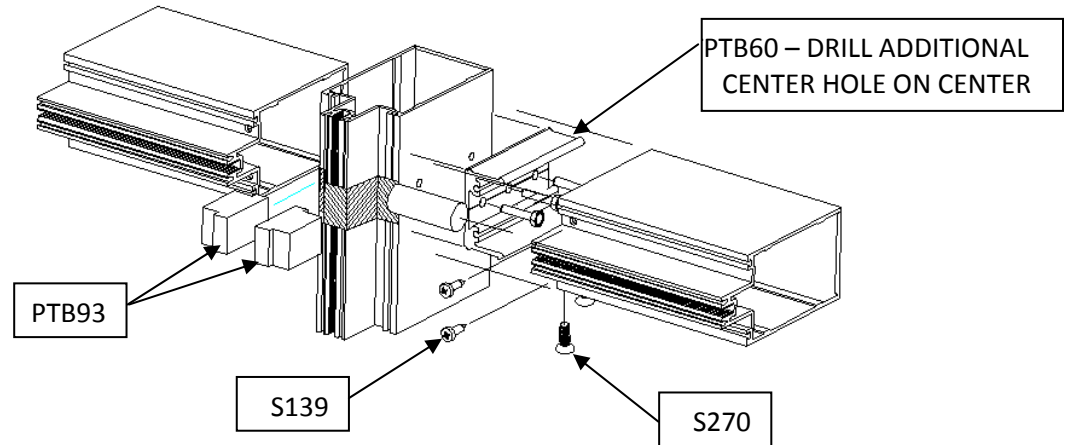
### **SSG & CAPTURED CURTAINWALL CORNER**



**Note:** Entrances should be installed first, taking care to locate the entrance frame accurately within the opening.

***Step #1: Seal and Secure Frame Clips to Vertical Mullions***

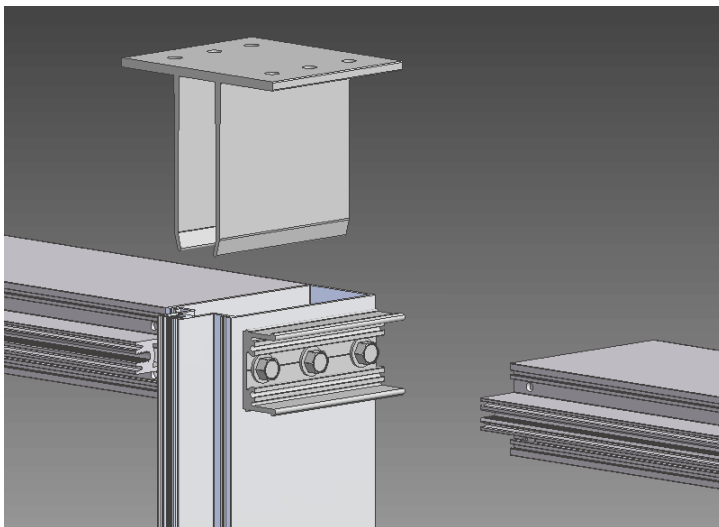
- Apply sealant to attachment side of shear blocks (frame clips) as shown in the illustration below, and attached to the verticals with fasteners (S139).



**Sealing and Securing Frame Clips to Verticals**

***Step #2: Attach Frame Clips & “F, T and U” Anchors to Vertical Mullions per Hurricane or Blast Test Reports & associated drawings***

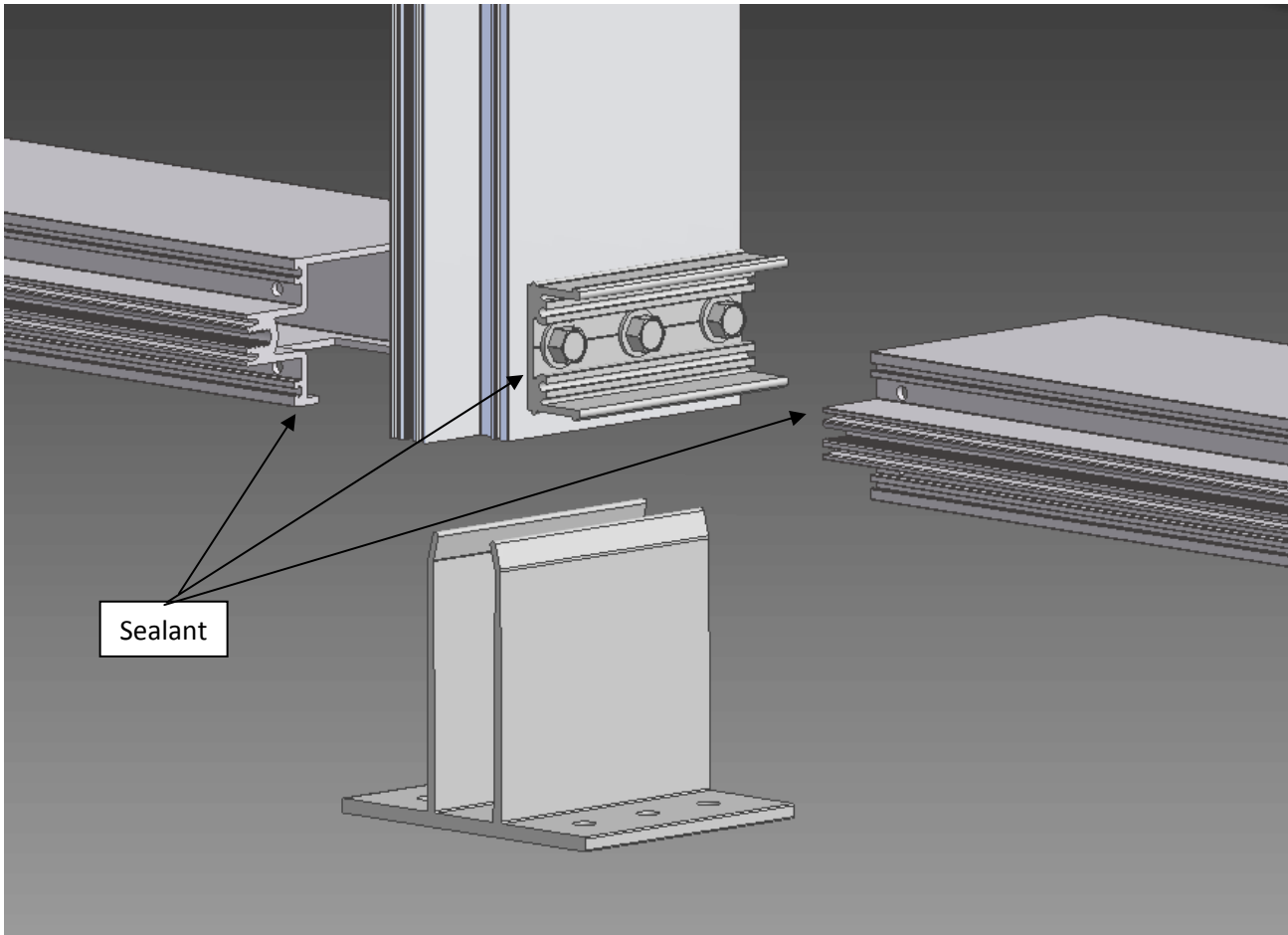
- F, T & U Anchors are located and attached to the substrate both top & bottom and used to locate vertical frame member to opening. Anchoring is according to test reports and drawings.



### ***Step #3: Attaching Horizontals to Frame Clips***

When installing horizontals, one or both ends of the horizontal member may need to be cut out (see illustrations) to allow the member to be located into place over shear blocks. Apply sealant to contact end/edge of each horizontal.

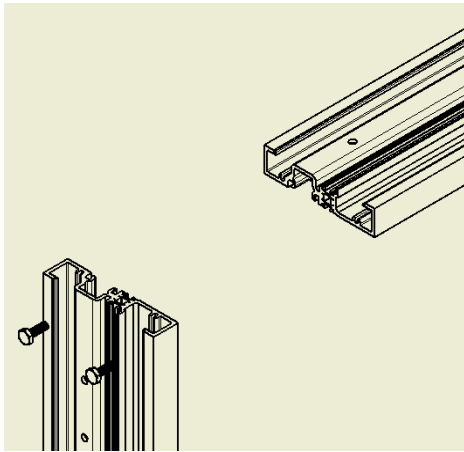
Slide horizontals onto shear blocks/frame clips. Apply sealant to the heads of the screws which secure the horizontals to the frame clips. Secure horizontals to vertical on one side, and to closure pocket on the other side.



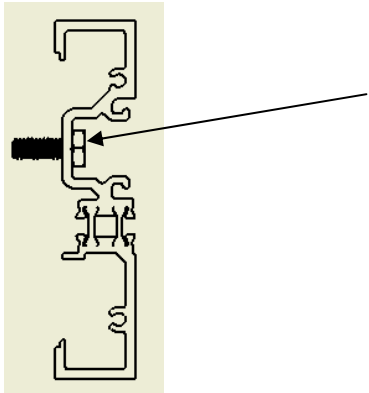
# MONUMENTAL OR THERMAL DOORS & SUB-FRAME FABRICATION & INSTALLATION

Locate & assemble door sub-frame

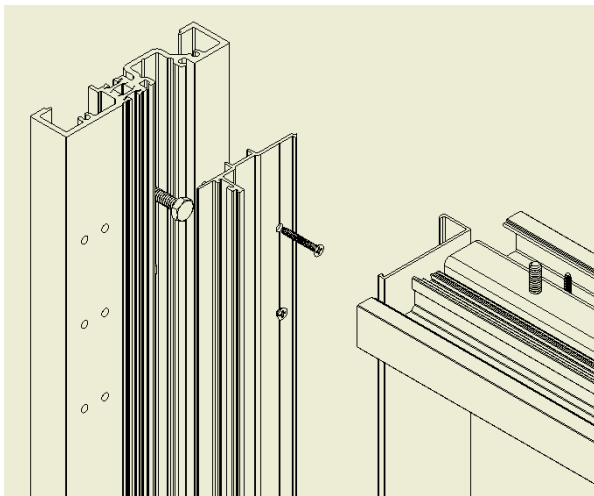
Attach horizontal sub-frame member to vertical sub-frame members as shown



Attach sub-frame to curtainwall or substrate using prescribed fasteners per test report and drawings.

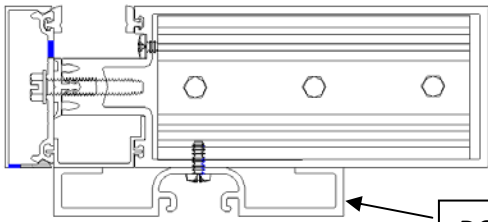


Attach door stop inner to sub-frame & apply cover



Application and fastener spacing specified by hurricane or blast test report, FPA & associated drawings

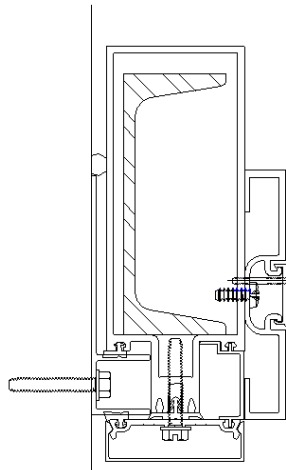
Locate & install door sub-frame to verticals & horizontal mullions.



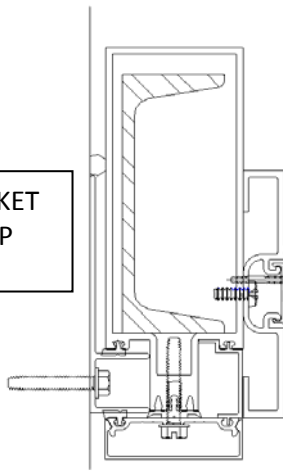
DOOR SUB-FRAME

Sub-frame fastener spacing specified by hurricane or blast test reports & associated drawings

Locate & install vertical glass pocket filler/door stop inner with pile installed & attach with fasteners specified; attach door stop snap cover.



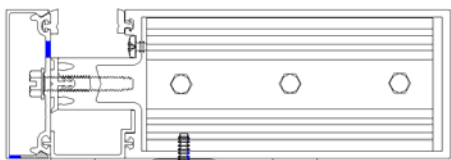
GLASS POCKET FILLER/STOP INNER



DOOR STOP SNAP COVER

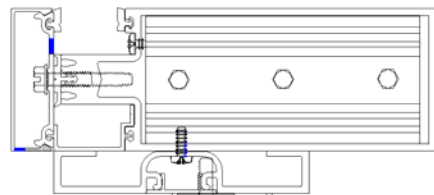
**FOR BLAST ONLY** – Monumental & Thermal Doors – HORIZONTAL DOOR STOP

Locate & snap in horizontal glass pocket filler and install internal horizontal door stop (ceiling mount) to sub-frame. Locate & attach external horizontal door stop with pile and attach with prescribed screws.



GLASS POCKET FILLER

INTERNAL DOOR STOP

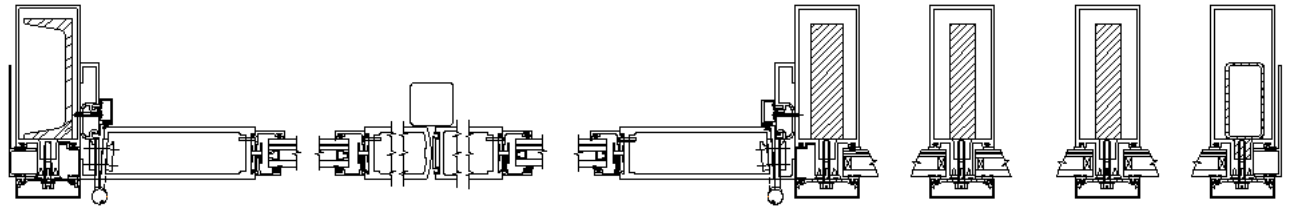


PILE

EXTERNAL DOOR STOP



**Monumental doors** - Refer to Hurricane or Blast Test Report, FPA and Drawings for specific applications.

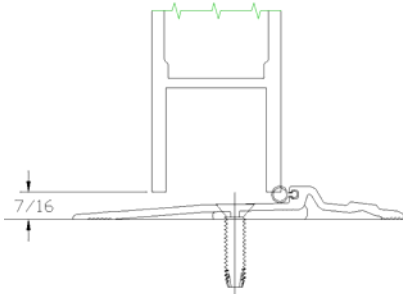


**Thermal doors (w/o curtainwall)** - Refer to Hurricane or Blast Test Report, FPA and drawings for specific applications.



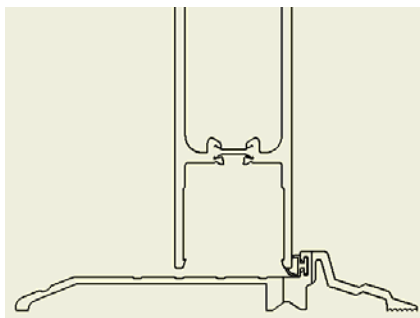
**MONUMENTAL & THERMAL DOORS – THRESHHOLD INSTALLATION**

Before installing threshold, notch out ends to fit around vertical stops as required; lay bed of caulk for primary seal; locate & attach threshold with prescribed fasteners (per test report).



MONUMENTAL DOOR THRESHOLD

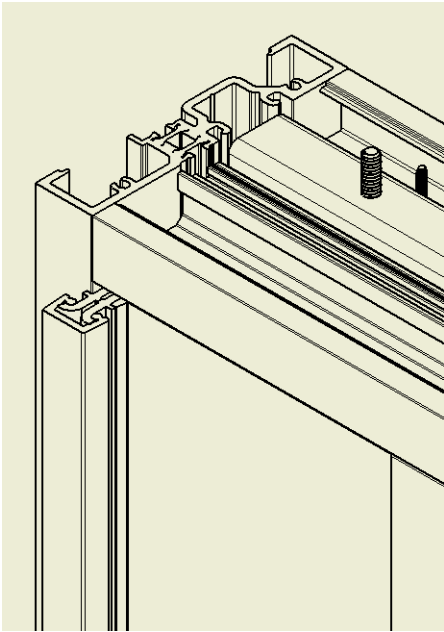
Thresholds are attached via fastener & spacing specified by hurricane or blast test reports & associated drawings



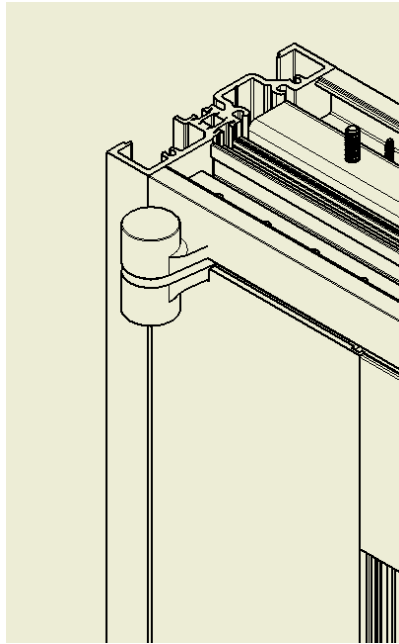
THERMAL DOOR & THERMAL THRESHOLD

## MONUMENTAL & THERMAL DOORS – HINGE OPTION INSTALLATION

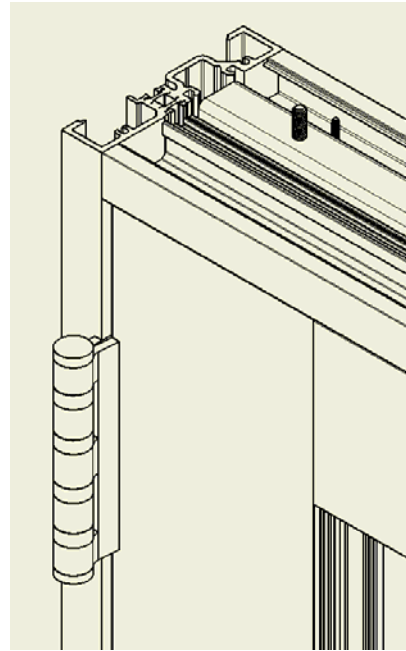
Doors and sub-frames are normally pre-machined and hinges are pre-installed to door leafs at Tubelite.



CONTINUOUS HINGE



PIVOT HINGE

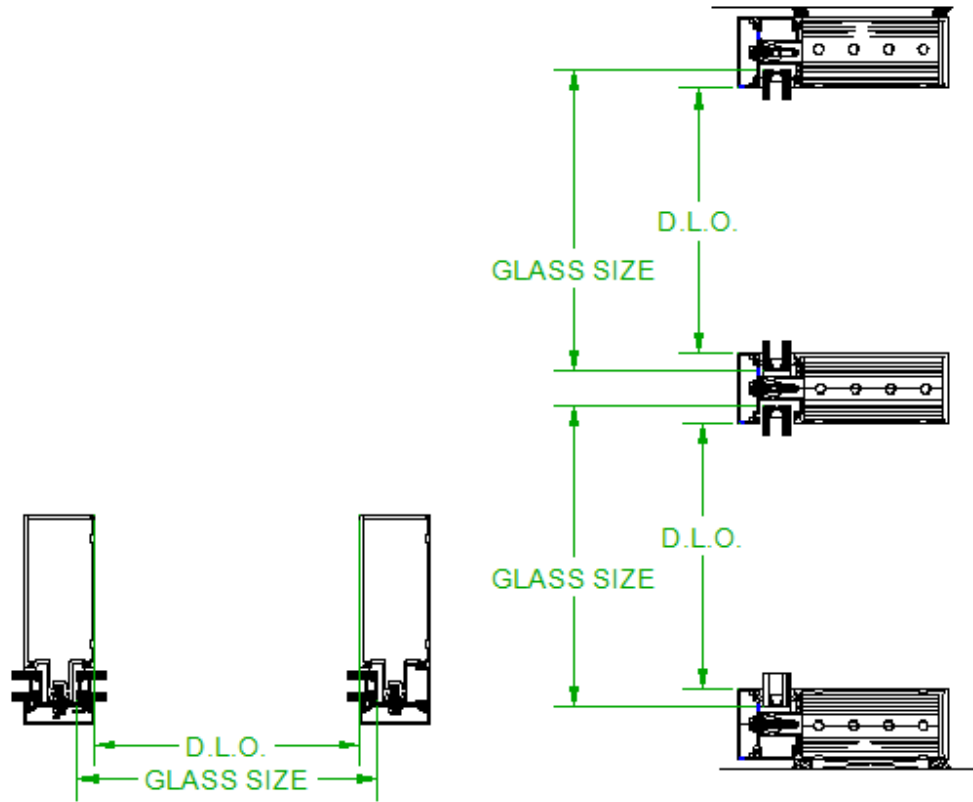


BUTT HINGE

# GLAZING INSTALLATION

Glass dimensions should not exceed day light opening (D.L.O.) PLUS 5/8" PER SIDE.

See illustration and notation below; application is per Hurricane or Blast Test Report & associated drawings



## Curtainwall Nominal Glass Dimensions

Formula:

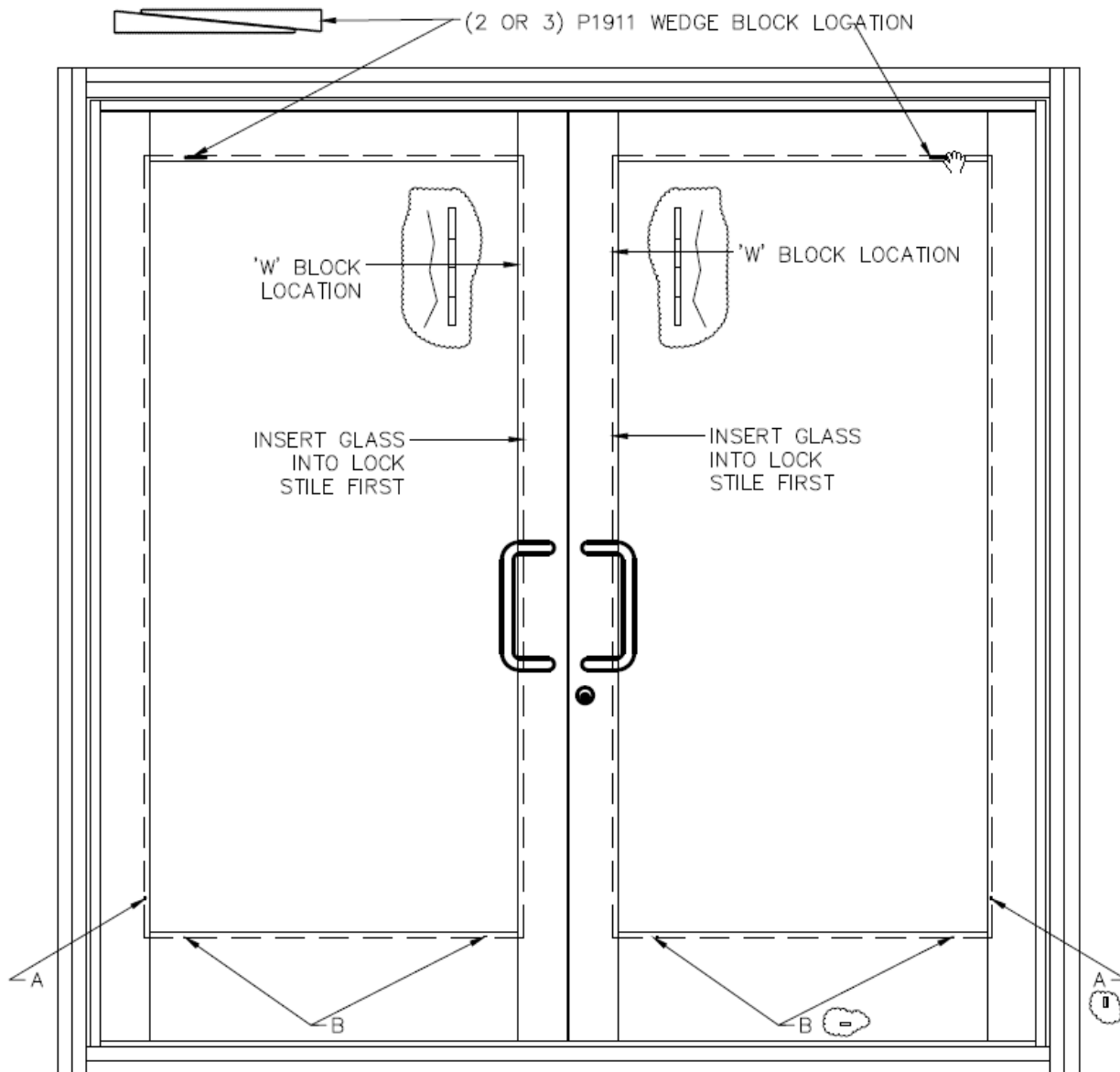
- This formula does not take into account out-of-square openings or glass tolerances. Consult your glass manufacturer before determining final glass sizes.
- When cutting gaskets, you should add 1/16" to 1/8" per foot of daylight opening for shrinkage. (An eighth of an inch per foot is approximately 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. + 1-1/4" + shrinkage allowance (see above).
- Install interior vertical gaskets, 1/2" beyond surfaces of the adjacent horizontal framing members. Apply butyl sealant to interior vertical gaskets where the horizontal gaskets connect.
- Cut interior horizontal gaskets to D.L.O. + shrinkage allowance (see page 30). Install interior horizontal gaskets, pressing ends into the butyl sealant and up against the vertical gaskets.

## Step #2: Install the Glass

- Cut interior vertical & horizontal gaskets to D.L.O. + 1-1/4" + shrinkage allowance & install interior gasket into vertical and horizontal glass stops.
- Place setting blocks ('B') at each quarter points (2 setting blocks per light).
- Place glass into opening (for thermal doors, insert glass into opening with leading edge inserted into lock stile first) and onto the setting blocks.
- Hold glass off exterior sides (metal), flatten 'W' block ('A') against the glass about 6" from the upper corner and slide it past the edge of the stile between glass and metal in the lock stile edge and inside stile pocket to allow it to expand into blocking position. See Illustration below.
- Place two or three (as required) wedge blocks opposing each other into space between the top of the glass and the bottom side of the top rail, hinge side – about 6" from corner. Push wedge blocks together so they increase in thickness and fill the space snugly and securely.
- Install wedge gasket into exterior side of glass



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

- Install the exterior vertical gaskets. The vertical gasket should start 5/8” above the surface of the upper horizontal, and should extend 5/8” 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 30).
- 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.