

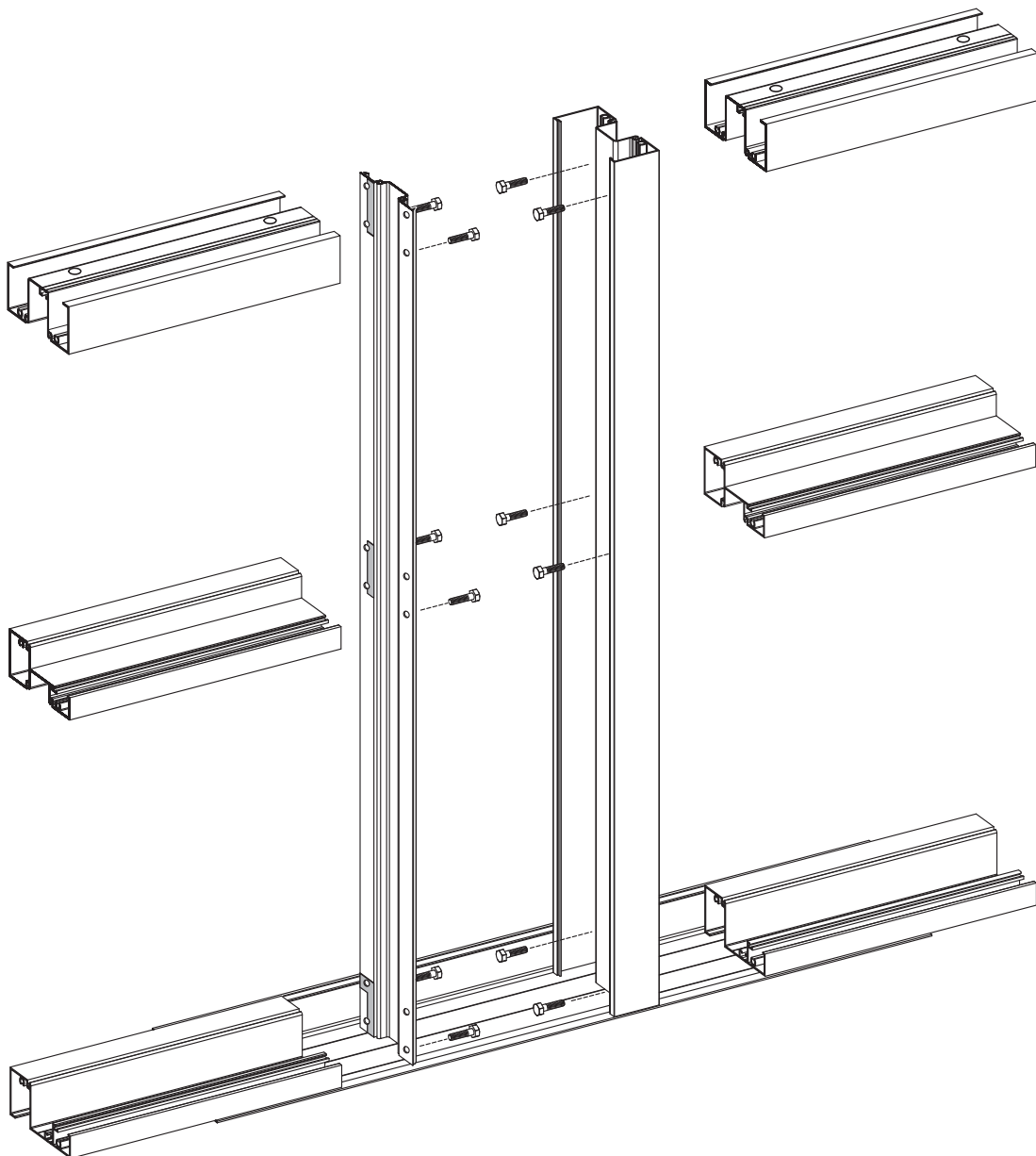


INSTALLATION INSTRUCTIONS

CLASSIC LINE™ SERIES CG451S2™

2" x 4½" STOREFRONT SYSTEM FOR 1" GLAZING

Exterior Glazed



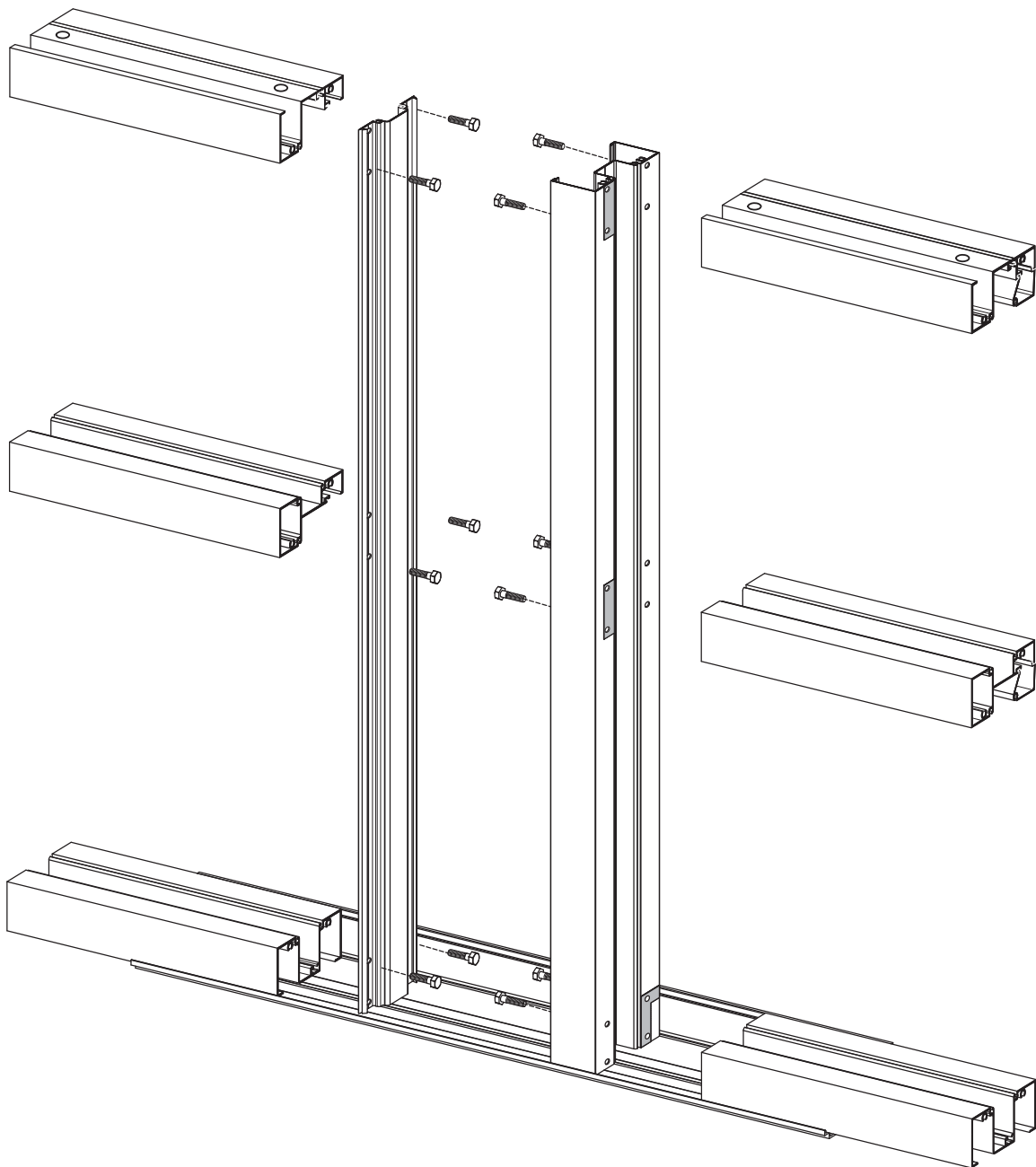


INSTALLATION INSTRUCTIONS

CLASSIC LINE™ SERIES CG451S2™

2" x 4½" STOREFRONT SYSTEM FOR 1" GLAZING

Interior Glazed



STOREFRONT INSTALLATION INSTRUCTIONS

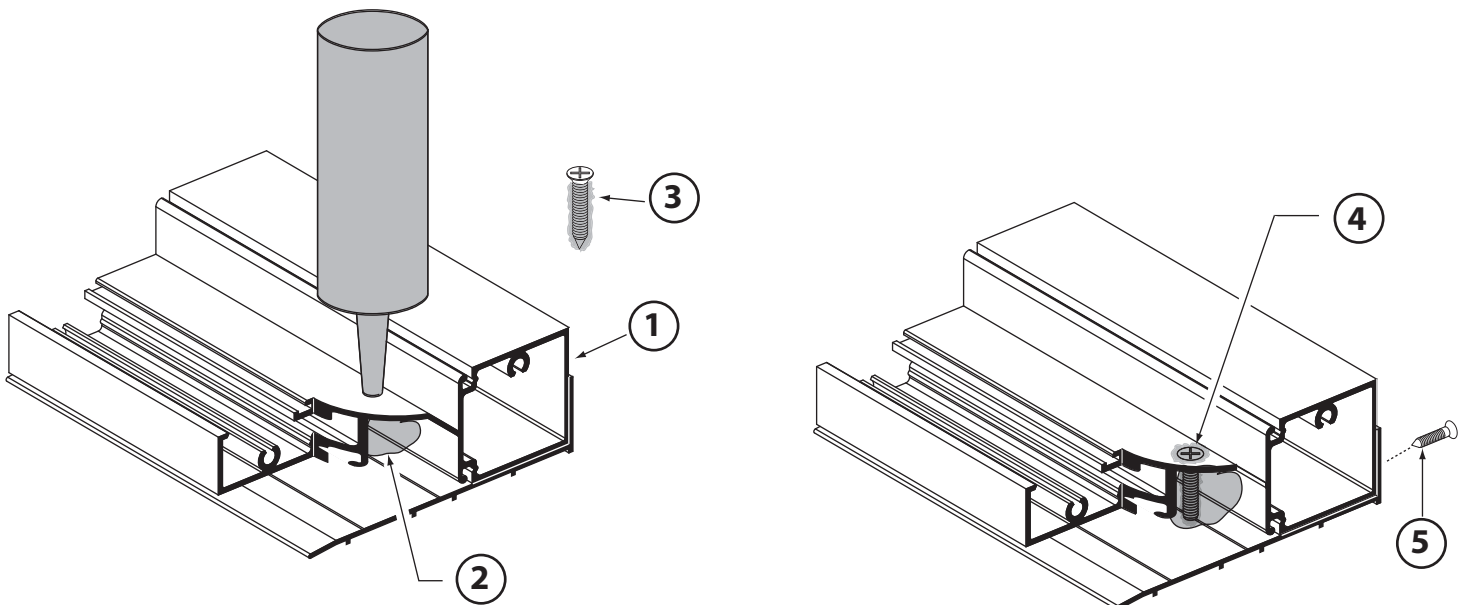
COMMON STOREFRONT SYSTEM FIELD FAILURE PROBLEMS

1. Failure to follow product installation instructions
2. Poor workmanship
3. Frames not installed level and plumb
4. Frames not properly attached to resist dynamic forces of shear, tension and compression
5. Leaks at sill flashing
6. Debris left in glazing pockets
7. Misapplication. For example, utilizing a storefront system for a curtain wall application
8. Failure to install gaskets correctly and sealing corners
9. Failure to install water diverters in ends of intermediate horizontals.
10. Failure to install end dams at each end of sill flashing
11. Glass not centered in opening and not using proper setting blocks and/ edge "W" blocks
12. Not using anti-walk blocks to keep glass centered in pockets in areas known to have seismic movement or near hospitals with helicopter traffic.

GOOD FOUNDATION IS KEY FOR WATER CONTROL

The foundation for a good storefront system begins with well designed sill and sill flashing profiles. The sill profile will have a full depth pocket providing for direct structural attachment to the substrate and eliminates blind seals. Structural anchors can be cap sealed, tooled and inspected prior to glazing. The sill flashing profile will have a full height leg on the interior with a "C" slot receiver at the top for holding sealant. This design controls infiltrated wind driven rain to keep the water on the exterior where it belongs. These two High Performance design features are standard on Vitro America Classic Line Storefront Systems.

AVOID THESE COMMON INSTALLATION PRACTICES



- ① Sill flashing not full height
- ② - ④ Blind seal
- ⑤ Fastener penetrating interior flashing leg

SERIES CG451S² INSTALLATION INSTRUCTIONS

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SERIES CG451S²

INSTALLATION INSTRUCTIONS



PART 1-Handling, Storing and Protection of Aluminum

- A. PRECAUTIONS:** The following precautions are recommended to protect architectural aluminum materials against damage. Following these precautions will help ensure early acceptance of your products and workmanship.
- B. HANDLE CAREFULLY:** All aluminum materials stored at job site must be stored with adequate separation and not stacked directly onto the concrete floor slab to prevent materials from being damaged when handling. Cardboard wrapped or paper interleaved materials must be kept dry.
- C. CHECK ARRIVING MATERIALS:** Check for quantity and keep records of where various materials are stored.
- D. KEEP MATERIAL AWAY FROM WATER, MUD AND SPRAY:** Prevent cement, plaster or other materials from damaging the finish.
- E. PROTECT MATERIALS AFTER ERECTION:** Wrap aluminum section profiles with polyethylene or protect by erecting a polyethylene splatter screen. Cement, plaster, terrazzo, other alkaline solutions and acid based materials used to clean masonry are very harmful to the finish and should be removed with water and mild soap IMMEDIATELY. Reference AAMA 609 and 610-2 for cleaning architectural aluminum.

PART 2 - General Installation Instructions

- A. CHECK SHOP DRAWINGS, INSTALLATION INSTRUCTIONS AND GLAZING INSTRUCTIONS** to become thoroughly familiar with the project. The SHOP DRAWINGS take precedence and include specific details for the project. The INSTALLATION INSTRUCTIONS are of general nature and cover most common conditions.
- B. CUTTING TOLERANCES:** Fabrication cutting tolerances are +0"/-1/32" unless otherwise noted.
- C. ERECTION:** All materials are to be installed plumb, level and true.
- D. BENCH MARKS:** All work should start from bench marks and/or column lines established by the ARCHITECTURAL DRAWINGS and the GENERAL CONTRACTOR with guaranteed accuracy. Check mullion spacing from both ends of masonry opening to prevent dimensional build-up of daylight opening.
- E. SURROUNDING CONDITIONS:** Make certain construction which will receive your materials is in accordance with the contract documents. Notify the general contractor in writing of any discrepancies and resolve differences before proceeding with work.
- F. ISOLATION OF ALUMINUM:** Aluminum to be placed in direct contact with uncured masonry or incompatible materials should be isolated with a heavy coat of zinc chromate or bituminous paint.
- G. SEALANTS:** Sealants must be compatible with all materials which they have contact, including other sealant surfaces. Consult with sealant manufacturer for recommendations relative to joint size, shelf life, compatibility, cleaning/priming, tooling, adhesion, etc. It is the responsibility of the GLAZING CONTRACTOR to submit a statement from the sealant manufacturer indicating that glass and glazing materials have been tested for compatibility and adhesion with glazing sealants, and interpreting test results relative to material performance, including recommendations for primers and substrate preparation required to obtain adhesion. The chemical compatibility of all glazing materials and framing sealants with each other and with like materials used in glass fabrication must be established. This is required on every project.
- H. FASTENING:** Within the body of these instructions, "fastening" means any method of securing one part to another or to adjacent materials. Only those fasteners used within the system are specified in these instructions. Due to various substrates to which the framing may be attached, structural perimeter anchor fasteners are not specified in these instructions. For structural perimeter fasteners, reference the shop drawings, structural anchor charts or consult with the fastener supplier.

SERIES CG451S² INSTALLATION INSTRUCTIONS

- I. BUILDING CODES:** Glass and glazing codes governing the design and use of products vary widely throughout the USA. Vitro America does not control the selection of product configurations, operating hardware, or glazing materials, and assumes no responsibility for these design considerations. It is the responsibility of the owner, specifier, architect, general contractor and installer to make these selections in strict conformance with all applicable codes.
- J. EXPANSION JOINTS:** Expansion joints and perimeter seals shown in these instructions and in the shop drawings are shown at normal size. Actual dimensions may vary due to perimeter conditions and differences in metal temperature between time of fabrication and the time of installation. Detailed instructions and formula used to calculate expansion joints are shown within the body of these instructions.
- K. FIELD TESTING:** It is recommended that AAMA 501.2 Water Hose Test be conducted once a sufficient portion of the framing is installed, glazed and sealed to ensure proper installation. This test should be repeated on large projects at specific intervals as deemed necessary by job conditions and acceptable quality control standards.
- L. COORDINATION WITH OTHER TRADES:** Coordinate with the GENERAL CONTRACTOR and sequence with other trades any materials which offset your framing installation. For example, backup walls, partitions, ceilings, mechanical ducts, convectors, etc.
- M. FINAL CLEANING (CARE AND MAINTENANCE):** Final cleaning of exposed aluminum surfaces should be done in accordance with AAMA publications 609.1 for anodized aluminum and 610.1 for applied painted coatings (liquid or powder).
- N. PRODUCT DESIGN CHANGES:** Vitro America reserves the right to change product designs without prior notice when deemed necessary for product improvement. Please check our website at www.vitroamerica.com for the latest product installation instructions prior to commencing work.

NOTE: CLASSIC LINE **SERIES CG451S²** FRAMING SYSTEM WAS TESTED USING **DOW 995** SEALANT FOR ALL INTERNAL SEALS AND **DOW 795** SEALANT FOR EXTERIOR PERIMETER SEALS. THROUGHOUT INSTALLATION INSTRUCTIONS “**SEALANT**” IS USED AS A GENERIC TERM. **REFERENCE:** PART 2 - GENERAL INSTALLATION INSTRUCTIONS - **G** REGARDING SEALANTS.

VITRO AMERICA ABBREVIATIONS USED IN THESE INSTRUCTIONS:

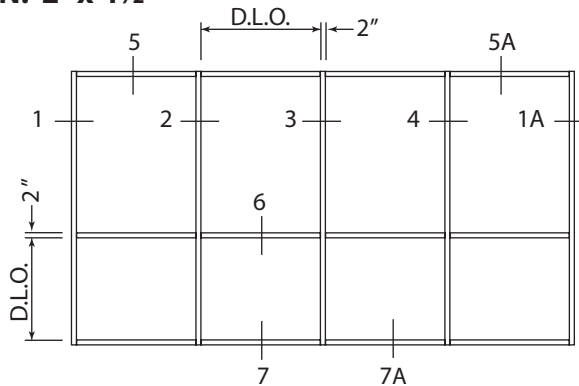
D.L.O. = Day Light Opening
Ø = Diameter
Typ. = Typical

SERIES CG451S² INSTALLATION INSTRUCTIONS

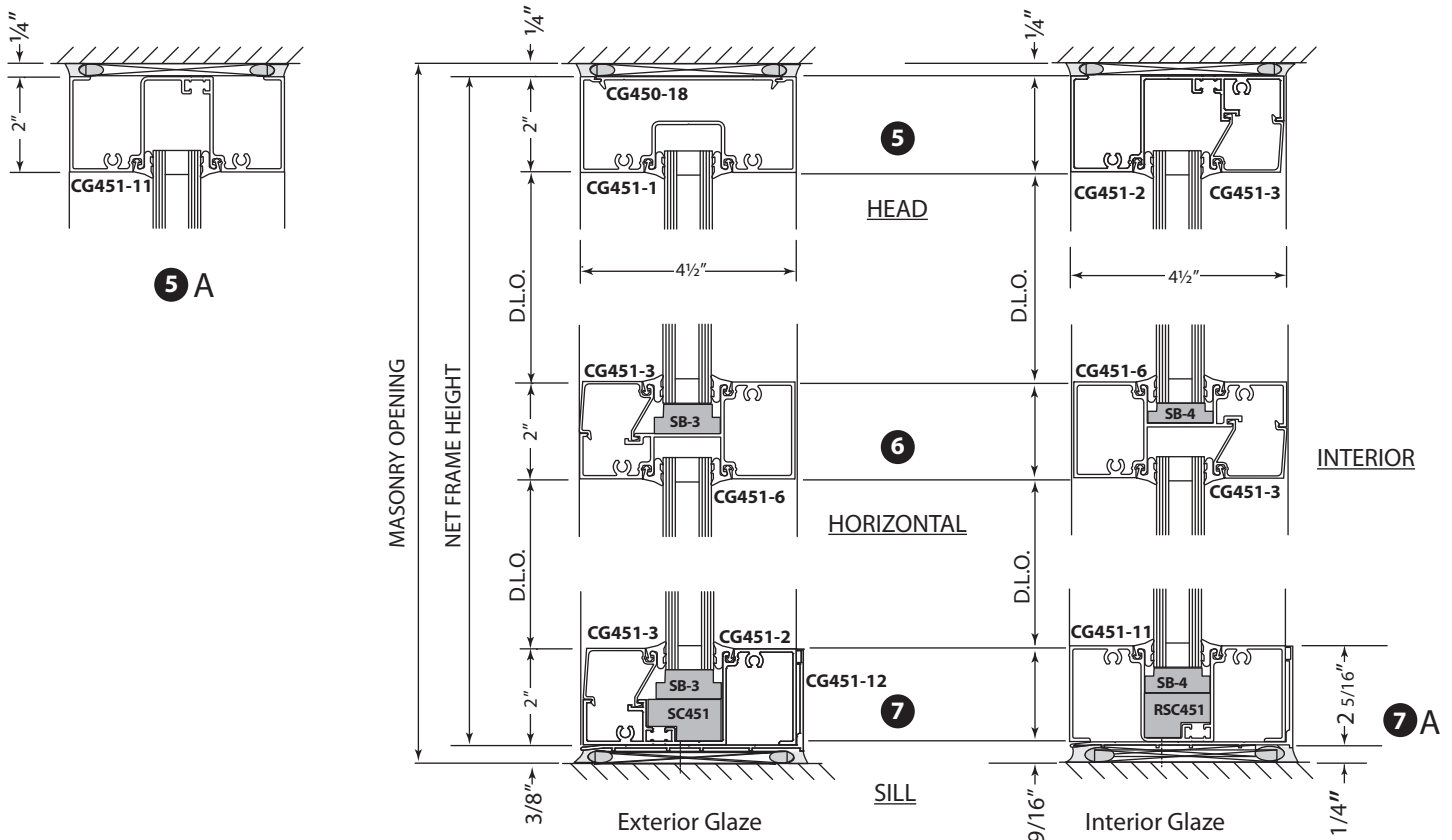
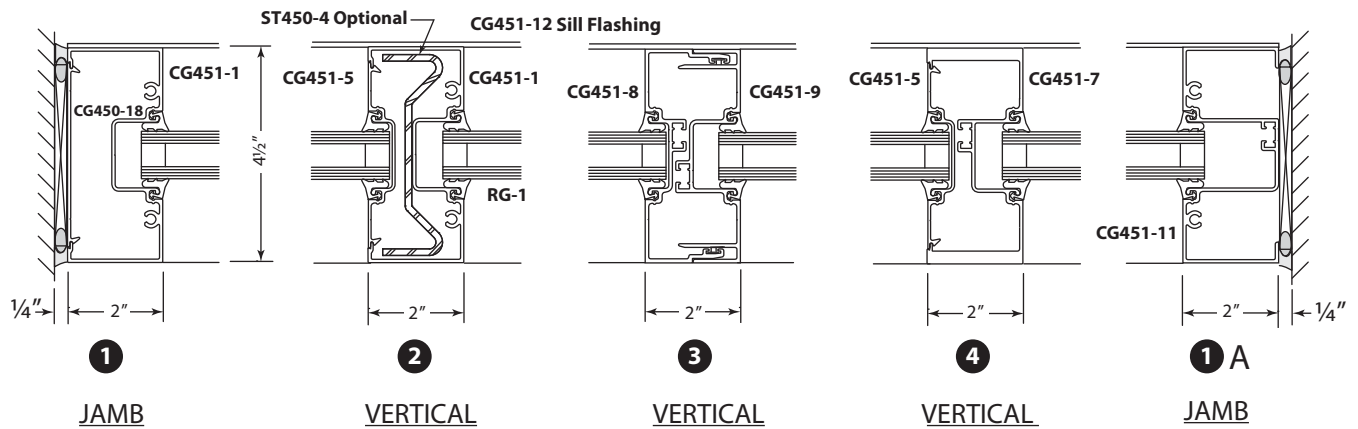
TYPICAL DETAILS AND ELEVATION: 2" x 4 1/2"

Glass Formula
D.L.O. + 7/8"

D.L.O. = Daylight Opening



INTERIOR



SERIES CG451S² INSTALLATION INSTRUCTIONS

FRAME FABRICATION

STEP 1.

DETERMINE NET FRAME WIDTH AND HEIGHT BY MEASURING MASONRY OPENING:

FIG. 1

FRAME WIDTH:

Measure width of masonry opening at the top, middle and bottom as shown in **FIG. 1**

*Sill Flashing Length = Smallest dimension minus (-) 1/2"

Note: 1/4" caulk joint is minimum that should be used. 3/8" to 1/2" is acceptable

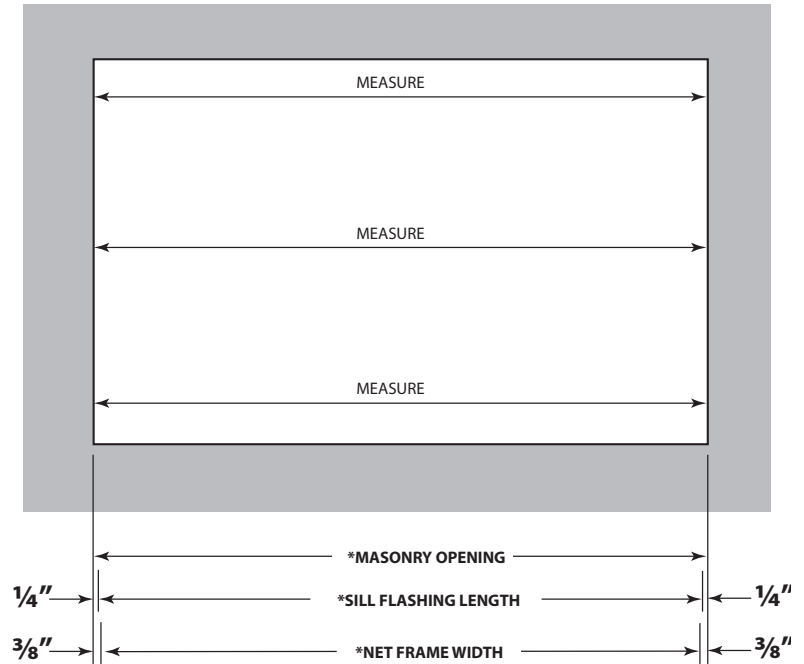


FIG. 2

FRAME HEIGHT:

Measure height of masonry opening in several places. See **FIG. 2**

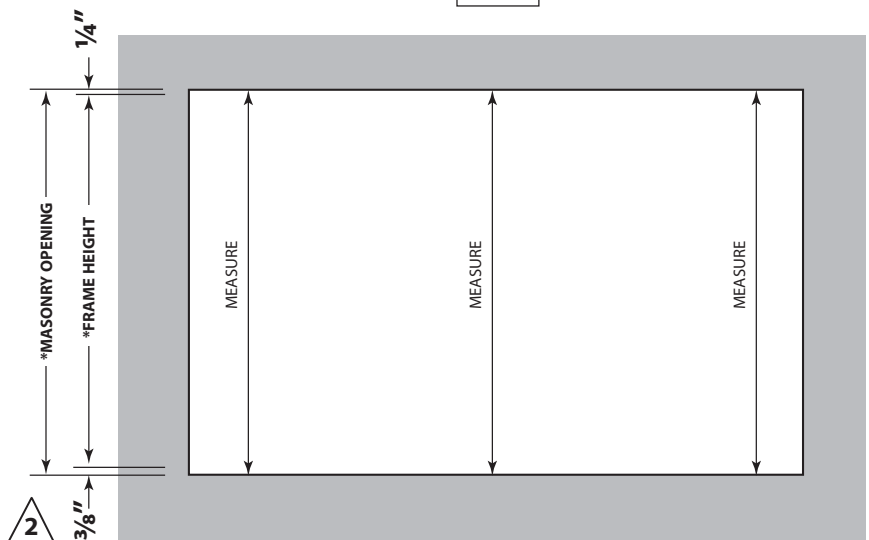
*Frame Height = Smallest dimension minus (-) 5/8"

1/4" shim/caulk at head

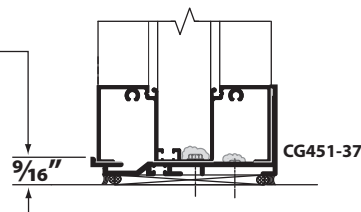
1/8" for **CG451-12** sill flashing

1/4" shim/caulk below sill flashing

Note: 1/4" caulk joint is minimum that should be used. 3/8" to 1/2" is acceptable



$\triangle 2 = 9/16"$ when using **CG451-37** subsill pan



SERIES CG451S² INSTALLATION INSTRUCTIONS



FRAME FABRICATION

STEP 2.

FABRICATE OPEN BACK VERTICALS AND SNAP-IN FILLERS

Cut vertical members to net frame height.

Drill or punch 0.257 holes (letter "F" drill) in vertical members for spline screw **FAS 14-2** (#1/4-14 x 1" HH tapping screw) using drill jig **DJ451** (FIG.3) or Vitro America punch die (**CG451S²**) and Time Fabsaver™ punch press.

Reference FIGS. 4 and 5 for using **DJ451** symmetrical drill jig.

Align **DJ451** at top, bottom, horizontal locations on vertical members and drill holes as shown.

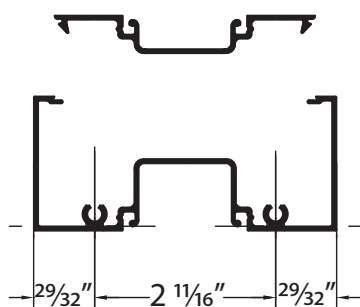


FIG. 4 Exterior Glazing

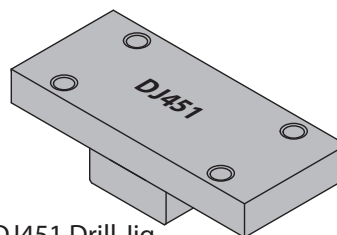
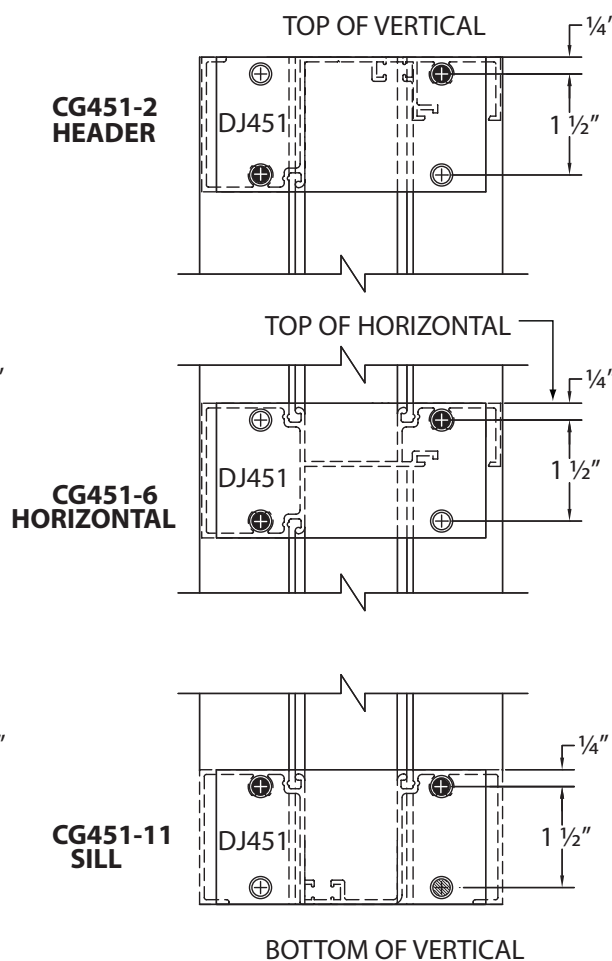
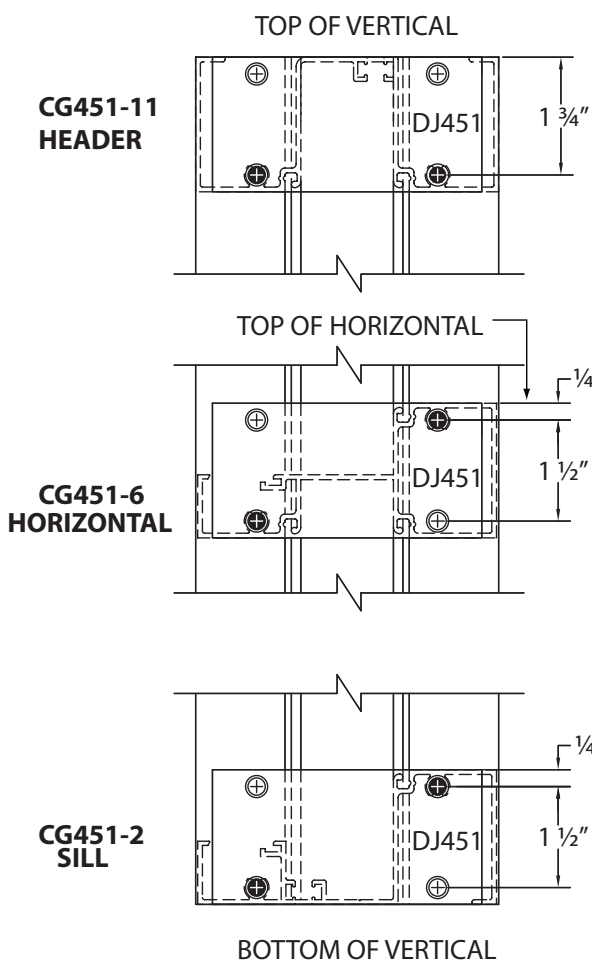


FIG. 3

DJ451 Drill Jig
Use Letter "F" (.257Ø) Drill

FIG. 5 Interior Glazing



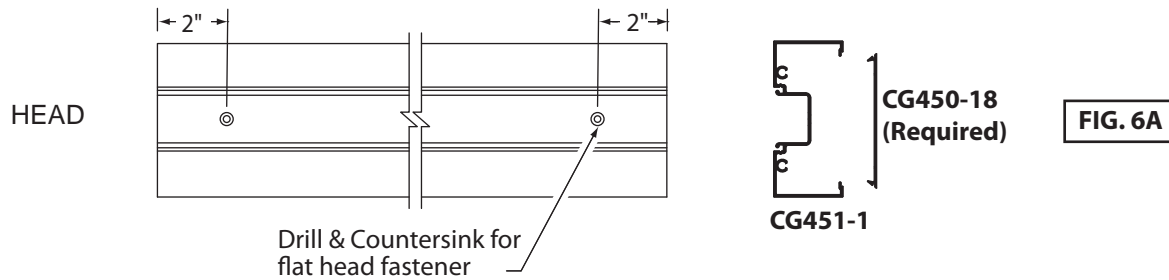
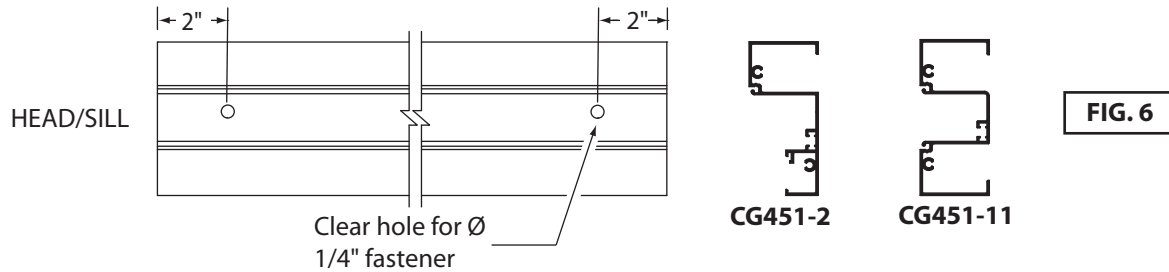
SERIES CG451S² INSTALLATION INSTRUCTIONS

FRAME FABRICATION

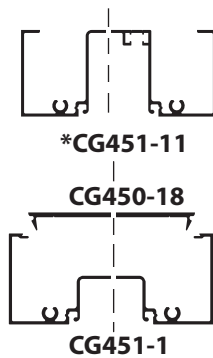
STEP 3

CUT HORIZONTAL PROFILES TO D.L.O. & CUT GLASS STOPS D.L.O. MINUS (-) 1/32"

Fabricate head, sill and wall jamb anchor holes as shown in **FIG. 6**, **FIG 6A** and **FIG. 7**. Reference anchor chart for quantity, size and location for each substrate. The first hole is always 2" from each end. Spacing between any additional fasteners vary based on substrate material.

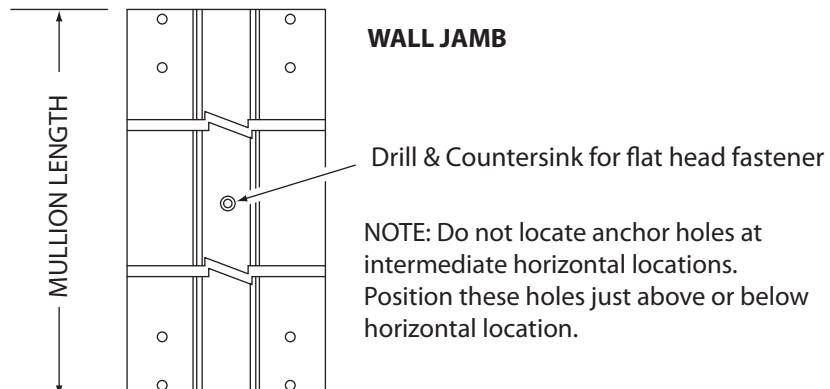


NOTE: **CG450-18** flat filler must be used for attaching **CG451-1** to substrate



* Preferred for high performance.
Clear hole for \varnothing 1/4" fastener

FIG. 7



SERIES CG451S² INSTALLATION INSTRUCTIONS

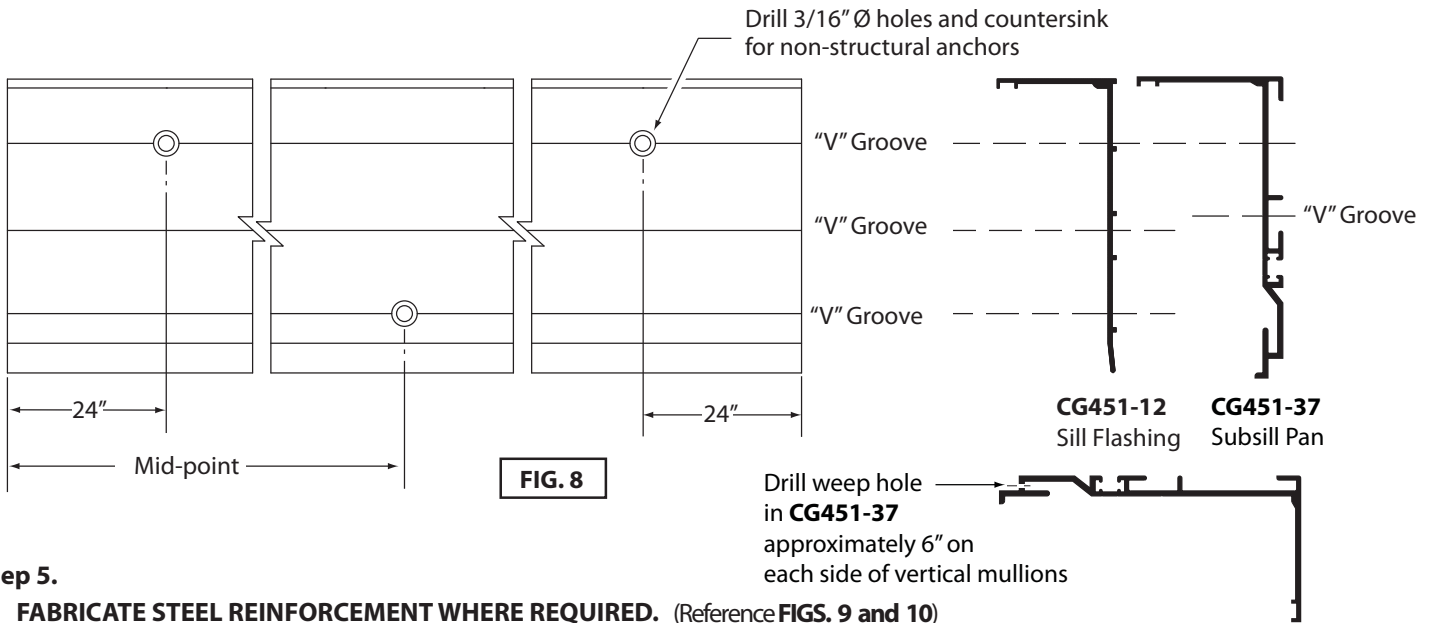


STEP 4

FABRICATE SILL FLASHING:

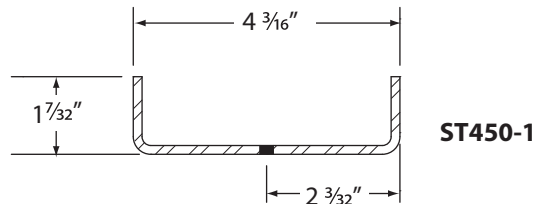
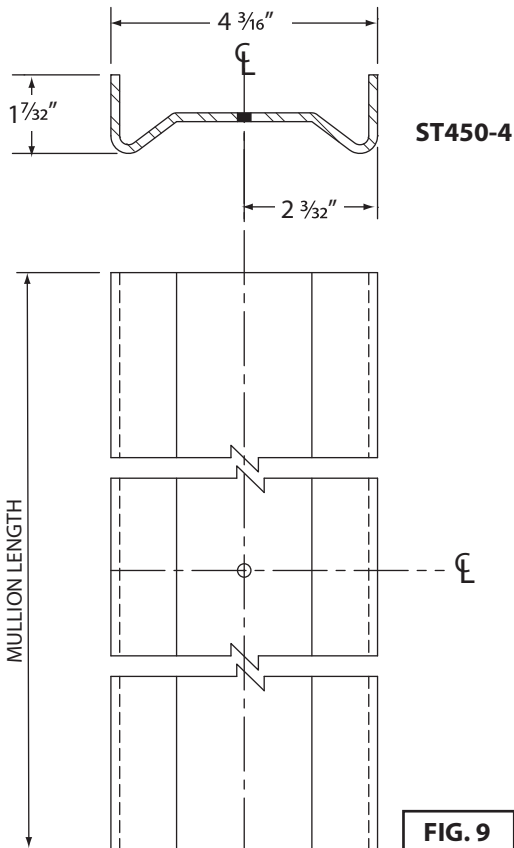
CUT SILL FLASHING CG451-12 (Reference **FIG.1** for cut length)

Fabricate sill flashing non-structural anchor holes as shown in **FIG. 8**. Hole locations shown are approximate. Reference anchor chart quantity, size and location for each substrate. Use "V" grooves for non-structural anchors. Reference **Step 7, FIG. 13** for structural fastener attachment. Holes may be staggered as required.



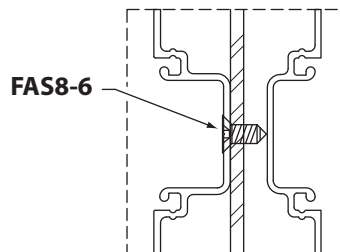
Step 5.

FABRICATE STEEL REINFORCEMENT WHERE REQUIRED. (Reference **FIGS. 9 and 10**)



Steel for intermediate doorjamb.

NOTE: Reference doorframe instructions for this operation.



Start at center and attach steel to mullion at 12" on center.
Drill and countersink hole as shown for (#8-32 x 3/8" FHP "F")

FIG. 10

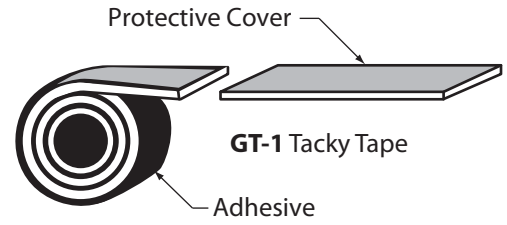
SERIES CG451S² INSTALLATION INSTRUCTIONS

FRAME ASSEMBLY - EXTERIOR GLAZED

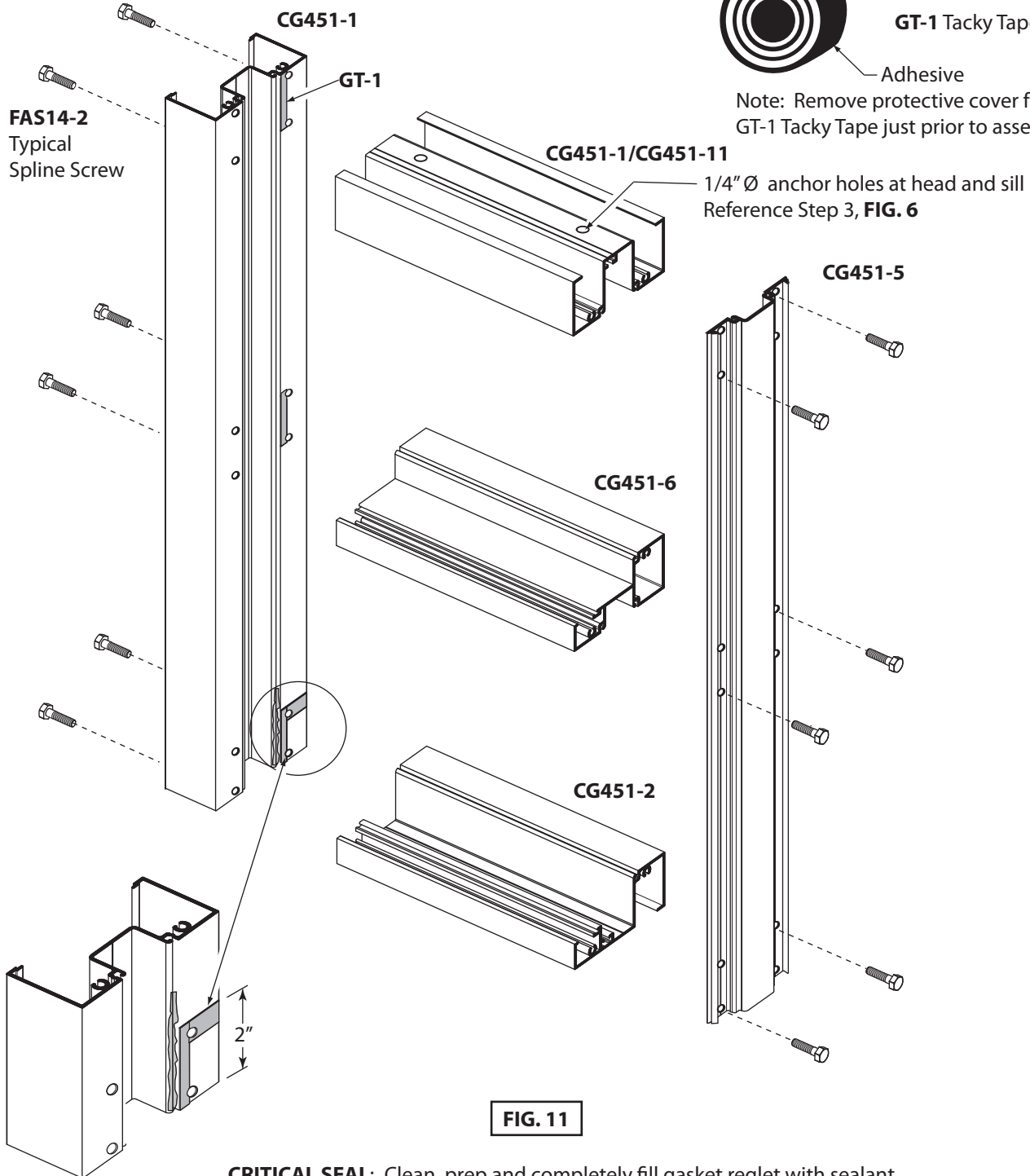
STEP 6.

APPLY GT-1 TACKY TAPE AT ALL HORIZONTAL TO VERTICAL JOINTS

Note critical seal area shown in FIG. 11.



Note: Remove protective cover from GT-1 Tacky Tape just prior to assembly.



CRITICAL SEAL: Clean, prep and completely fill gasket reglet with sealant at bottom of vertical and pocket filler as shown.

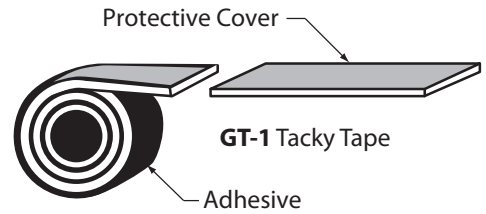
SERIES CG451S² INSTALLATION INSTRUCTIONS

FRAME ASSEMBLY - INTERIOR GLAZED

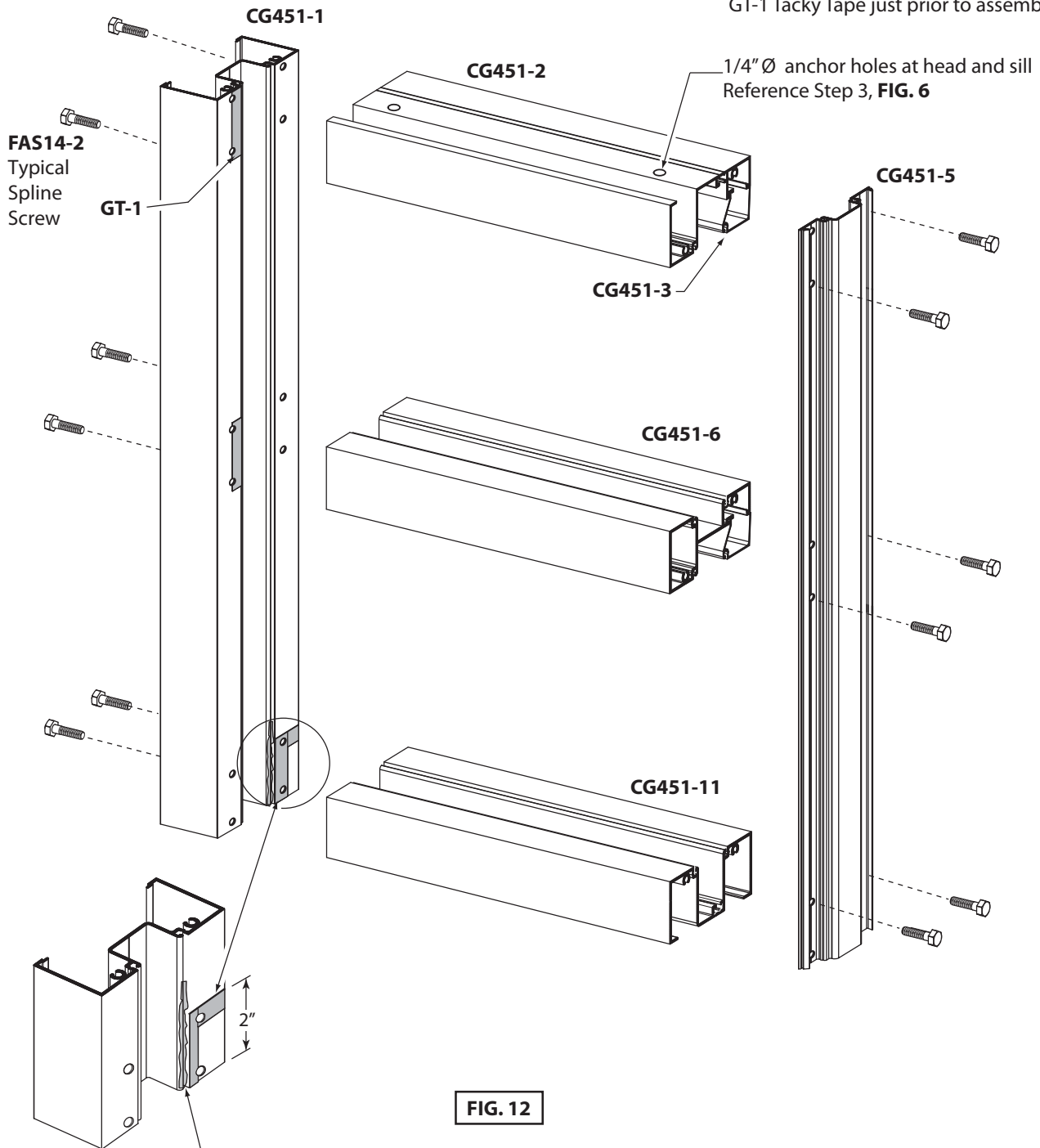
STEP 6.

APPLY GT-1 TACKY TAPE AT ALL HORIZONTAL TO VERTICAL JOINTS

Note critical seal area shown in FIG. 12



Note: Remove protective cover from GT-1 Tacky Tape just prior to assembly.



CRITICAL SEAL : Clean, prep and completely fill gasket reglet with sealant at bottom of vertical and pocket filler as shown.

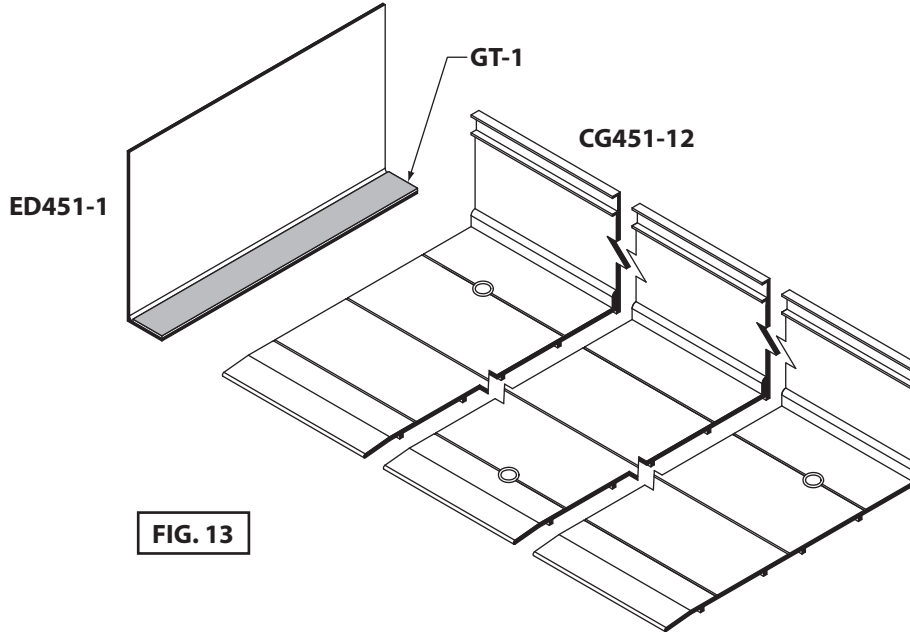
SERIES CG451S² INSTALLATION INSTRUCTIONS

FRAME ASSEMBLY

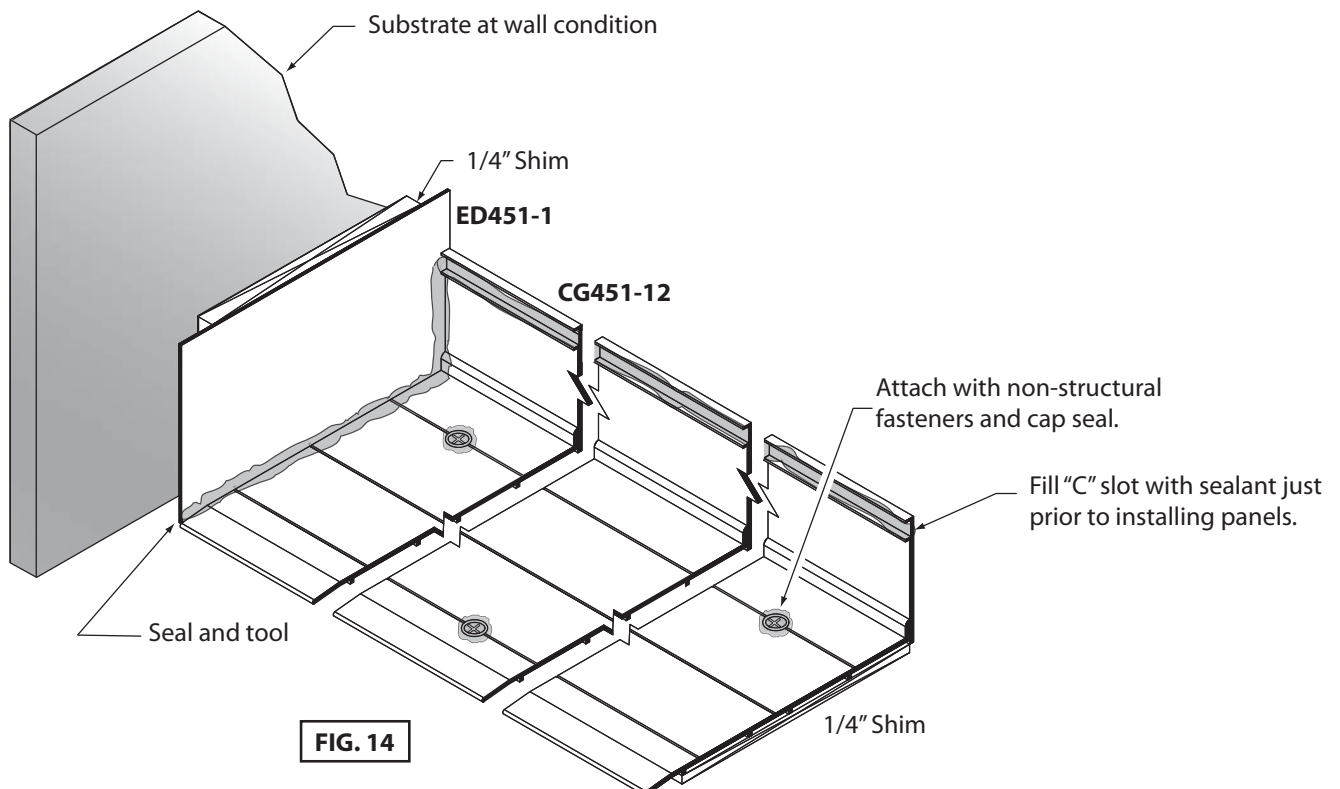
STEP 7.

INSTALL SILL FLASHING

Apply **GT-1** tacky tape to **ED451-1** end dam(s) and attach to sill flashing as shown in **FIG. 13**



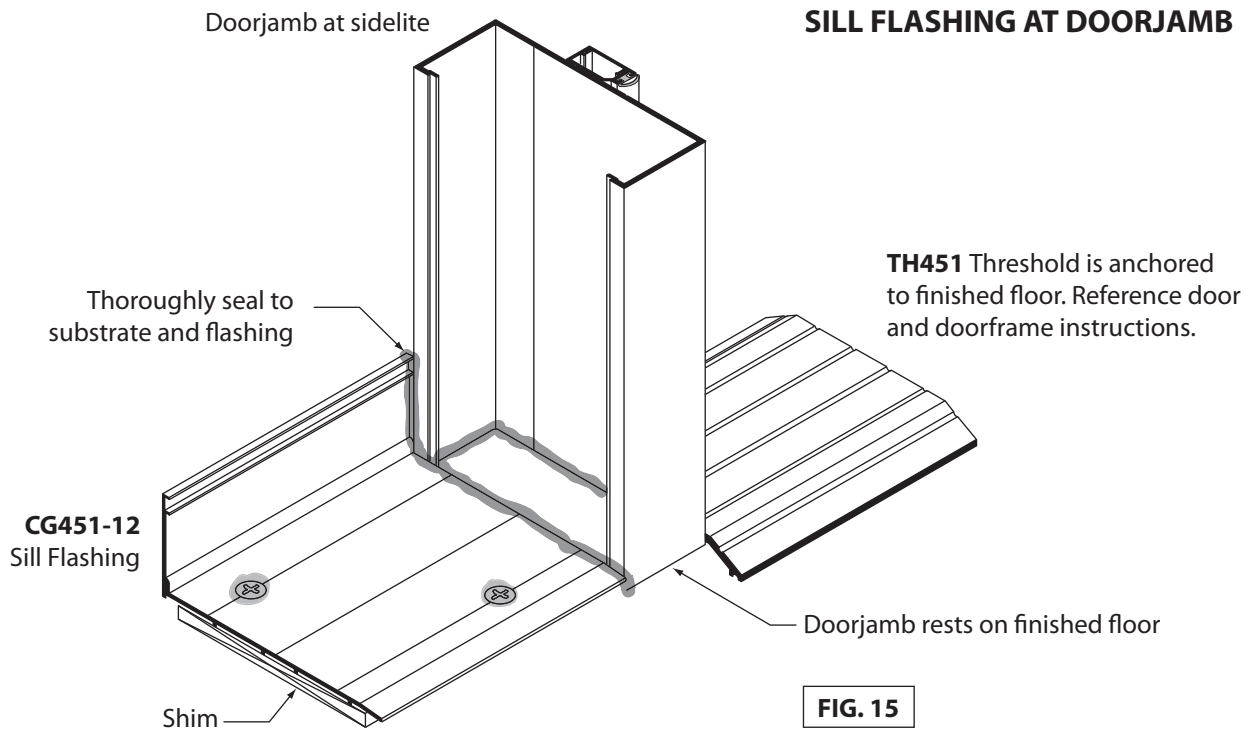
Center sill flashing into opening allowing for a 1/4" minimum shim space at each end. Shim beneath sill flashing and attach sill flashing. Wedge shims tightly behind end dams at wall jambs and seal as shown in **FIG. 14**. Run a continuous bead of sealant along the entire length of the sill flashing's "C" slot just prior to installing frame panels.



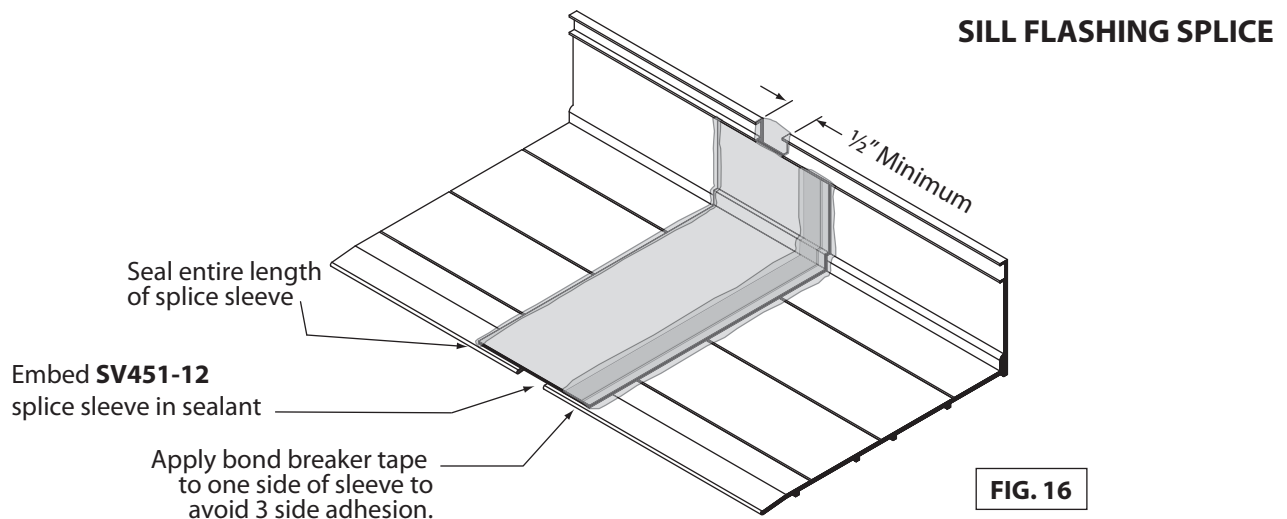
SERIES CG451S² INSTALLATION INSTRUCTIONS

Install doorframe in opening first. Install sill flashing so that it abuts tightly against doorjamb. Shim, level and attach to substrate with non-structural fasteners. Cap seal fasteners and apply sealant at inside of doorjamb and flashing as shown in **FIG. 15**.

NOTE: Do not apply perimeter sealant at this time. Perimeter sealant is not applied until all panels have been installed and attached to masonry opening.



Splices should be located every 12 to 15 feet with a 1/2" expansion joint as shown in **FIG. 16**.



SERIES CG451S² INSTALLATION INSTRUCTIONS

Miter cut two 18" sections of sill flashing to correct angle as shown in **FIG. 17**. Drill two anchor holes located in each section as shown to hard pin sill flashing. Shim and anchor with 3/16" non-structural fasteners and cap seal. Completely seal mitered corners. **NOTE:** This procedure is required for mitered corners.

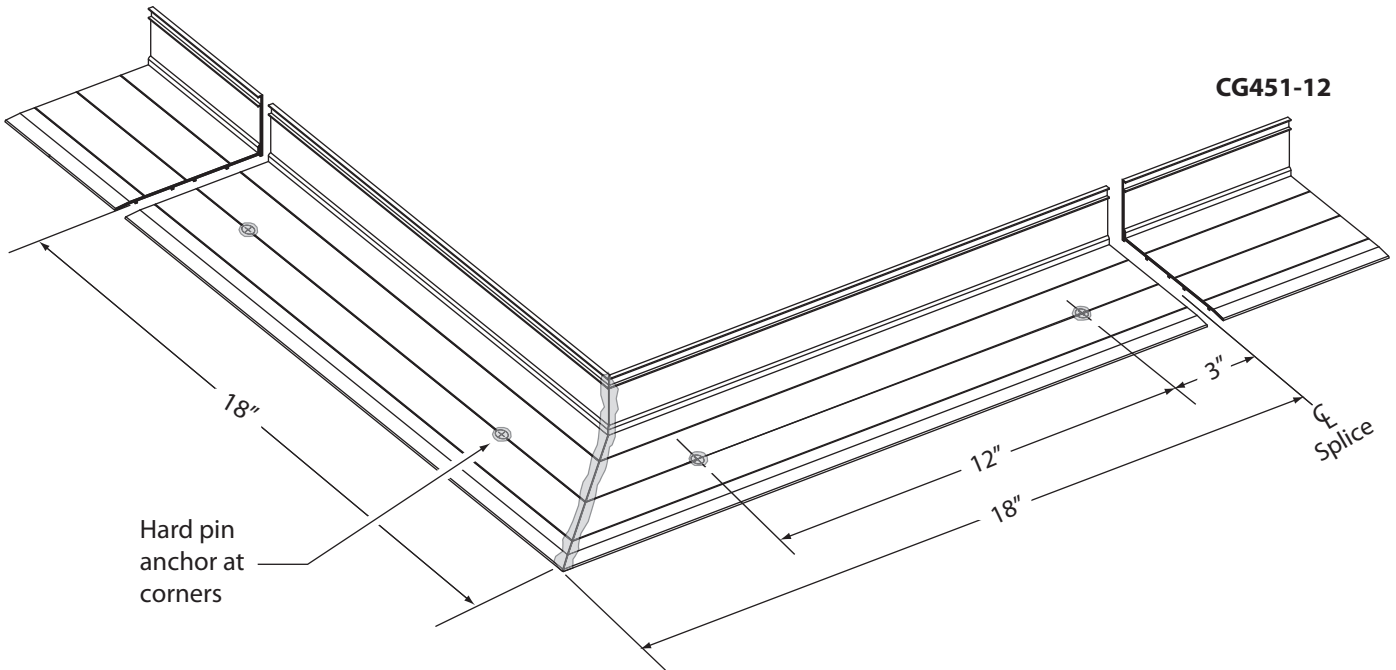


FIG. 17

Completely seal corner and cap seal anchors with sealant

Cut **CG450-18** flat filler D.L.O. minus (-) 6". Drill (3) 1/4" Ø holes as shown in **FIG. 18**. Use short piece of **CG451-1** to properly align **CG450-18** flat filler to **CG451-12**. Anchor with (3) 1/4" Ø x 2" Tapcon screws and cap seal with sealant. **CG451-17** bulkhead snap fits onto **CG450-18**.

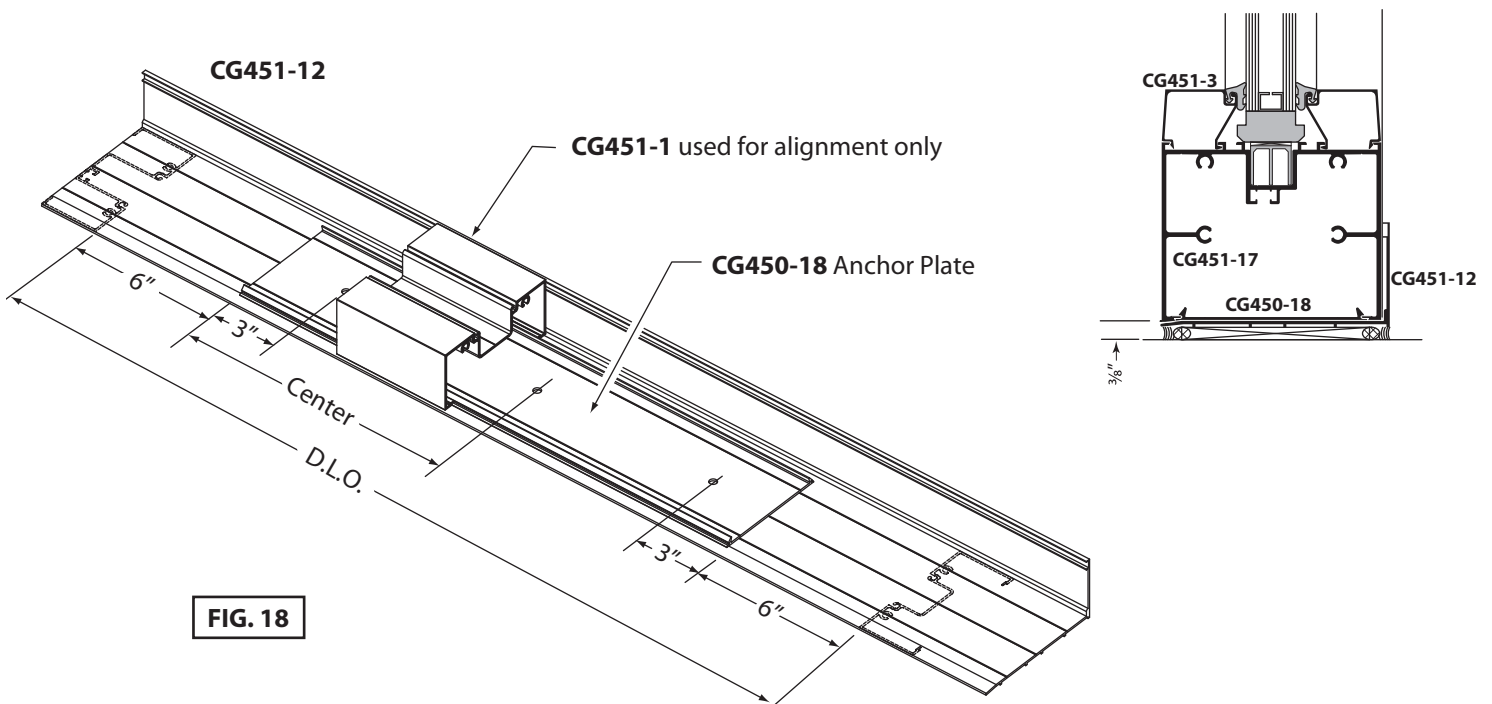


FIG. 18

SERIES CG451S² INSTALLATION INSTRUCTIONS

EXPANSION MULLION INSTALLATION PROCEDURE

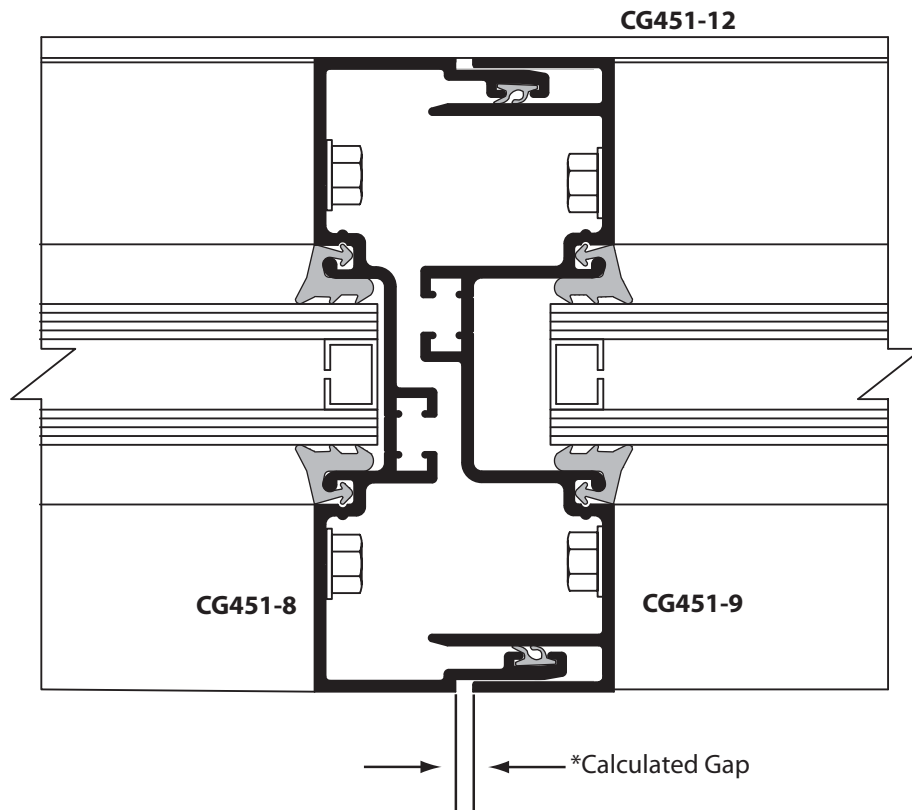


FIG. 19

STEP 15.

*Determined by job conditions, project specifications and temperature at the time of installation. Expansion mullions allow for 3/8" maximum movement. Reference **FIG. 19**

EXPANSION GAP SIZE FORMULA = LENGTH (") X F° DIFFERENCE X 0.0000129

L= Length in inches between centerline of expansion mullion in elevation

F= Specified temperature variation (Degrees Farenheit)

0.0000129 = Thermal coefficient for aluminum

EXAMPLE:

Assume 100° temperature variation specified and temperature at job site on day of installation is 60°.

1. $100^{\circ} - 60^{\circ} = 40^{\circ}$ temperature difference
2. Length of elevation between expansion mullions equals 20' - 0" or 240"
3. $240" \times 0.0000129 \times 40^{\circ} = 0.124"$. Therefore, set expansion gap at 0.124 or 1/8"

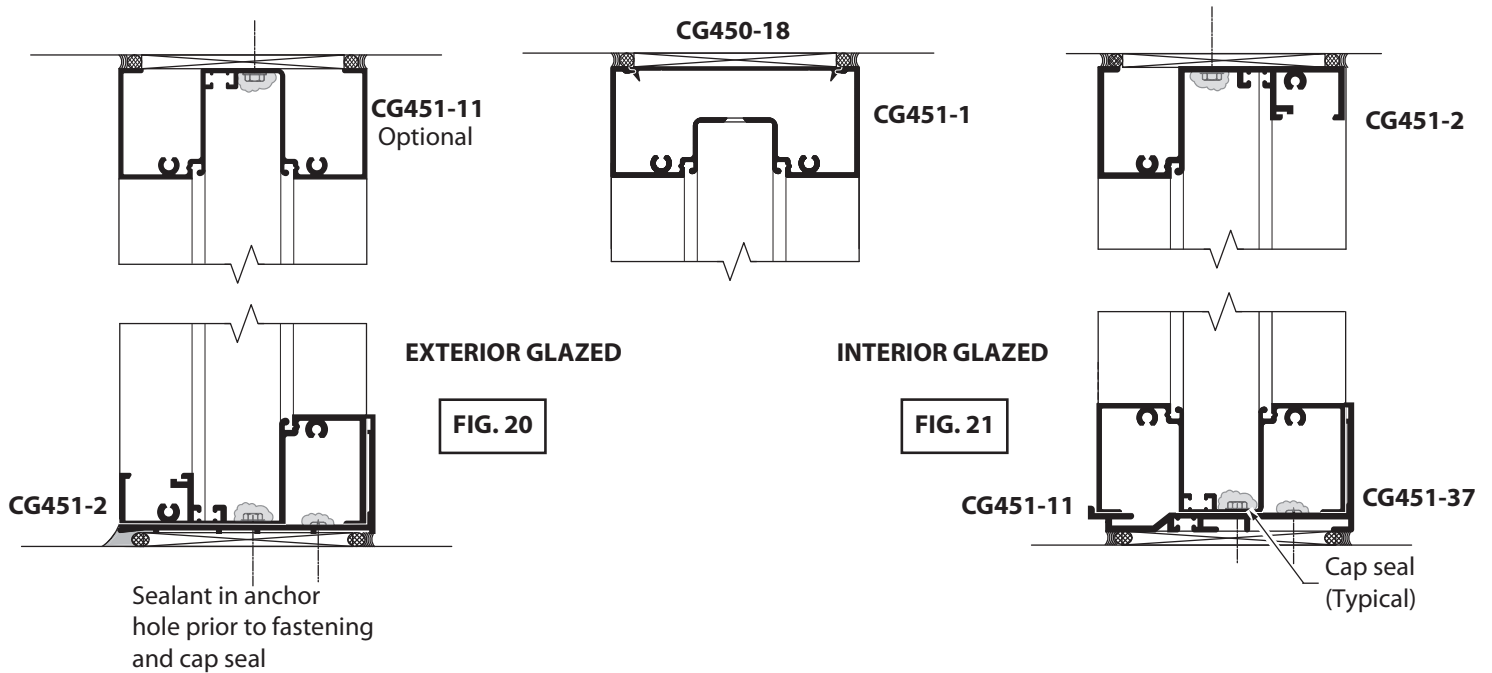
SERIES CG451S² INSTALLATION INSTRUCTIONS

INSTALLATION

STEP 16.

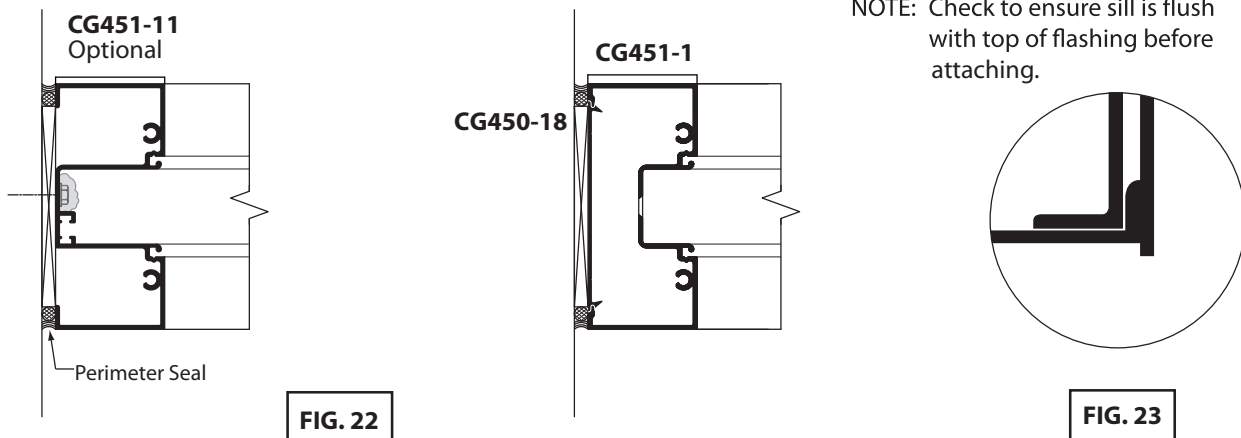
Install first panel on left end, plumb, level and place 1/4" shim tightly between end dam and wall jamb. See **FIG. 14, page 14**. Match drill holes located in sill through and into flashing substrate. Clean debris and insert sealant into holes prior to attaching structural fasteners. See **FIGS. 20 and 21**. Match drill anchor holes in head profile into substrate. With the first panel installed and attached to substrate, continue installing panels as illustrated on page 19. Once all panels have been installed and securely anchored, **cap seal all structural fasteners**.

NOTE: Ensure panels are pushed tightly against sill flashing and level before attaching. See **FIG. 23**.



NOTE: Apply perimeter sealant at exterior and interior after all panels have been installed and anchored to substrate.

Anchor jambs to substrate when required. Reference shop drawings and/or anchor charts. After all panels have been anchored, apply perimeter seal on exterior and interior. See **FIG. 27, page 20** for weeps at flashing.

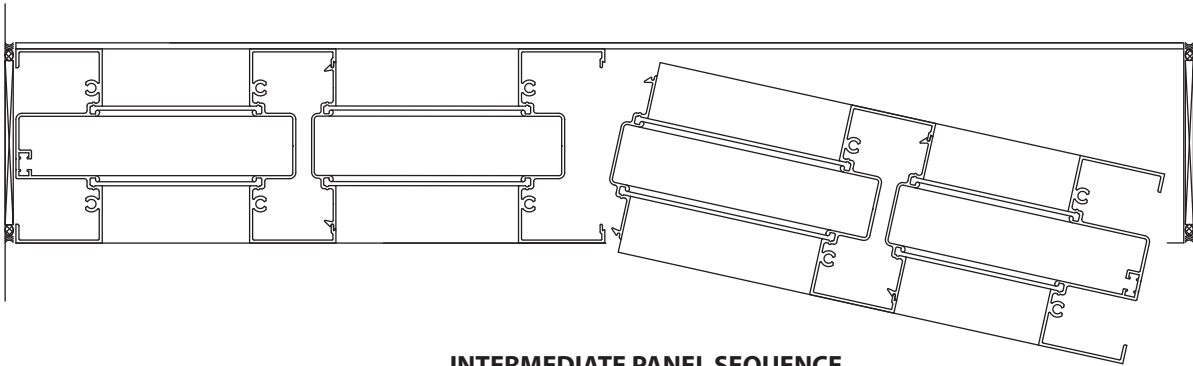


SERIES CG451S² INSTALLATION INSTRUCTIONS

INSTALLATION

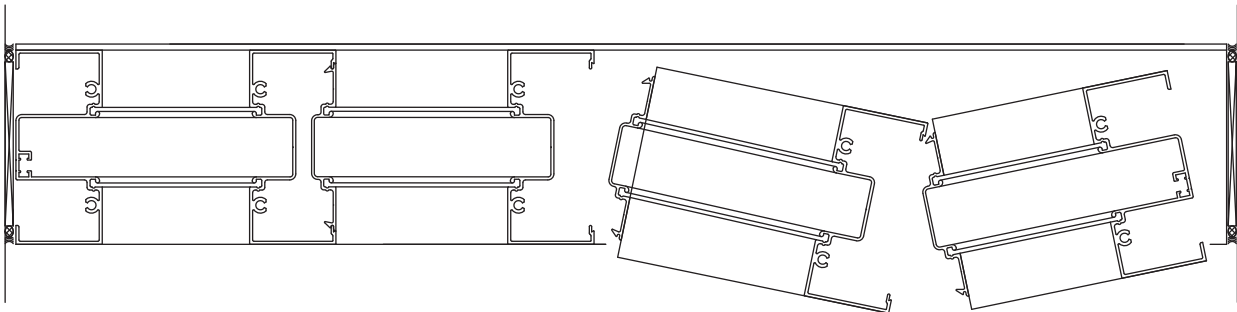
STEP 17.

Frames can be shop fabricated and assembled into panels for field installation. Each panel must have at least one deep pocket for glazing. Two shallow pockets should never be facing each other. Expansion mullions should be used in elevations exceeding 24 feet in length to allow for thermal movement. See **FIG. 19, page 17**. Install shim as required.



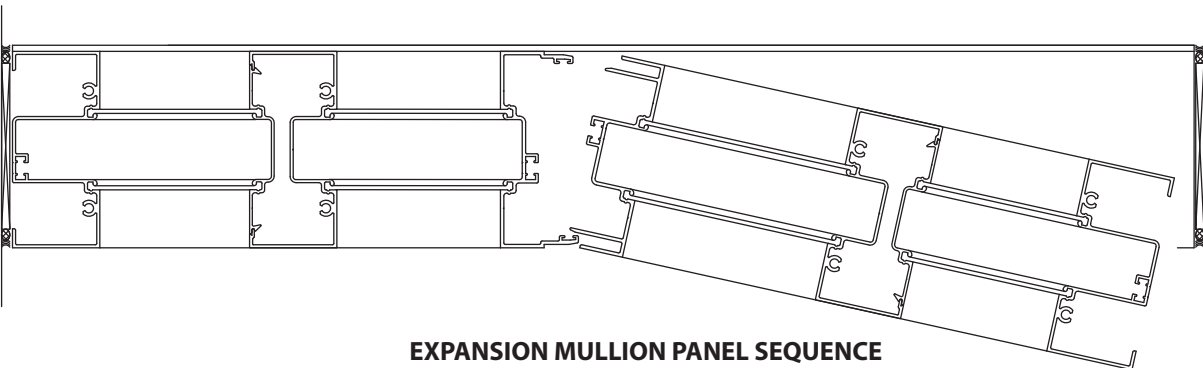
INTERMEDIATE PANEL SEQUENCE

FIG. 24



LAST PANEL SEQUENCE

FIG. 25




EXPANSION MULLION PANEL SEQUENCE

FIG. 26

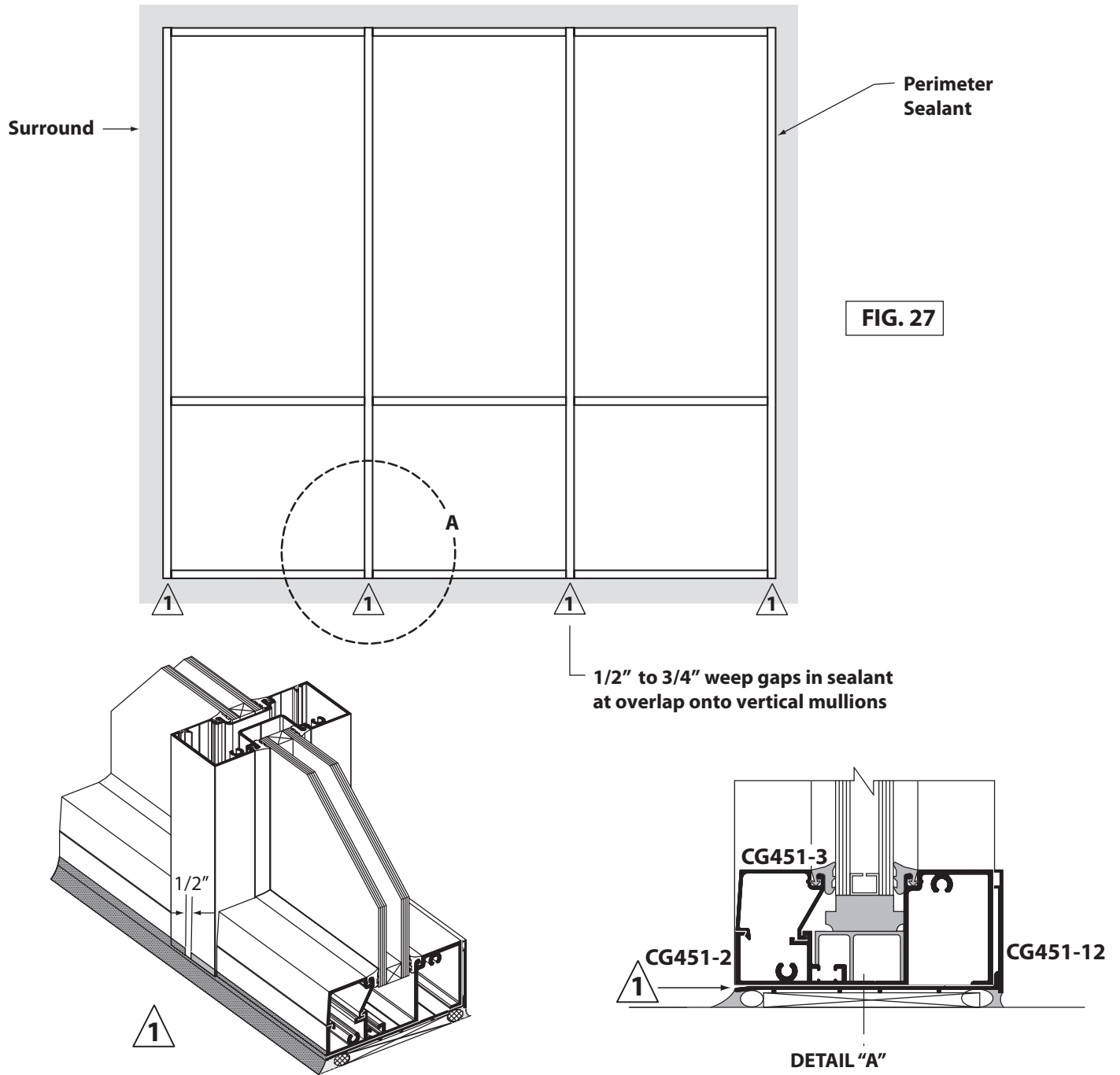
SERIES CG451S² INSTALLATION INSTRUCTIONS

STEP 18.

APPLY PERIMETER SEALANT.

Apply sealant as shown. Seal across intersection between sill and sill flashing. Leave approximately 1/2" to 3/4" gap in sealant for weepage where it overlaps onto vertical mullion as noted by symbol. 

PERIMETER SEALANT



SERIES CG451S² INSTALLATION INSTRUCTIONS

GLAZING

STEP 18.

REMOVE ALL TRASH FROM GLAZING POCKETS AND REGLETS.

GLASS SIZE = DAYLIGHT OPENING (D.L.O.) + 7/8"

Set glass on two (2) identical setting blocks positioned at 1/4 points in opening. Reference Dead Load Charts for locations on intermediate horizontal. Setting blocks are not to be placed closer than 6" from the edge of glass.

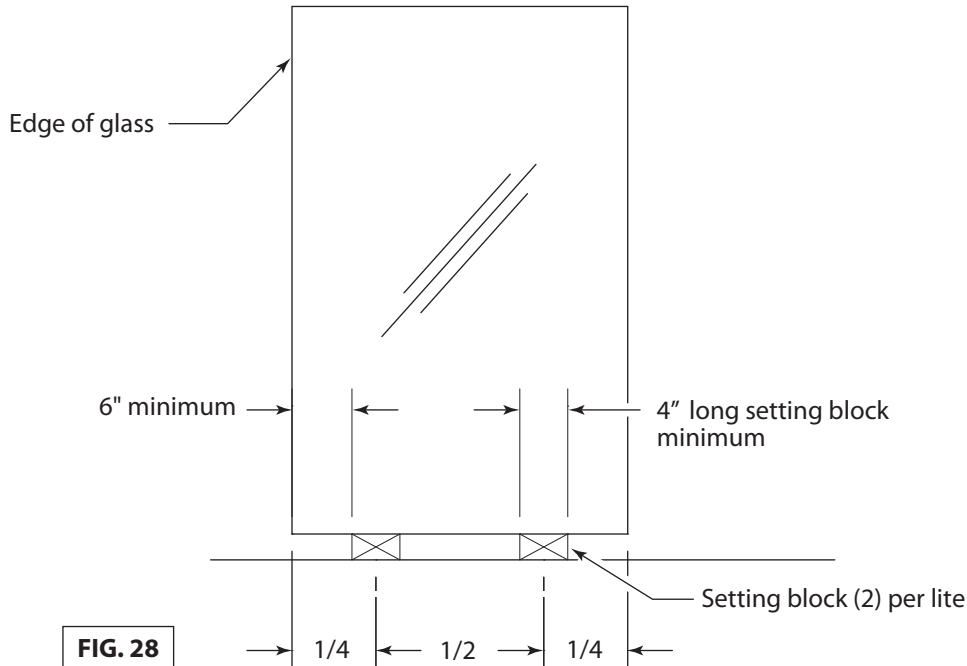


FIG. 28

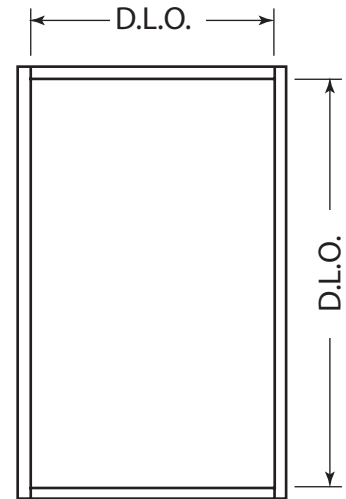


FIG. 29

Reference Dead Load Charts for intermediate horizontal

Four gaskets are cut 3/16" longer per foot than D.L.O. (width and height; Ref. FIG. 29) to allow for shrinkage. It is important that gaskets are cut and installed as shown in **FIG. 30**.

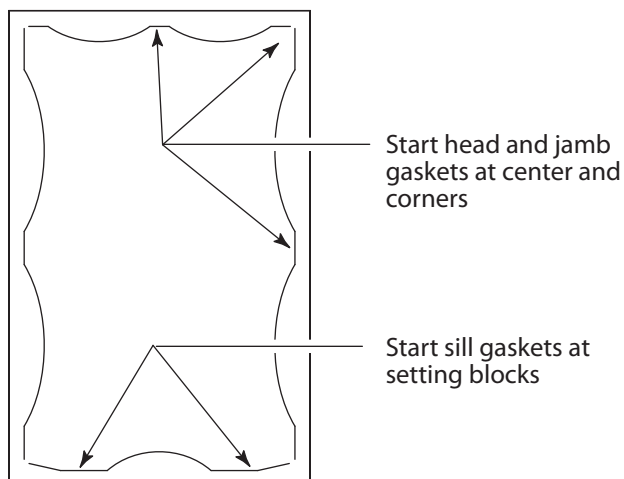


FIG. 30

SERIES CG451S² INSTALLATION INSTRUCTIONS

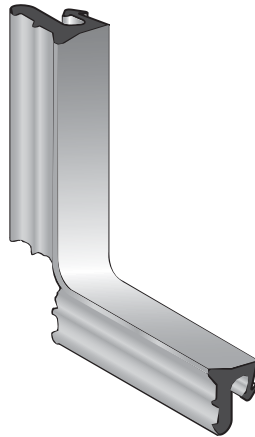
GLAZING GASKETS FOR STOREFRONT SYSTEMS

CORNER TREATMENTS

Glazing gaskets are prone to shrink and pull away at the corners over a period of time. This allows for excessive air and/or water infiltration at the corners. Standard glazing practice is to provide corner treatment to ensure weather tightness on the exterior and interior corner intersections.

NOT RECOMMENDED

Notch Cutting Corners - The corners of the rubber gasket are notched on the underside without cutting the nearside. The gasket is installed in one length and is butt joined in the center at the horizontal or header. While this method of glazing is widely used for marine glazing residential sliding glass doors or shower doors, it is not recommended for commercial storefront glazing.



Corner Notching-Not Recommended

RECOMMENDED

SEALED CORNERS

Pull gaskets back 2" in both directions from interior and exterior corners as shown in **FIG. 31** and seal with sealant. This should be done on exterior and interior for best performance. While long-term adhesion to the rubber gaskets with sealant is not assured, historical field experience has proven this type corner treatment to be the next best method short of vulcanized corner gaskets.

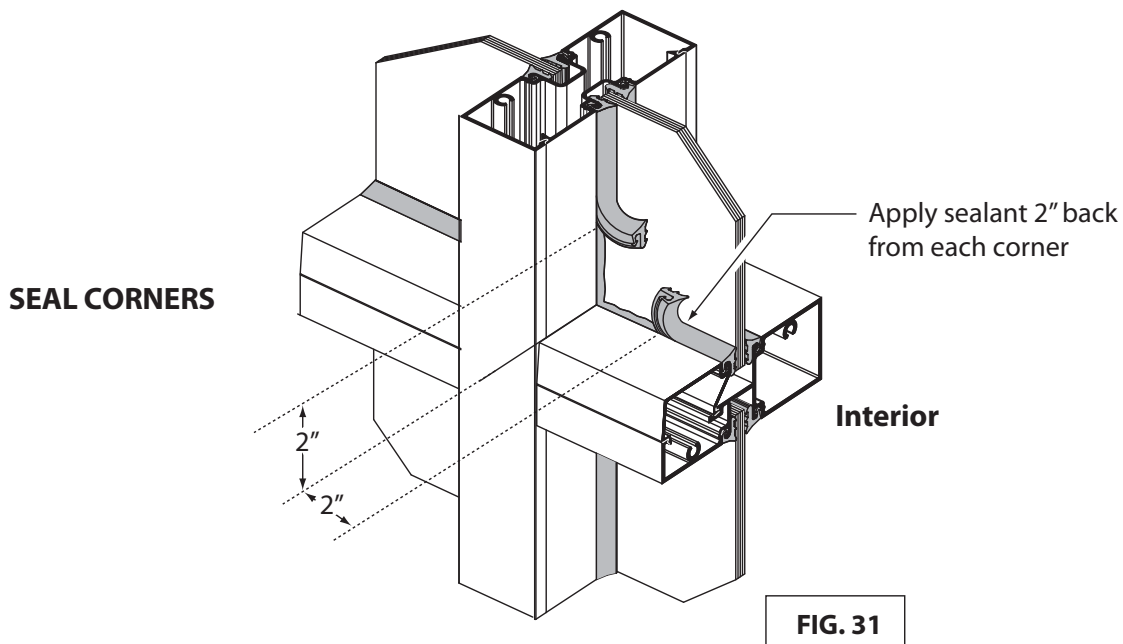


FIG. 31

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EXTERIOR GLASS INSTALLATION

STEP 19.

EXTERIOR or INTERIOR GLAZING:

Install interior glazing gaskets to create a tight fit at corners.
Place setting blocks at 1/4 points or 1/8 points or as required.

INSTALL GLASS:

Use glazing methods below. For exterior **FIG. 32** or interior **FIG. 33** glazing begins with bottom lites and works toward the top.

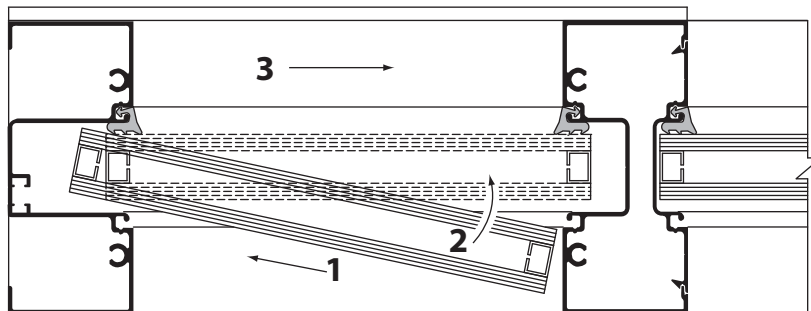


FIG. 32

EXTERIOR GLAZING

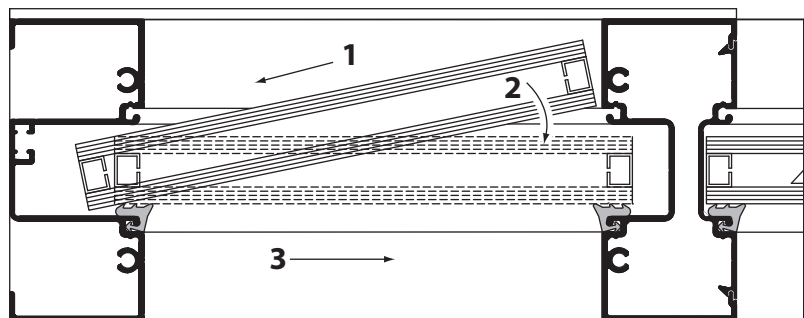
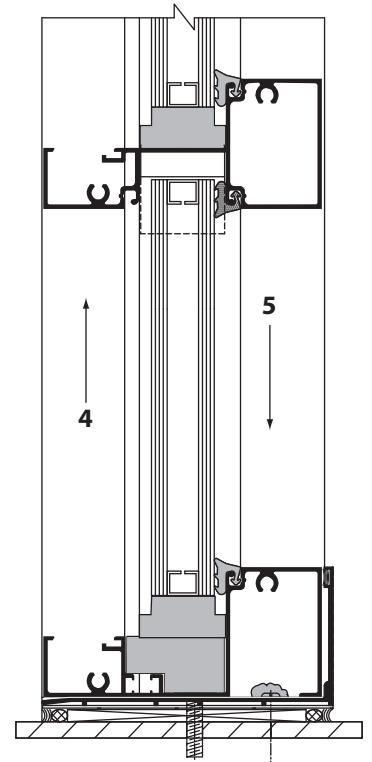
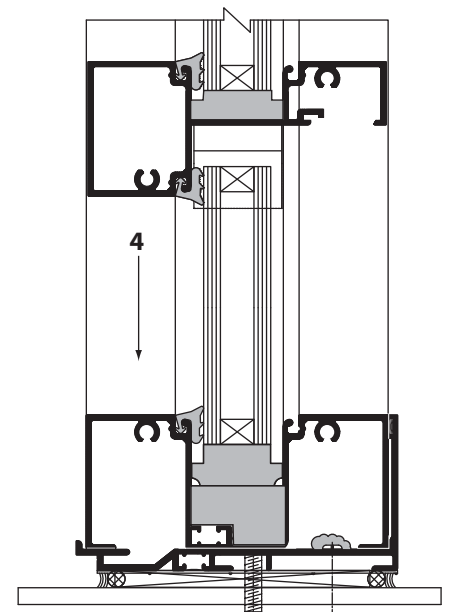


FIG. 33

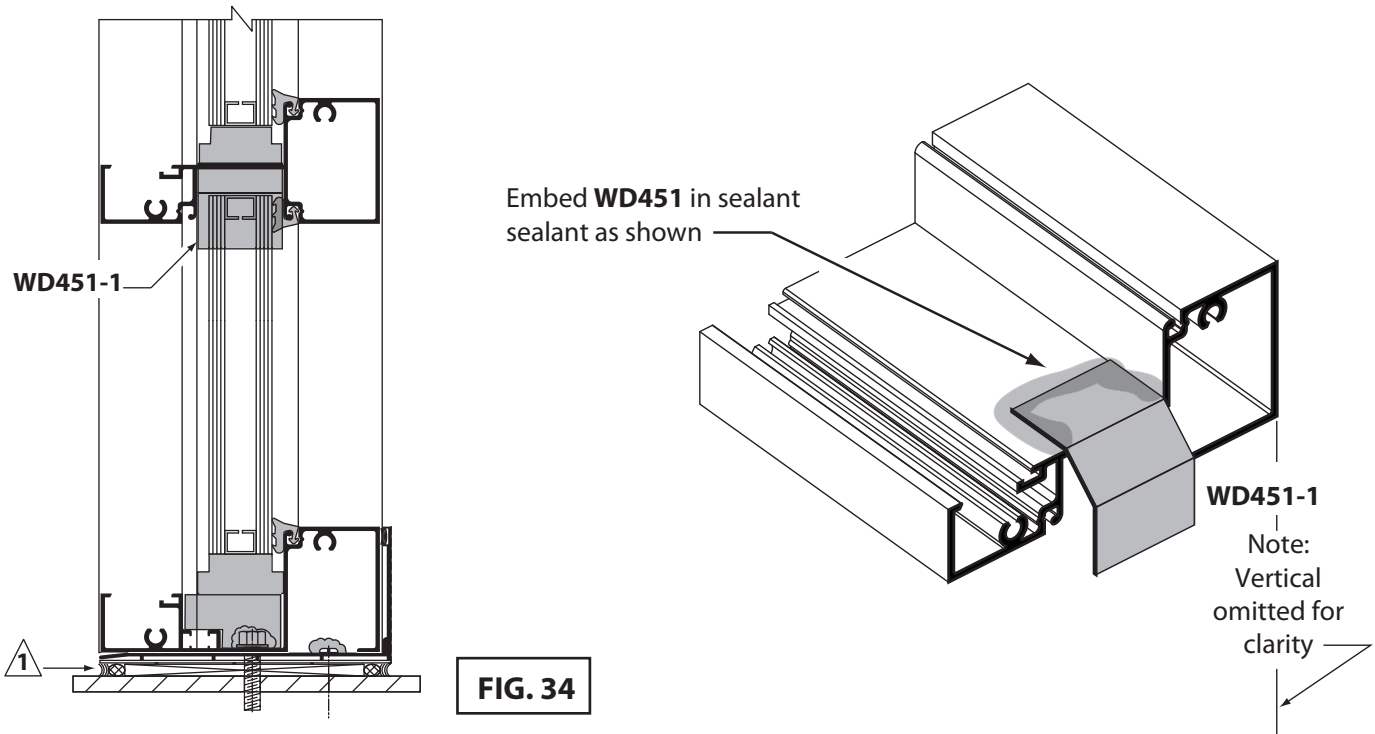
INTERIOR GLAZING



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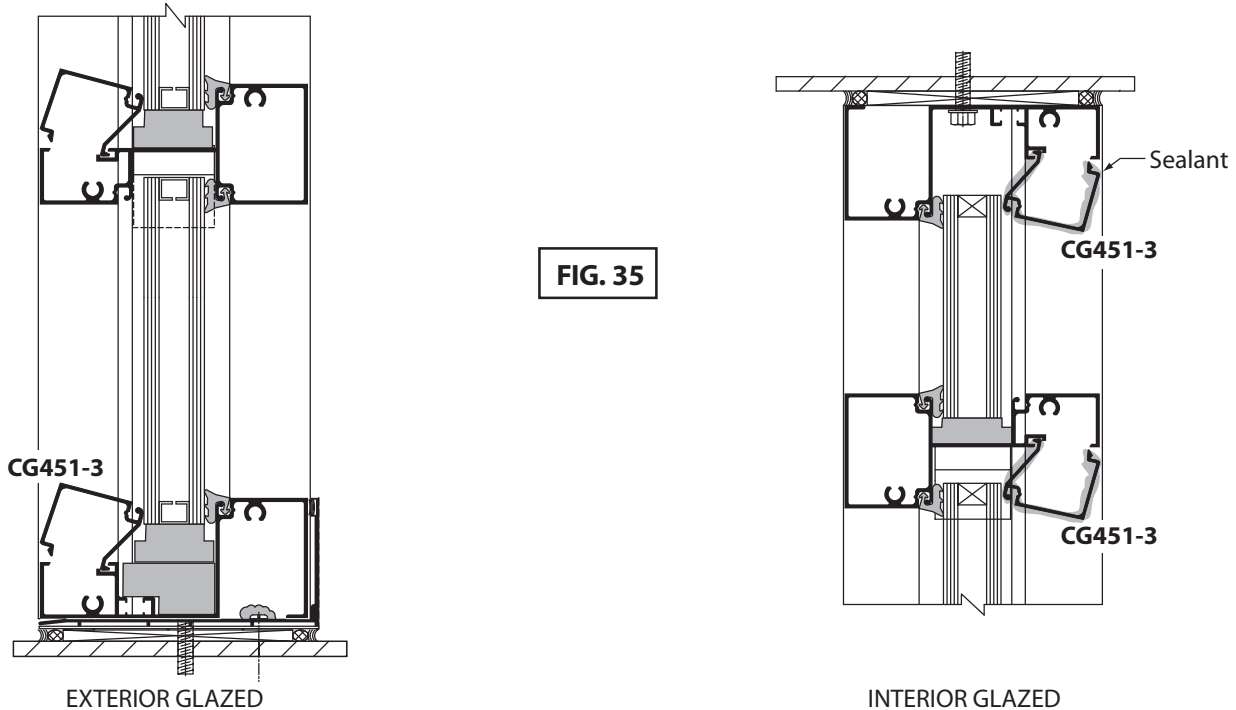
STEP 20

Install **WD451-1** water deflectors at each end of intermediate horizontals during sequential glazing process after the bottom lite of glass has been installed. Repeat process for each subsequent intermediate horizontal. Embed water deflectors in bed of sealant. See **FIG. 34**.



STEP 21.

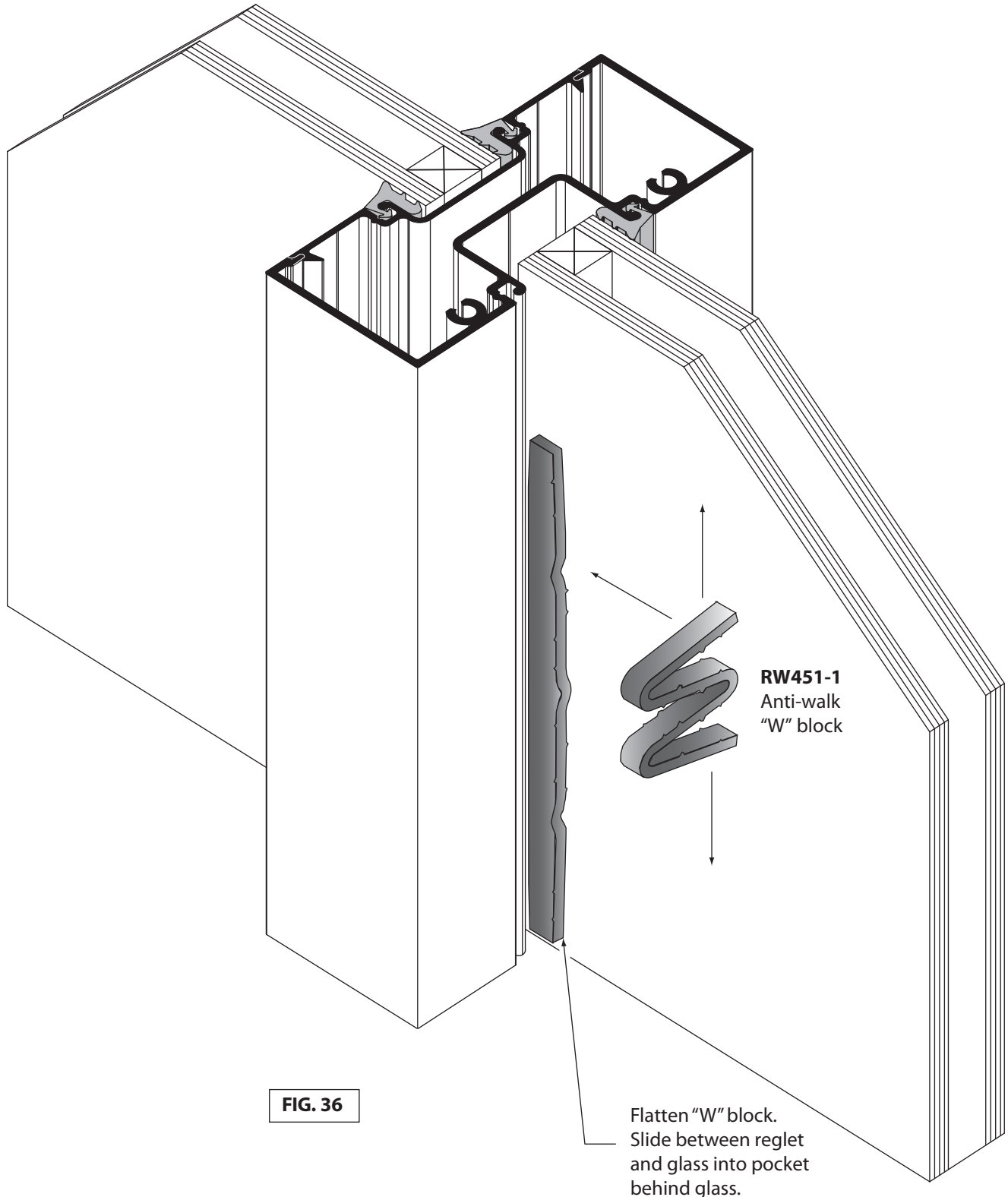
Install snap-in glass stops. Apply sealant to ends of glass stops for interior glazing only. Install remaining glazing gaskets.



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STEP 22.

Regions prone to seismic movement and/or buildings such as hospitals with helicopter traffic often require anti-walk blocks ("W" blocks) to prevent the glass from "walking" or shifting from the shallow pocket into the deep pocket. Install one **RW451-1** "W" anti-walk block into the deep glass pocket at the approximate center of the glass opening as shown in **FIG. 36**.

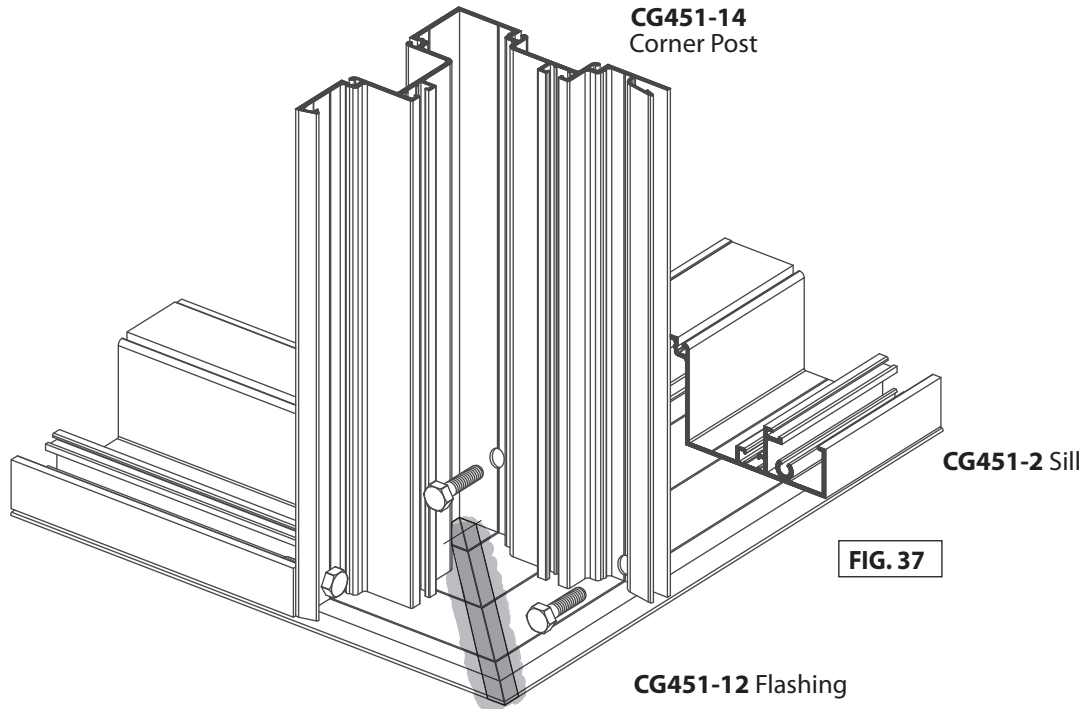


SERIES CG451S² INSTALLATION INSTRUCTIONS

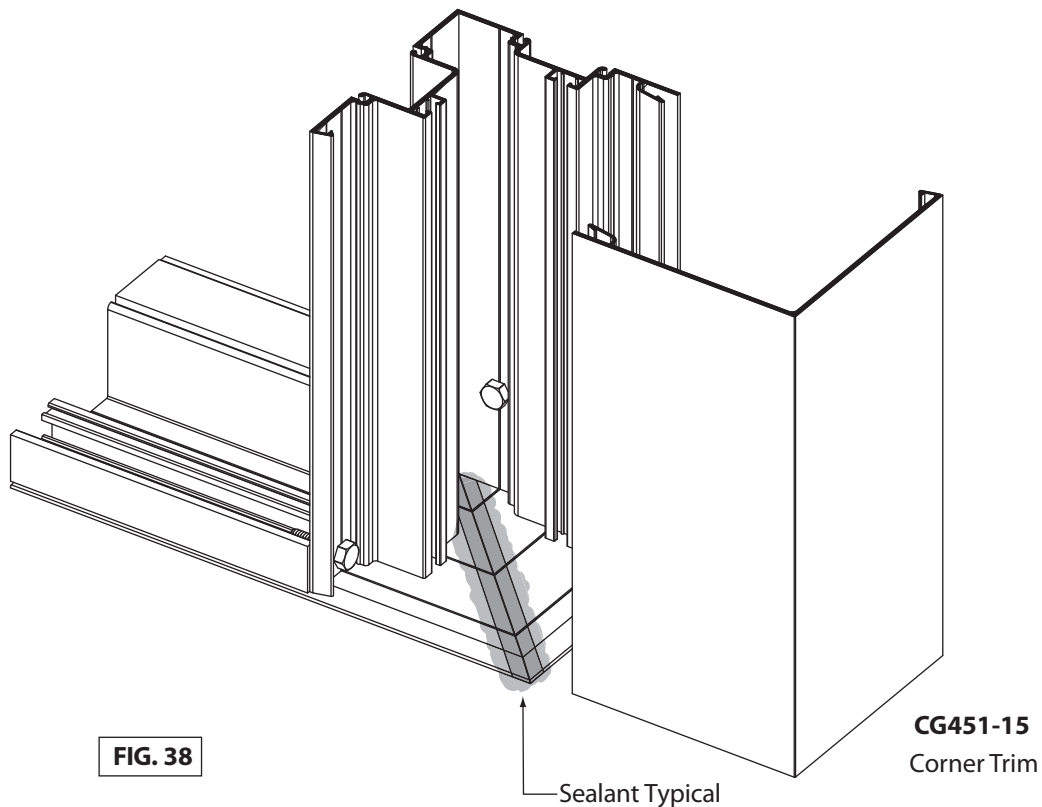
INSTALLATION OF OPTIONAL CORNERS

STEP 23.

Attach horizontal members to one side and anchor head and sill as shown in **Step 16, FIG 20**. Install horizontals to other side and anchor head and sill.



Install corner trim as shown in **FIG. 38**

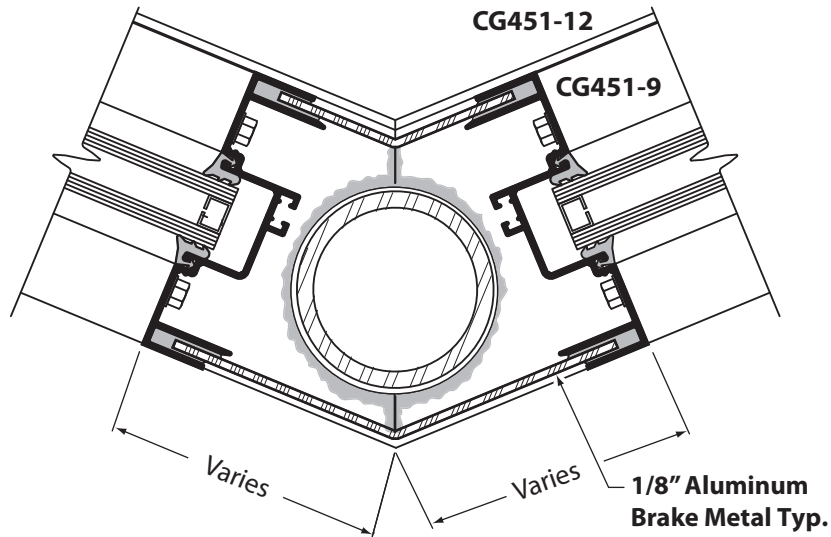
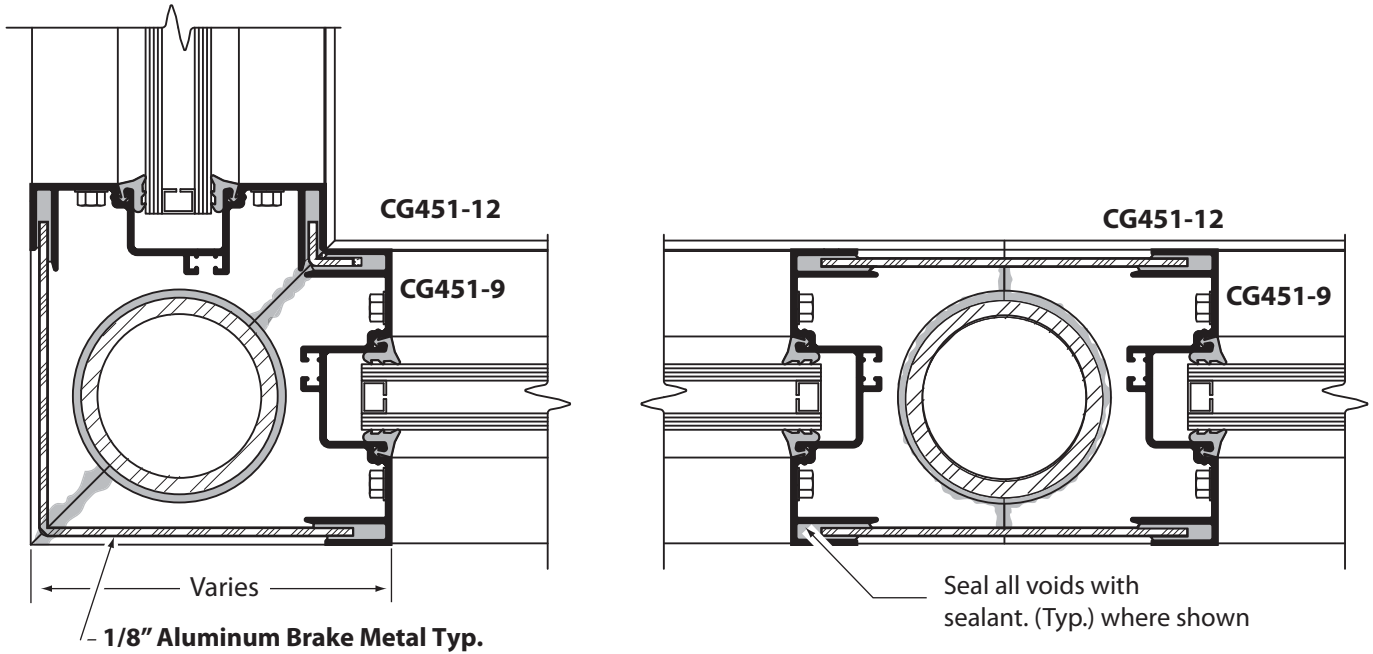


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INSTALLATION OF OPTIONAL CORNERS

Fabricate female half of expansion mullion used for optional adjustable corners in same manner as for standard mullion.

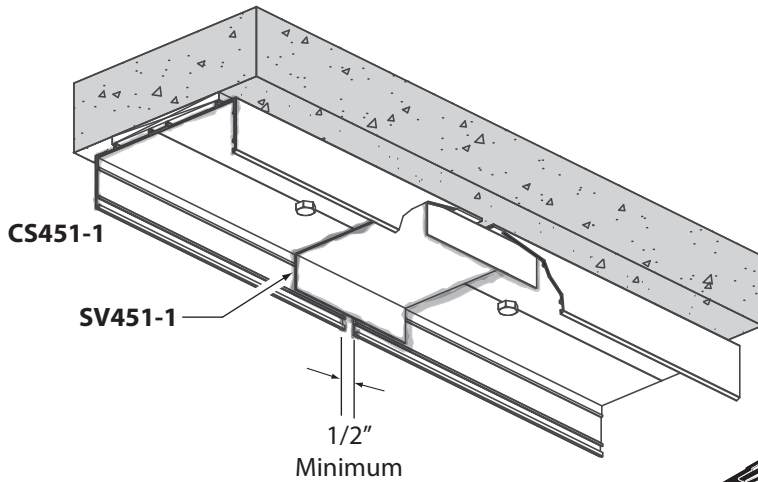


SERIES CG451S² INSTALLATION INSTRUCTIONS

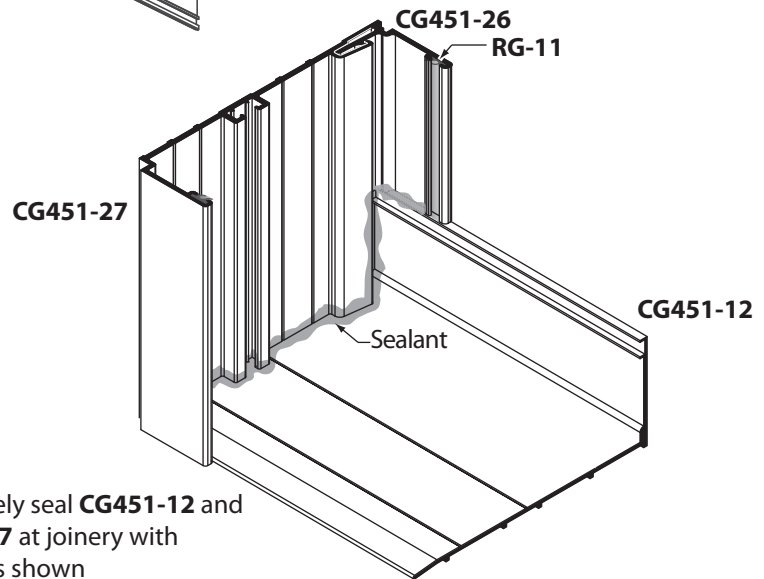
INSTALLATION

HEAD RECEPTOR SPLICE JOINT

Cut **SV451-1** splice sleeve to fit and embed in sealant. Fill voids with sealant and tool.



JAMB RECEPTOR AT SILL FLASHING



SHIM INSTALLATION (shims are furnished by installer) Install shims at head, sill flashing and jamb at anchor attachment location.

