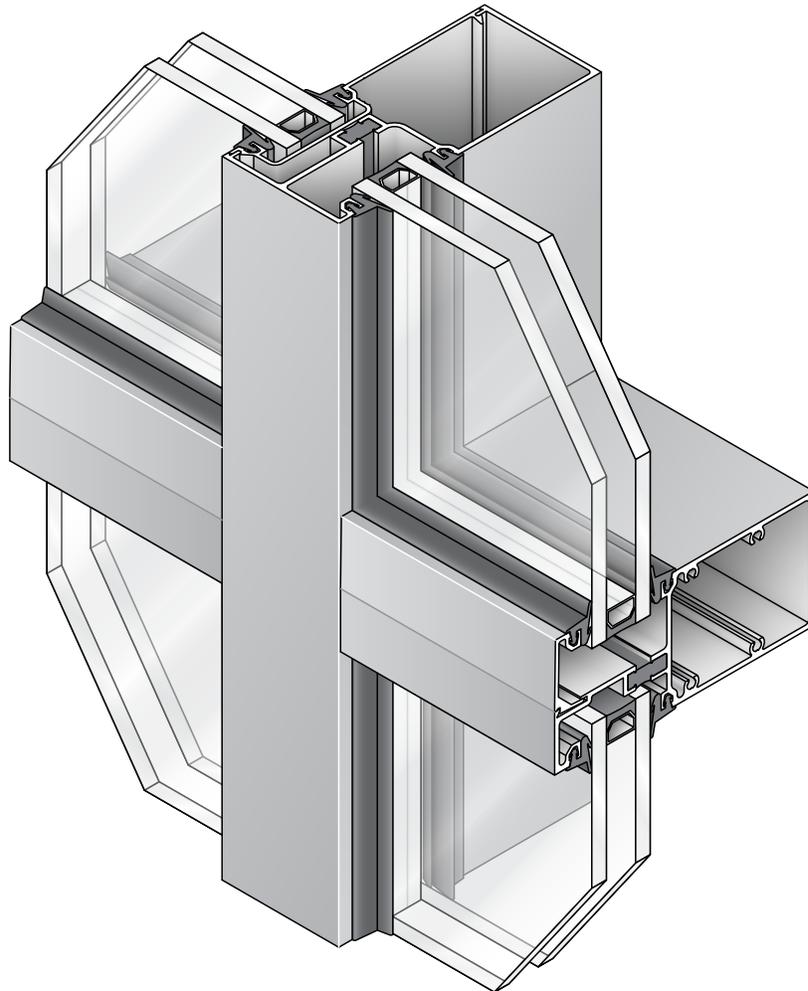


# INSTALLATION INSTRUCTIONS

## SERIES FF450, FF451, FT451, FF600, FF601, AND FT601 FLUSH FRONT STOREFRONTS



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Phone: (800) 262-5151 • Fax: (866) 262-3299  
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# HANDLING, STORAGE, AND PROTECTION OF ALUMINUM

The following precautions are recommended to protect the material against damage. Following these precautions will help ensure early acceptance of your products and workmanship.

**A. HANDLE CAREFULLY.**

All aluminum materials at job site must be stored in a safe place, well removed from possible damage by other trades. Cardboard wrapped or paper interleaved materials must be kept dry.

**B. CHECK ARRIVING MATERIALS.**

Check for quantity counts and keep records of where various materials are stored.

**C. KEEP MATERIALS AWAY FROM WATER, MUD, AND SPRAY.**

Prevent cement, plaster or other materials from damaging the finish.

**D. PROTECT THE MATERIALS AFTER ERECTION.**

Protect erected frame with polyethylene or canvas splatter screen. Cement, plaster, terrazzo, other alkaline solutions, and acid based materials used to clean masonry are harmful to the finish. ***If any of these materials come in contact with the aluminum, IMMEDIATELY remove with water and mild soap.***

**NOTE:** Any modifications, other than those specified in this document, could result in this product's failure to meet UL safety ratings and void the manufacturer's warranties.

The rapidly changing technology within the architectural aluminum products industry demands that C.R. Laurence/U.S. Aluminum reserve the right to revise, discontinue, or change any product line, specification, or electronic media without prior written notice.

**NOTE:** Dimensions in parentheses ( ) are millimeters unless otherwise noted.

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# GENERAL INSTALLATION NOTES

## RECOMMENDED GUIDELINES FOR ALL INSTALLATIONS:

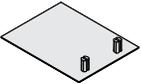
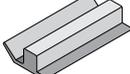
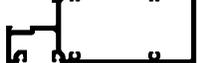
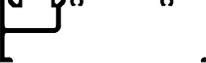
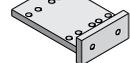
- 1. REVIEW CONTRACT DOCUMENTS.** Check shop drawings, installation instructions, architectural drawings, and shipping lists to become thoroughly familiar with the project. The shop drawings take precedence and include specific details for the project. Note any *field verified* notes on the shop drawings prior to installing. The installation instructions are of a general nature and cover most conditions.
- 2. INSTALLATION.** All materials are to be installed plumb, level, square, and true.
- 3. BENCH MARKS.** All work should start from bench marks and/or column lines as established by the architectural drawings and the general contractor with guaranteed accuracy. Working from these datum points and lines determine:
  - a) The plane of the wall in reference to offset lines provided on each floor.
  - b) The finish floor lines in reference to bench marks on the outer building columns.
  - c) Mullion spacing from both ends of masonry opening to prevent dimensional build-up of daylight opening.
- 4. FIELD WELDING.** All field welding must be adequately shielded to avoid any splatter on glass or aluminum. Results will be unsightly and/or structurally unsound. Advise general contractor and other trades accordingly. All field welds of steel anchors must receive touch up paint (zinc chromate) to avoid rust.
- 5. SURROUNDING CONDITIONS.** Make certain that construction which will receive your materials is in accordance with the contract documents. If not, notify the general contractor in writing and resolve differences before proceeding with work.
- 6. 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.
- 7. SEALANTS.** Sealants must be compatible with all materials with 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.***
- 8. 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 the varying perimeter conditions and performance requirements, perimeter and anchor fasteners are not specified in these instructions. For perimeter and anchor fasteners refer to the shop drawings or consult the fastener supplier.
- 9. BUILDING CODES.** Due to the diversity in state/provincial, local, and federal laws and codes that govern the design and application of architectural products, it is the responsibility of the individual architect, owner, and installer to assure that products selected for use on projects comply with all the applicable building codes and laws. U.S. Aluminum exercises no control over the use or application of its products, glazing materials, and operating hardware, and assumes no responsibility thereof.
- 10. 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/or difference in metal temperature between the time of fabrication and the time of installation. Gaps between expansion members should be based on temperature at time of installation.
- 11. WATER HOSE TEST.** As soon as a representative amount of the wall has been glazed (500 square feet or 46.5 m<sup>2</sup>) a water hose test should be conducted in accordance with AAMA 501.2 specifications to check the installation. On all jobs the hose test should be repeated every 500 square feet (46.5 m<sup>2</sup>) during the glazing operation.
- 12. COORDINATION WITH OTHER TRADES.** Coordinate with the general contractor any sequence with other trades which offset curtain wall installation (i.e. fire proofing, back-up walls, partitions, ceilings, mechanical ducts, converters, etc.).
- 13. CARE AND MAINTENANCE.** Final cleaning of exposed aluminum surfaces should be done in accordance with AAMA 609.1 for anodized aluminum and 610.1 for painted aluminum.

# PRODUCT DESCRIPTION

Thank you for purchasing the CRL- U.S. Aluminum Flush Front System. It is designed to install easily and efficiently. This Installation Manual covers the general procedures required for all storefront systems.

**IMPORTANT: READ THIS MANUAL THOROUGHLY BEFORE BEGINNING INSTALLATION.**

## SERIES FF450 PARTS LIST - MAIN ASSEMBLIES

CAT. NO.	Description	Shape	CAT. NO.	Description	Shape
FF452	Jamb		EC450	End Dam	
PF100	Jamb Filler		SV400	Splice Sleeve	
RF200	Shallow Pocket Filler		CP450	Closure Plate for Verticals	
FF460	Male Mullion Expansion		WD160	Water Deflector Shallow Pocket	
FF469	Female Mullion Expansion		WD150	Water Deflector Deep Pocket	
FF473	Head Mullion		SB141	Setting Block Interior Glazing	
M473	Glazing Bead		SB140	Setting Block Exterior Glazing	
FH463	Interior Glazed Horizontal		WB452	"W" Edge Block	
FH453	Exterior Glazed Horizontal		HC200	Head Anchor (Optional)	
FF482	Interior Glazing Sill		DJ452	Drill Jig	
FF483	Exterior Glazing Sill		NP225	Glazing Gasket Interior/Exterior	
FF400	Subsill		NP238	Glazing Gasket Interior/Exterior	
M875	Exterior Glazing Bead		NP218	Glazing Gasket Heavy Exterior	

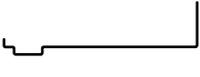
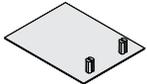
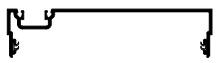
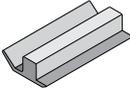
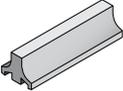
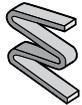
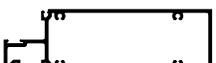
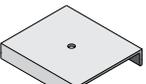
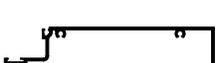
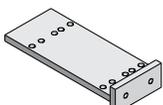
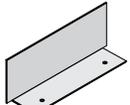
# SERIES FF451, FT451 PARTS LIST - MAIN ASSEMBLIES

Extrusion part number with a "T" are for THERMALLY BROKEN parts. Series FF451 extrusions have the same profile, but are NOT THERMALLY BROKEN.

CAT. NO.	Description	Shape	CAT. NO.	Description	Shape
FT552	Jamb		EC450	End Dam	
PT100	Jamb Filler		SV400	Splice Sleeve	
RX210	Shallow Pocket Filler		CP550	Closure Plate for Verticals	
FT560	Male Mullion Expansion		WD210	Water Deflector Shallow Pocket	
FT569	Female Mullion Expansion		WD200	Water Deflector Deep Pocket	
FT573	Head Mullion		SB240	Setting Block Interior Glazing	
M573	Glazing Bead		SB200	Setting Block Exterior Glazing	
FT563	Interior Glazed Horizontal		WB452	"W" Edge Block	
FT553	Exterior Glazed Horizontal		HC200	Head Anchor (Optional)	
FT582	Interior Glazing Sill		DJ552	Drill Jig	
FT583	Exterior Glazing Sill		NP225	Glazing Gasket Interior/Exterior	
FT400	Subsill		NP238	Glazing Gasket Interior/Exterior	
M116	Glazing Bead		NP218	Glazing Gasket Interior/Exterior	

# SERIES FF600 PARTS LIST - MAIN ASSEMBLIES

Extrusion profiles shown are for exterior glazing projects. Extrusion profiles for interior glazing projects are available and are listed in our catalog and on our web site.

CAT. NO.	Description	Shape	CAT. NO.	Description	Shape
FF652	Jamb		SV700	Splice Sleeve	
FF600	Jamb Filler		CP450	Closure Plate for Verticals	
RF800	Shallow Pocket Filler		WD160	Water Deflector Shallow Pocket	
FF660	Male Mullion Expansion		WD150	Water Deflector Deep Pocket	
FF669	Female Mullion Expansion		SB141	Setting Block Interior Glazing	
FF673	Head Mullion		SB140	Setting Block Exterior Glazing	
M673	Glazing Bead		WB452	"W" Edge Block	
FH653	Exterior Glazed Horizontal		HC700	Head Anchor (Optional)	
FF683	Exterior Glazed Sill		DJ652	Drill Jig	
FF700	Subsill		NP225	Glazing Gasket Interior/Exterior	
M875	Glazing Bead		NP238	Glazing Gasket Interior/Exterior	
EC680	End Dam		NP218	Glazing Gasket Heavy Exterior	

# SERIES FF601, FT601 PARTS LIST - MAIN ASSEMBLIES

Extrusion part number with a "T" are for THERMALLY BROKEN parts. Series FF601 extrusions have the same profile, but are NOT THERMALLY BROKEN. Extrusion profiles shown are for exterior glazing projects. Extrusion profiles for interior glazing projects are available and are listed in our catalog and on our web site.

CAT. NO.	Description	Shape	CAT. NO.	Description	Shape
FT752	Jamb		SV700	Splice Sleeve	
FT600	Jamb Filler		CP550	Closure Plate for Verticals	
RX810	Shallow Pocket Filler		WD210	Water Deflector Shallow Pocket	
FT760	Male Mullion Expansion		WD200	Water Deflector Deep Pocket	
FT769	Female Mullion Expansion		SB240	Setting Block Interior Glazing	
FT773	Head Mullion		SB200	Setting Block Exterior Glazing	
M773	Glazing Bead		WB452	"W" Edge Block	
FT753	Exterior Glazed Horizontal		HC700	Head Anchor (Optional)	
FT783	Exterior Glazing Sill		DJ752	Drill Jig	
FT700	Subsill		NP225	Glazing Gasket Interior/Exterior	
M116	Glazing Bead		NP238	Glazing Gasket Interior/Exterior	
EC680	End Dam		NP218	Glazing Gasket Heavy Exterior	

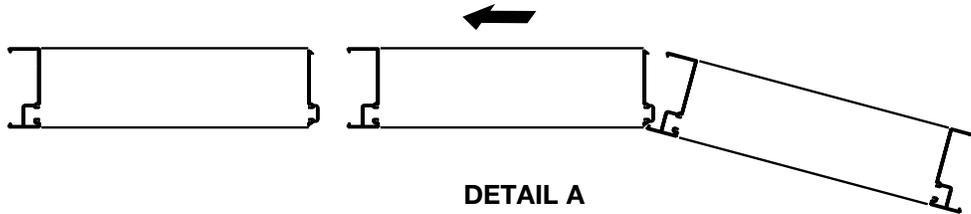
# FRAME FABRICATION

Frames may be shop fabricated and shipped to the job site partially or totally assembled.

Systems feature screw race joinery and allow for interior or exterior glazing.

Frames are fabricated in units and snap together. Each unit must have at least one vertical deep pocket to allow for glazing. Plan units accordingly. **See DETAIL A.**

**Never allow two shallow pockets to face each other.**



Expansion mullions must be used in long run elevations to accommodate thermal expansion. **See page 30.**

Units sit into a continuous subsill. Shimming of subsill is required for leveling.

**NOTE:** Series FF450 for 1/4" (6) is shown in these instructions.  
Series FF451 and FT451 for 1" (25) glazing are similar.

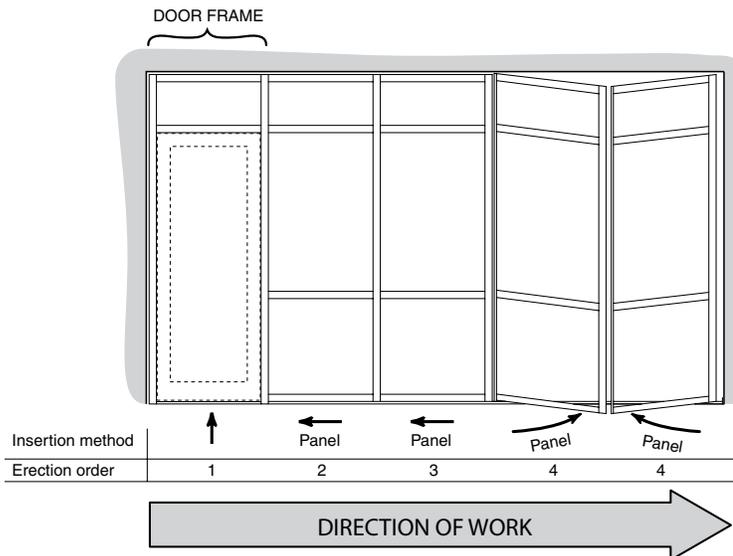
1. Measure ROUGH OPENING to determine FRAME DIMENSION. Allow a minimum clearance of 1/2" (13) at header and 3/8" (10) at wall jambs and subsill. Extra clearances may be necessary to accommodate building tolerances.

2. Cut members to size

**Subsill:** Overall FRAME WIDTH PLUS 1/8" (3). Subsill must extend 1/8" (3) outside of last wall jamb to allow last panel installation. Subsill runs through.  
If opening exceeds 24' (7.32 m) in width, splice sleeves must be used at splice joints. **See DETAIL Q.**  
If entrances occur subsill should butt against door jambs. **See DETAIL P.**

**Verticals:** FRAME HEIGHT MINUS 5/16" (8). Verticals run through.

**Horizontals:** DAYLIGHT OPENING. Horizontals run between verticals. Cut horizontal glazing beads 1/32" (0.8) undersize for easier installation.



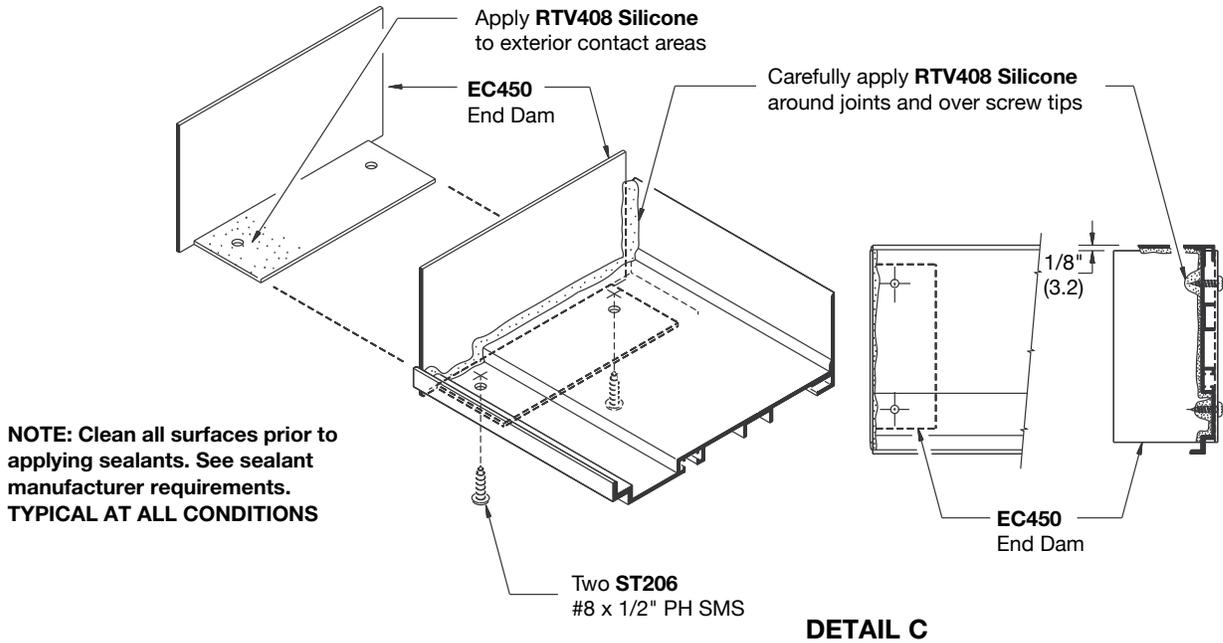
Units are inserted into an opening from LEFT to RIGHT

**NOTE:** Subsill must extend 1/8" (3) outside of frame to allow for last panel installation

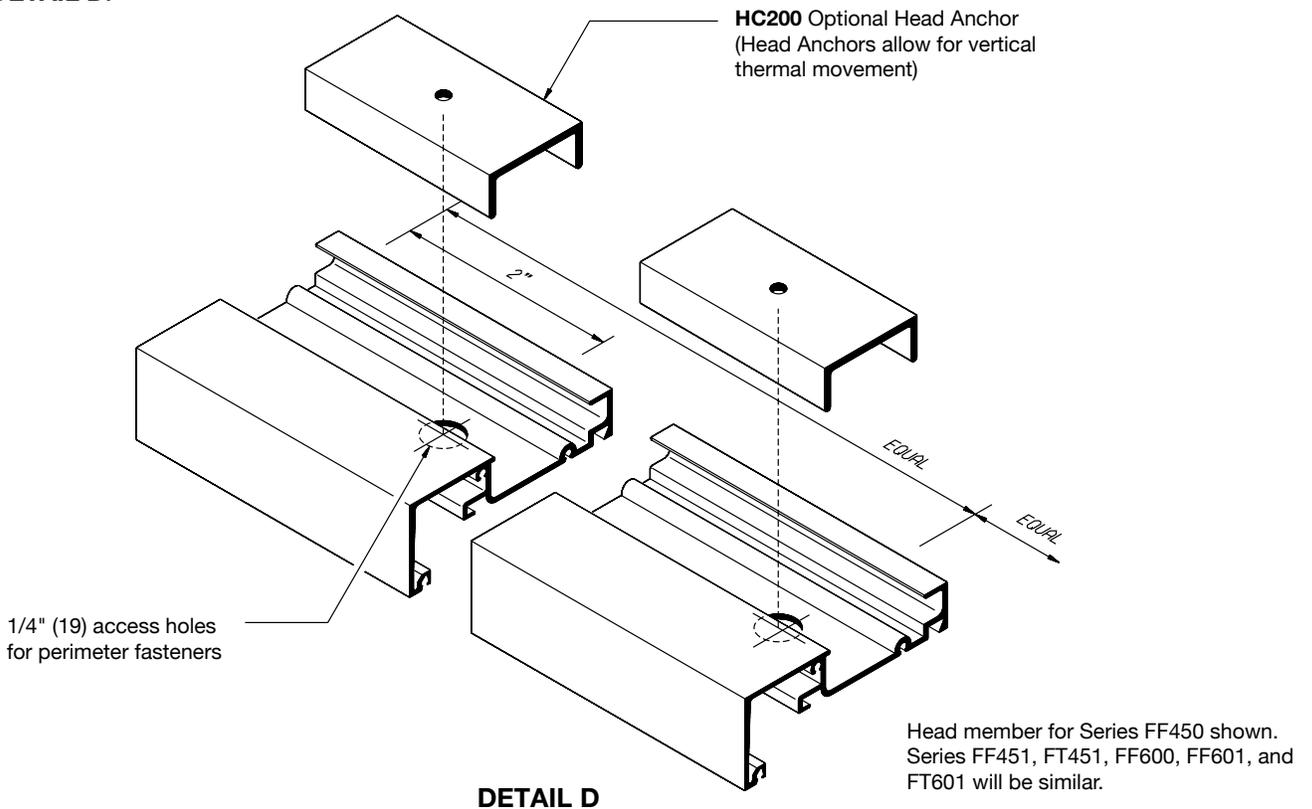
DETAIL B

# FRAME FABRICATION (CONTINUED)

3. Apply End Dams to ends of Subsill. See **DETAIL C**. Do not apply End Dams to ends that butt against Door Jambs. See **DETAIL P**, Page 16.



4. If optional Head Anchors are used, drill 3/4" (19) access holes in head members 2" (51) from ends and at mid-point. See **DETAIL D**.

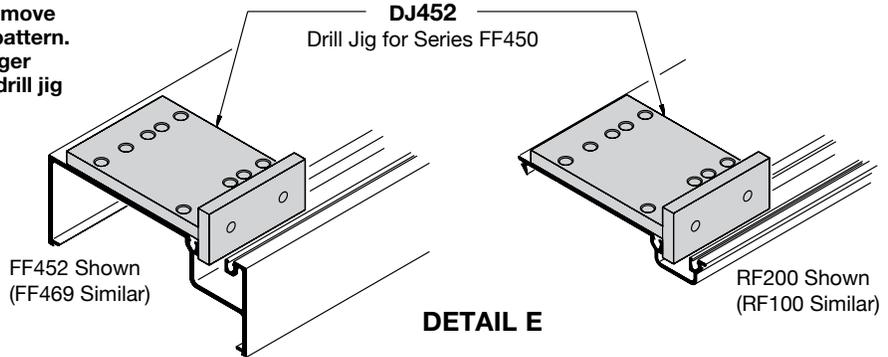


# FRAME FABRICATION (CONTINUED)

5. Mark the location of horizontals in vertical members and drill holes for assembly screws. The use of Drill Jigs is recommended. Use Drill Jig DJ452 for Series FF450, Drill Jig DJ552 for FF451 and FT451, Drill Jig DJ652 for FF600, and Drill Jig DJ752 for FF601 and FT601. See **DETAIL E**. Hook jig into glazing pockets as shown.

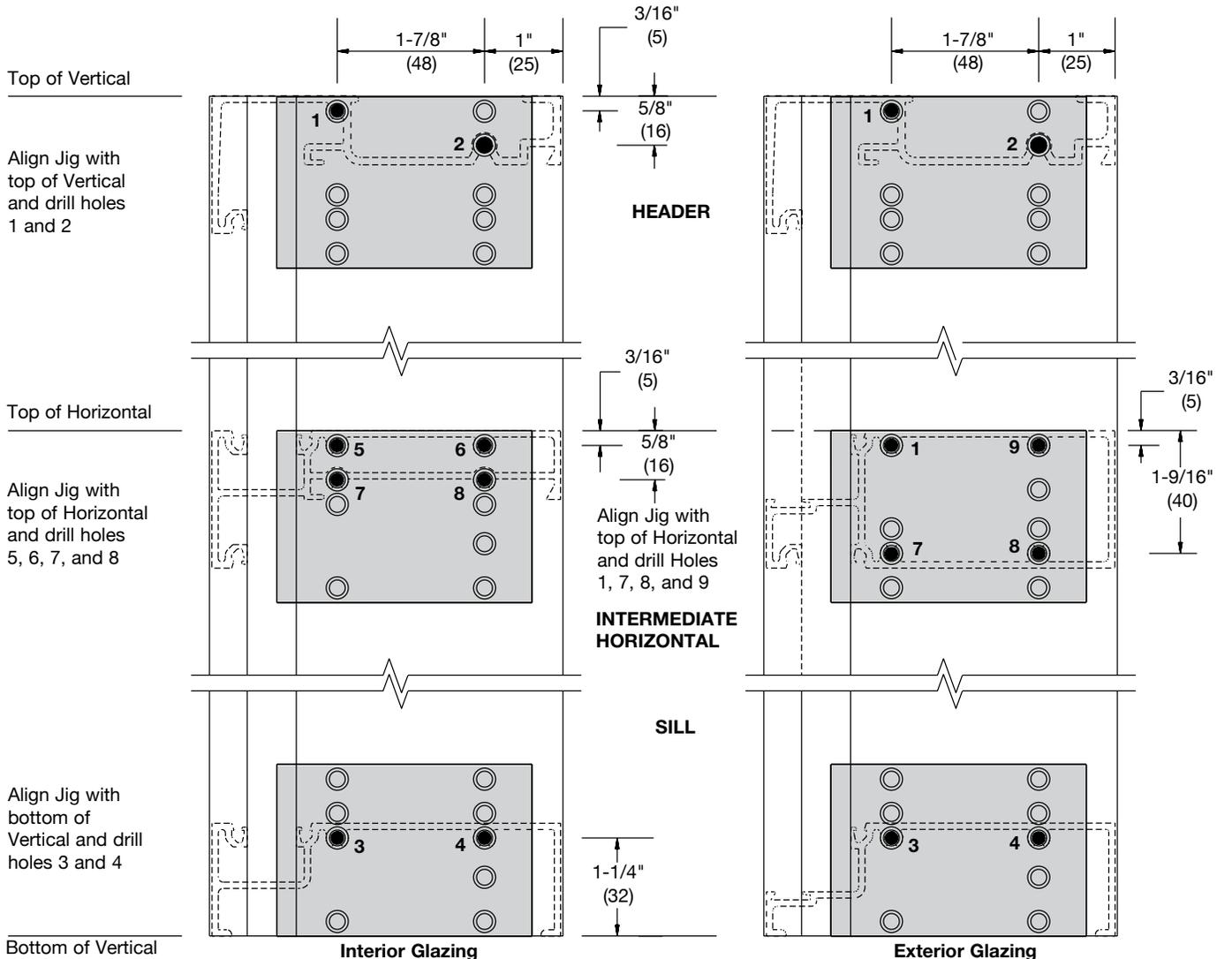
**HELPFUL HINT:**  
Clean all surfaces prior to applying Spot drill then remove drill jig to complete hole pattern. This will keep it sharp longer and reduce possibility of drill jig moving during drilling.

(See page 12 for FF451)



**DETAIL E**

Drill .201" (5) Holes using a Cat. No. 80107 #7 Drill as Shown

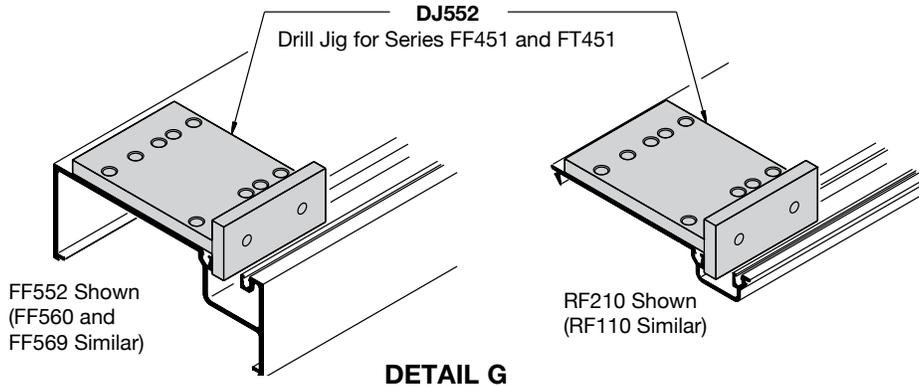


**DETAIL F**

NOT TO SCALE

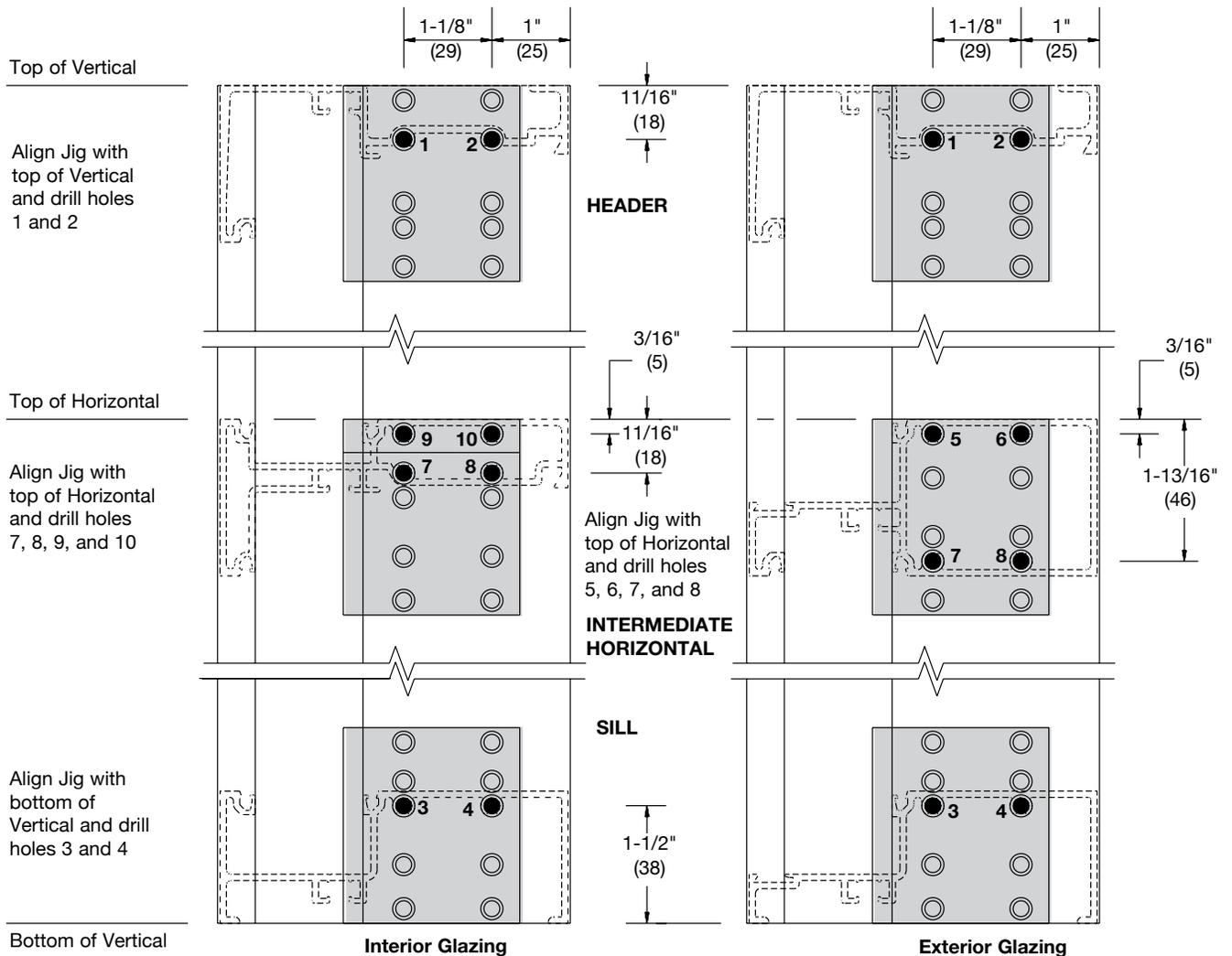
# FRAME FABRICATION (CONTINUED)

5a. Mark the location of horizontals in vertical members and drill holes for assembly screws. The use of drill jigs is recommended. See **DETAIL G**. Hook jig into glazing pockets as shown. Series FF451 shown, Series FT451 is similar. All Drill Jigs are used in the same fashion with other series.



**DETAIL G**

Drill .201" (5) Holes using a Cat. No. 80107 #7 Drill as Shown



**DETAIL H**

NOT TO SCALE

# GENERAL FRAME ASSEMBLY

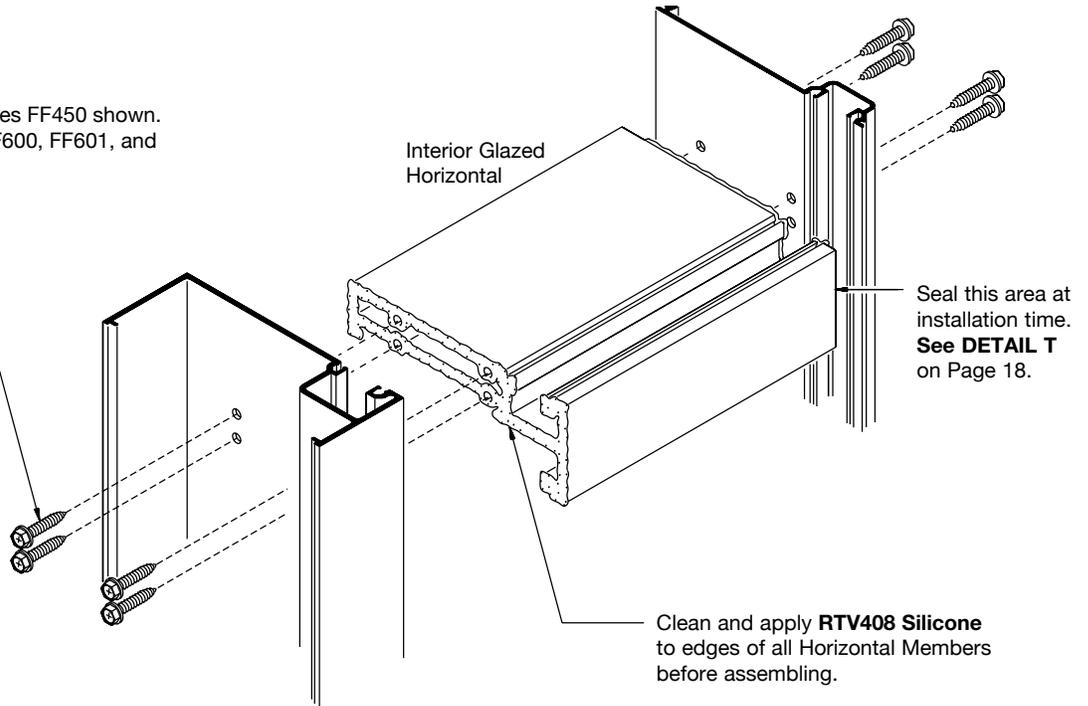
If transition adaptors for 1/4" (6) spandrel are being used (Series FF451 and FT451) see **DETAIL BB** on Page 22.

1. Apply **RTV408 Silicone** to edges of all horizontal members and assemble panels using screws provided. See **DETAIL I**. Never allow two shallow pockets to face each other. Tool excess silicone.

**NOTE:**

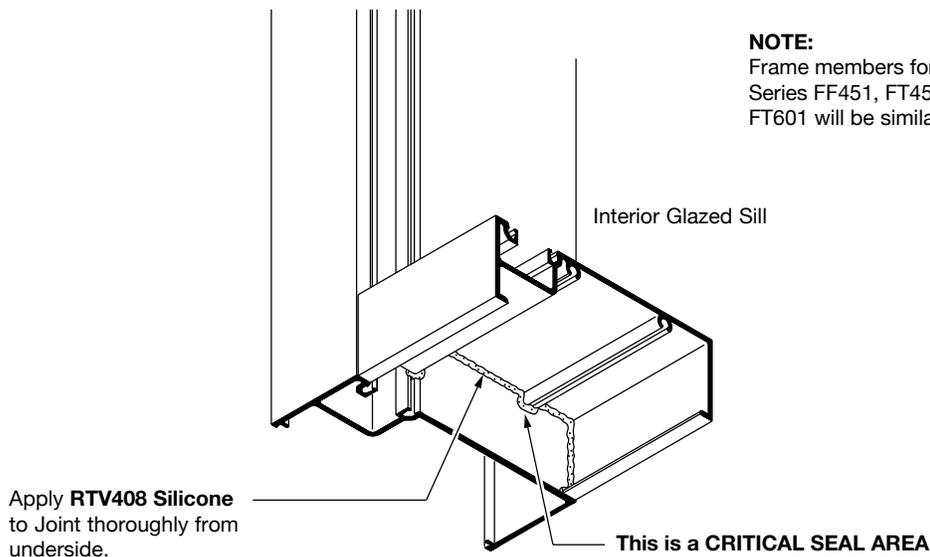
Frame members for Series FF450 shown. Series FF451, FT451, FF600, FF601, and FT601 will be similar.

Four **ST251** #10 x 1" Hex Head Phillips Assembly Screws. (Two Screws per Joint at Head and Sill Members)



**DETAIL I**

2. After panels are assembled, apply a bead of **RTV408 Silicone** to joint between verticals and sill members, from the underside, to ensure a watertight installation. See **DETAIL J**.



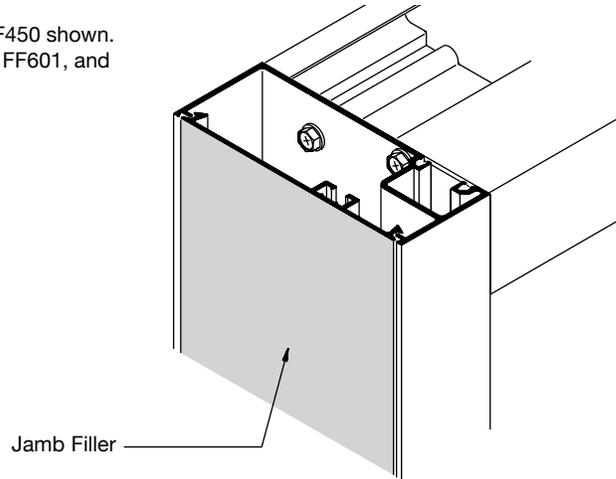
**DETAIL J**

# GENERAL FRAME ASSEMBLY (CONTINUED)

3. Snap jamb filler to back of wall jamb. See **DETAIL K**.

**NOTE:**

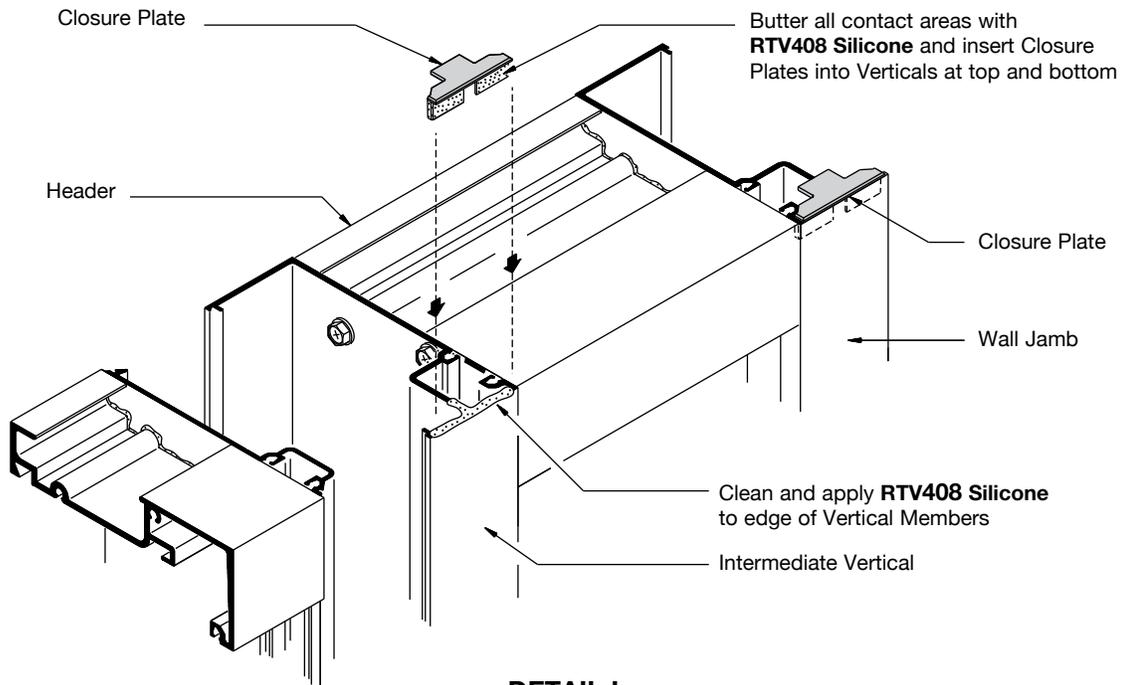
Frame members for Series FF450 shown.  
Series FF451, FT451, FF600, FF601, and  
FT601 will be similar.



**DETAIL K**

4. Apply **RTV408 Silicone** to top edge of vertical member and insert closure plates. See **DETAIL L**.  
Closure plate vertical walls fit into vertical members.

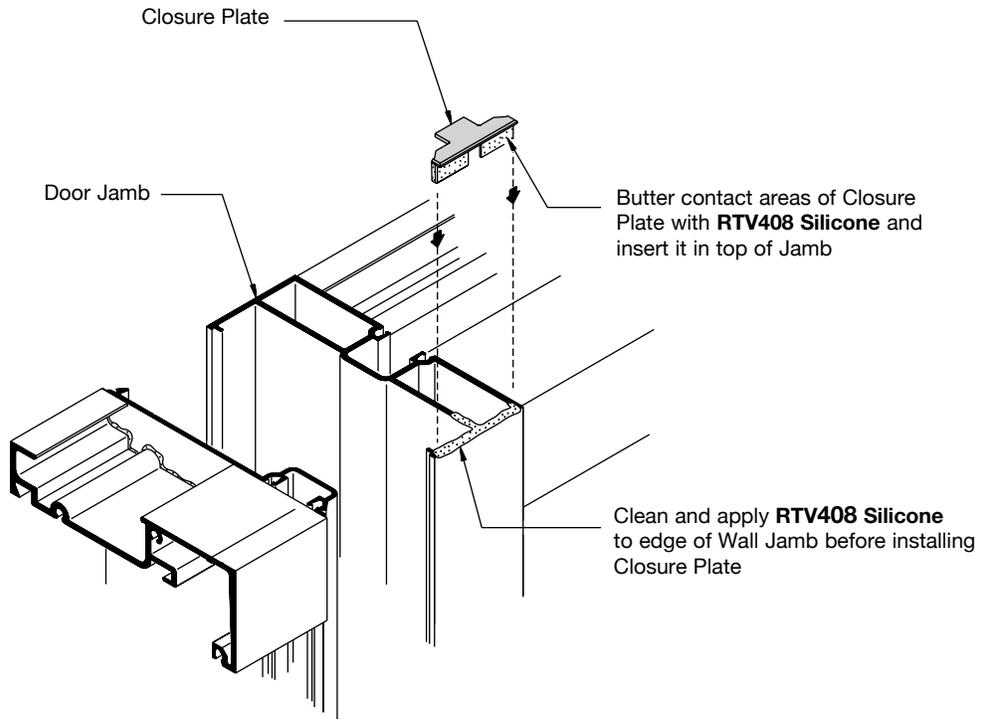
**Closure plates are required to ensure continuous perimeter sealing.** Trim closure plates as required, to fit expansion members.



**DETAIL L**

# GENERAL FRAME ASSEMBLY (CONTINUED)

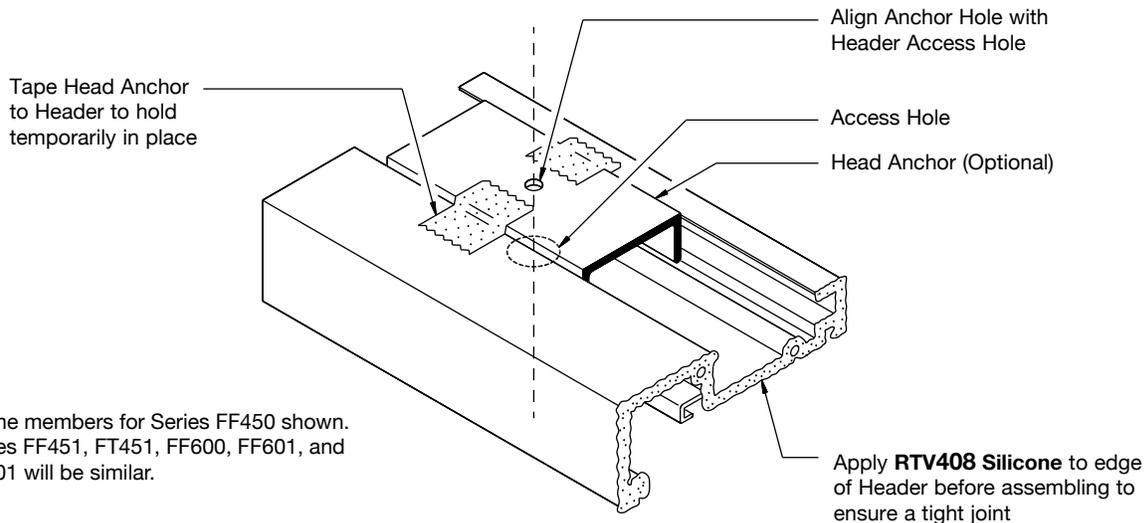
5. Install closure plates for door jambs following the standard procedure. See **DETAIL M**.



**NOTE:**  
Frame members for Series FF450 shown.  
Series FF451, FT451, FF600, FF601, and  
FT601 will be similar.

**DETAIL M**

6. If head anchors are used, tape them to the header members at clearance hole locations. See **DETAIL N**.



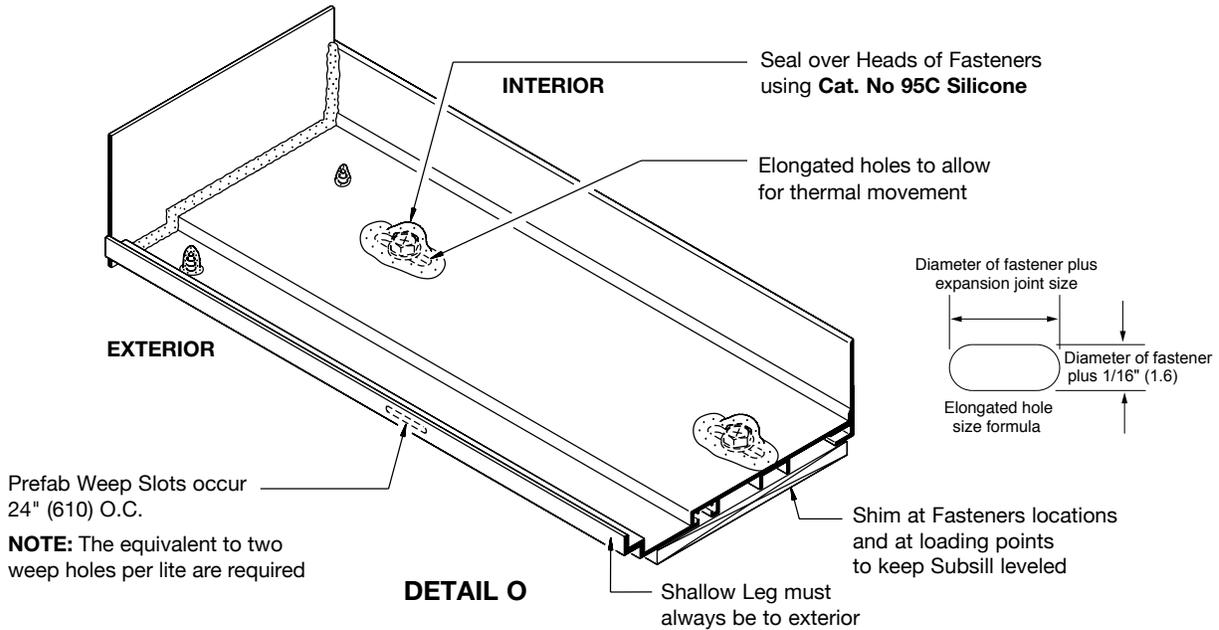
Frame members for Series FF450 shown.  
Series FF451, FT451, FF600, FF601, and  
FT601 will be similar.

**DETAIL N**

# GENERAL SILL INSTALLATION

**NOTE:** When entrances occur install Entrance Frame first.

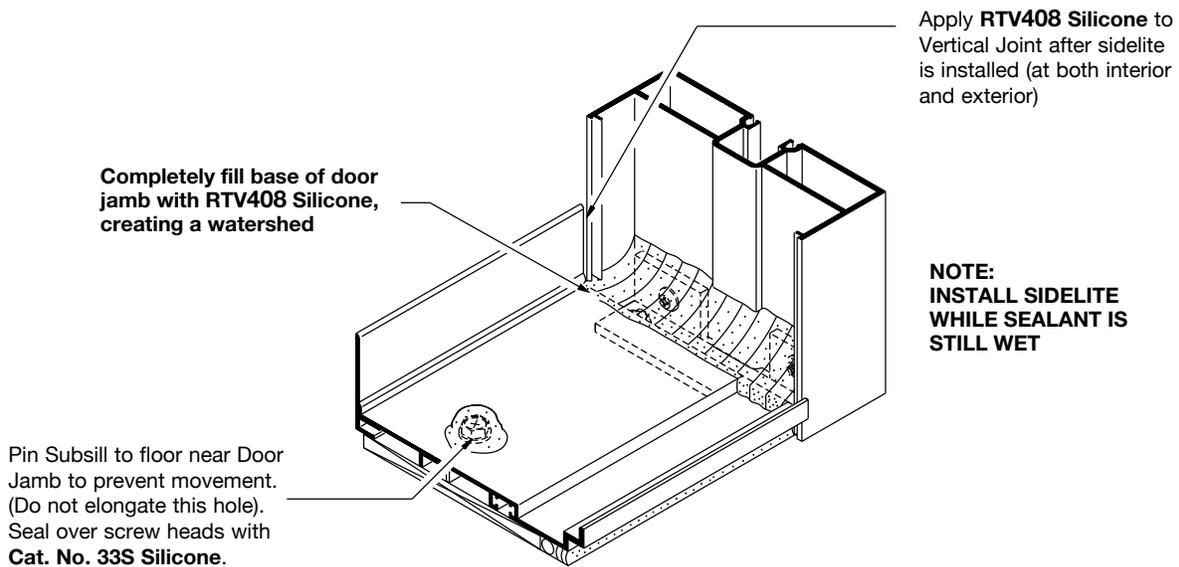
1. Set subsill in place, shimmed as required for leveling and anchor it to structure. Locate fasteners 6" (152) from each side of verticals and 24" (610) on center, or as required. Holes for fasteners should be elongated laterally to allow for thermal movement. **Pin subsill to structure at one point only per cut length.** (This hole is not elongated). Subsill should be shimmed at fasteners location and underneath verticals. Seal around all joints and over heads of fasteners. **See DETAIL O.**



Subsill butts against door jambs, where they occur.

**NOTE:** End of subsill that butts against door jamb can not be dammed, to allow for sidelite installation. Special care should be taken to control water infiltration at this joint. **See DETAIL P.**

Infiltrated water from upper lites must be kept out of door jambs. See **DETAIL U** on page 19.

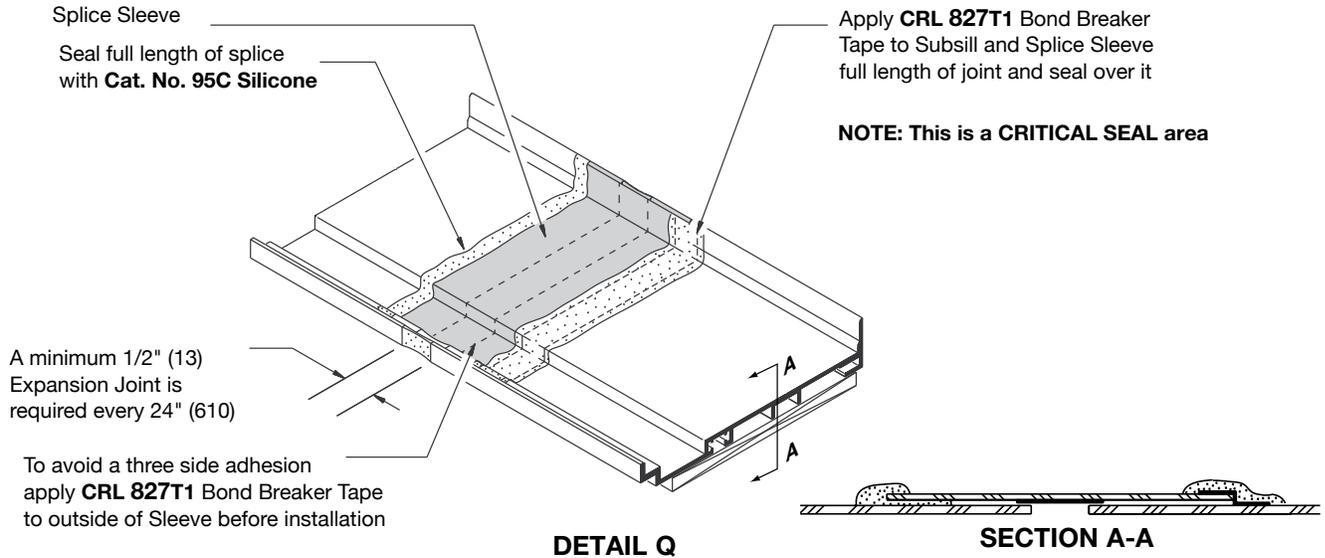


**DETAIL P**

NOT TO SCALE

# GENERAL SILL INSTALLATION (CONTINUED)

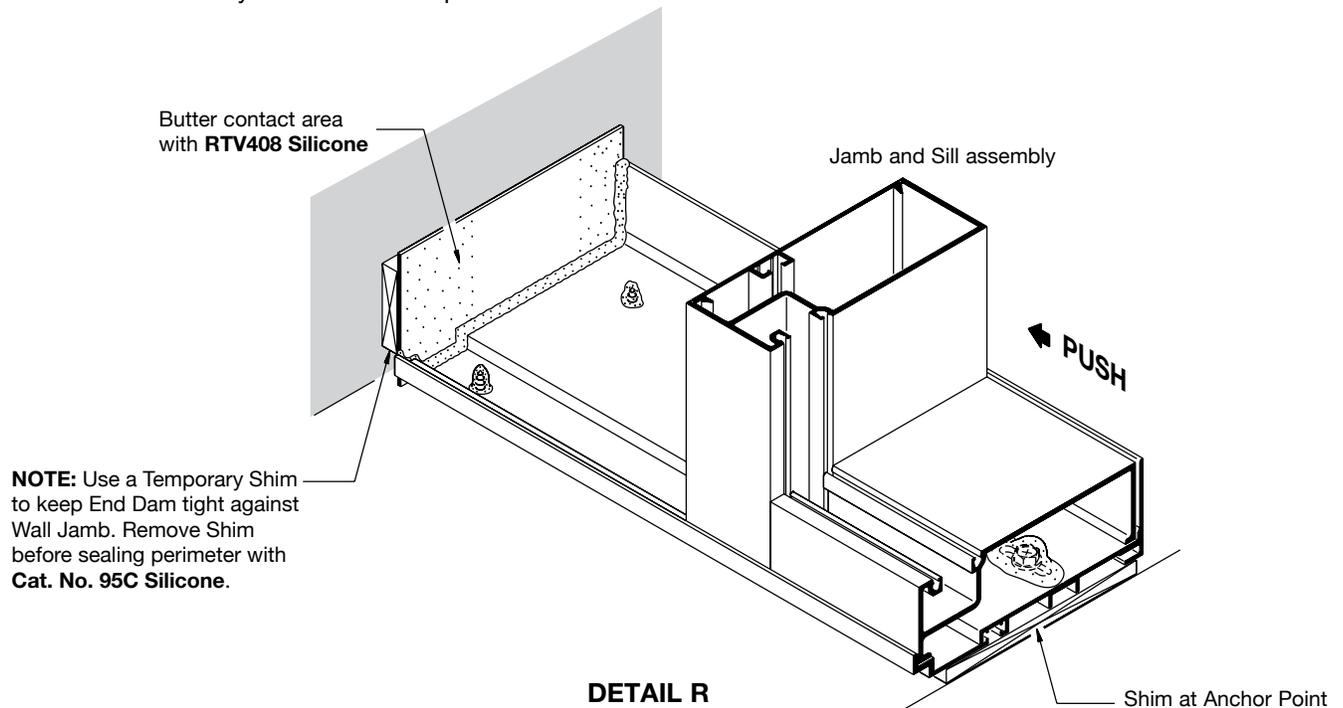
2. If opening exceeds 24' (7.32 m) in width, splice sleeves must be used at splice joints. Splice Subsill as required. Locate splice sleeves near center of Daylight Opening, **See DETAIL Q.**



3. If there are no entrances, start installation at wall jamb unit. Apply silicone to end dam contact area. **See DETAIL R.** Set first panel inside subsill and in place.

**NOTE:** Use a temporary shim to push end dam tight against wall jamb. **See DETAIL R.** Remove temporary shim after installation is completed and before sealing around perimeter.

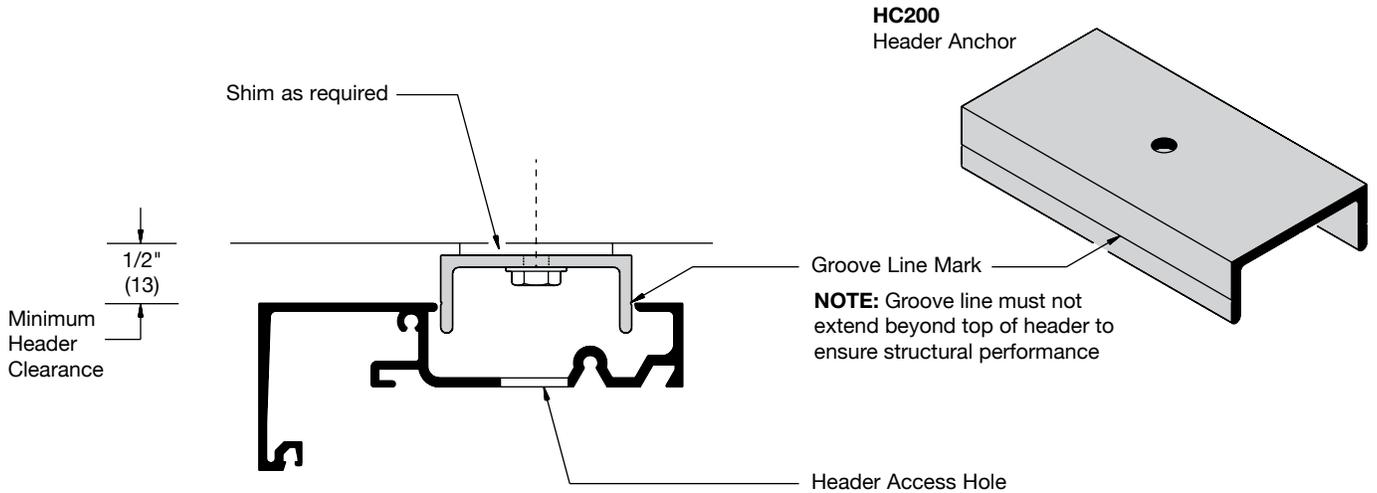
Panel must be pushed against subsill upturned back wall. **See DETAIL W** on page 19. Plumb and shim unit and fasten it to structure. Locate header fasteners 6" (152) from each side of verticals and no more than 24" (610) O.C. (See page 18 for optional head anchors). Secure wall jamb through glass pocket if required to limit deflection. Always shim at anchor points.



# GENERAL FRAME INSTALLATION

1. If optional head anchors are used fasten them to structure through head member access holes.

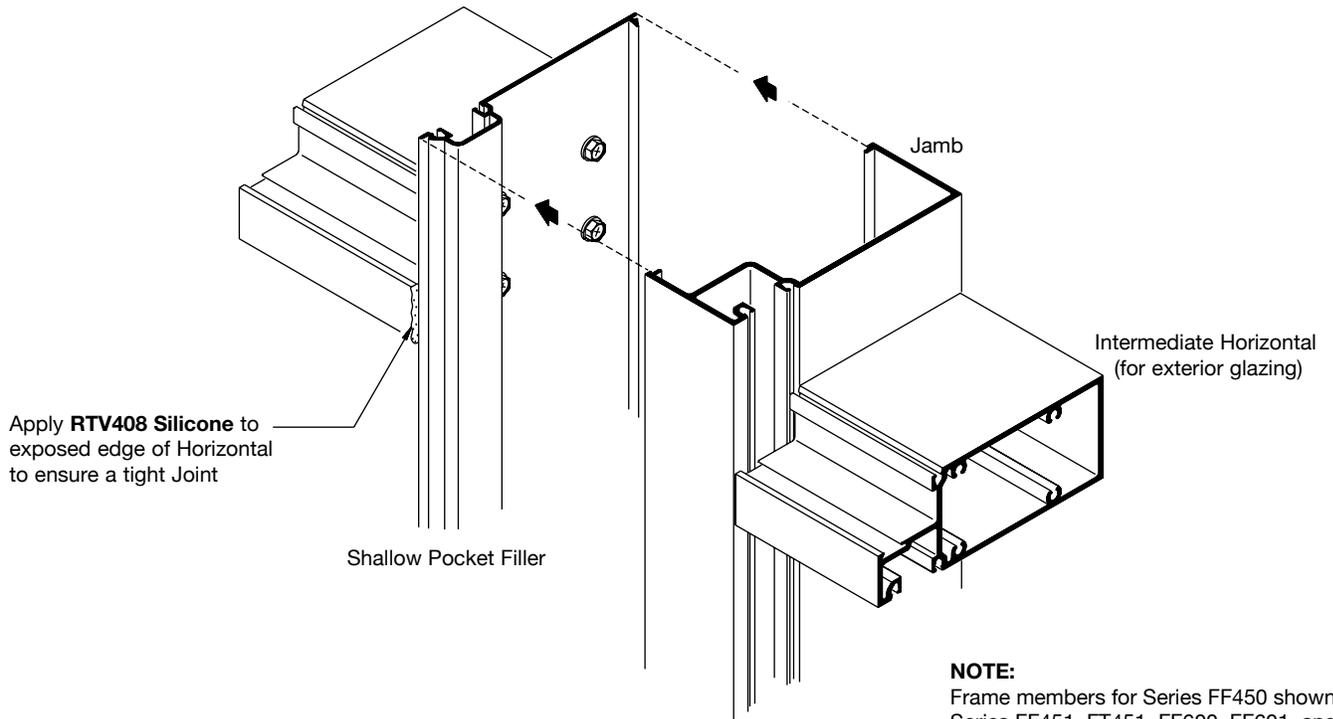
**NOTE:** Top of header must align with line mark in head anchors for optimum performance. Anchors may be shimmed if required. See **DETAIL S**.



**DETAIL S**

2. Install remainder of panels one by one, snapping them together. See **DETAIL T**.

**NOTE:** The last two panels may require being installed together as a unit to fit into opening. See Page 09.



**DETAIL T**

**NOTE:** Frame members for Series FF450 shown. Series FF451, FT451, FF600, FF601, and FT601 will be similar.

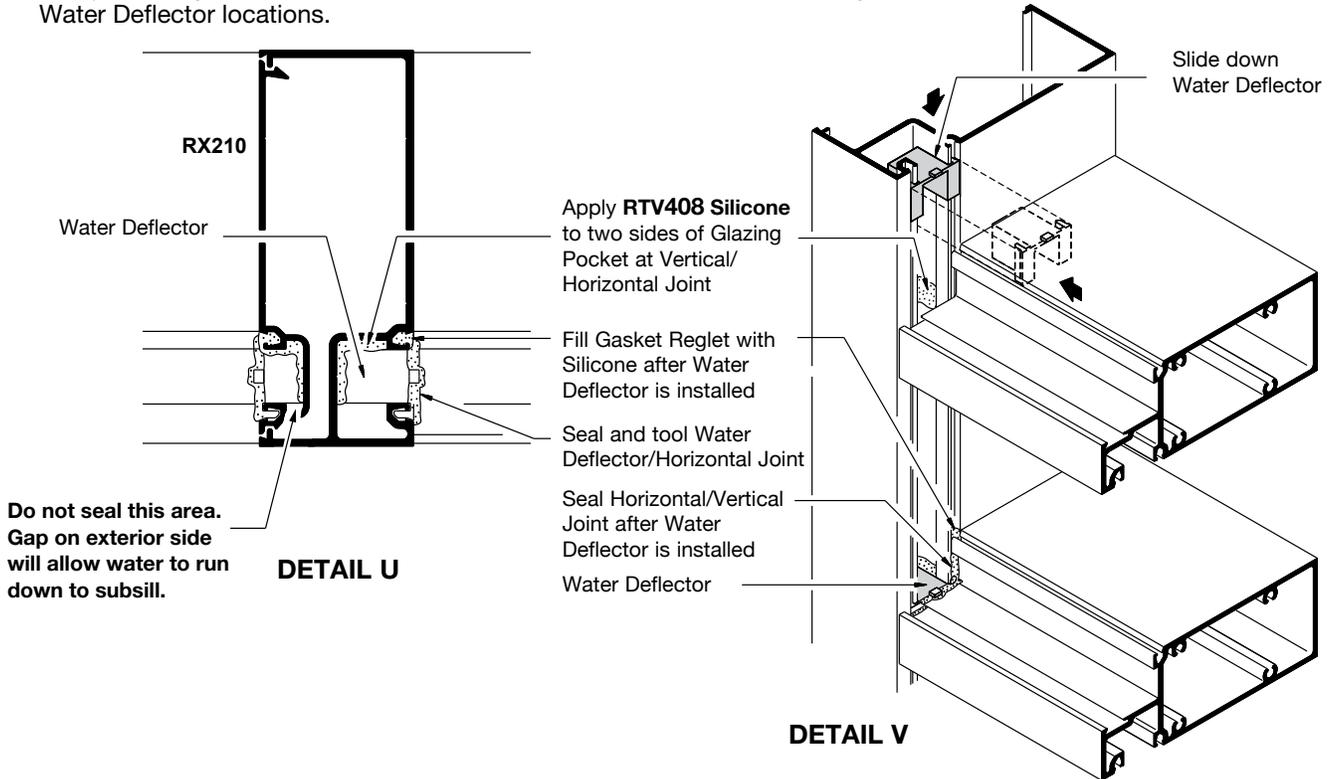
## GENERAL FRAME INSTALLATION (CONTINUED)

- Apply **RTV408 Silicone** to vertical glazing pocket and gasket reglet at vertical/horizontal intersection. Silicone must be applied to two sides of pocket only. Clearance at outside will allow infiltrated water to run down to subsill. **See DETAIL U.**
- Insert water deflector into glazing pocket and slide it down to position. **See DETAIL V.** Top of deflector must be flush with horizontal glazing pocket.

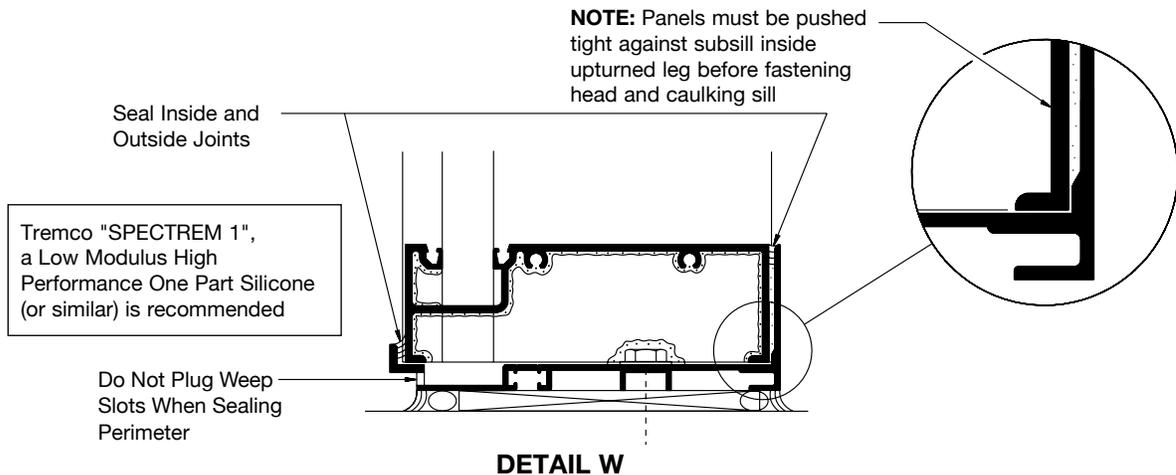
**NOTE:** Water Deflectors applied to door jambs must be sealed all around to prevent water from running to floor. (Water will drain at opposite end).

**THERMAL FLUSH FRONT NOTE (Series FT451 and FT601):**

Apply masking tape over slots of **RX210** Vertical Filler to allow for sealing at Water Deflector locations.



- Seal joints between panels and subsill at both inside and outside. **See DETAIL W.**



- When interior glazing a multistory building, exterior perimeter sealing must be done before glazing, unless caulking is to be done from the exterior as a secondary operation.

# GLAZING

## GLASS SIZES\*

**SERIES FF450 and FF600 for 1/4" (6) glazing:** Daylight Opening + 5/8" (16) (Except door transom, see page 25 - 26)

**SERIES FF451, FT451, FF601, and FT601 for 1" (25) glazing:** Daylight Opening + 7/8" (22) (Except door transom, see page 25 - 26)

\*These formulas do not take into account glass tolerances. Consult glass manufacturer before ordering glass.

## INTERIOR GLAZING

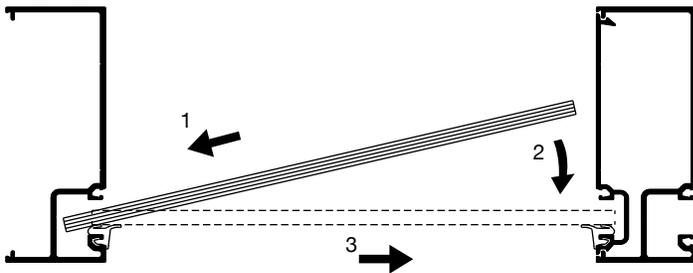
1. Cut glazing gaskets to size. Gaskets should be cut 1/8" (3) longer per foot of aluminum member to allow for shrinkage. Same gaskets are used for interior and exterior.
2. Install setting blocks, two per glass lite, into horizontal and sill members. Check deadload charts and shop drawings for correct setting block locations.
3. Install exterior gaskets. Vertical gaskets run through. Start at corners and work towards center. Tight butt joined corners are critical to avoid leakage.

**NOTE: All glazing pockets must be clean of debris before glazing to prevent blockage of weeps or drains.**

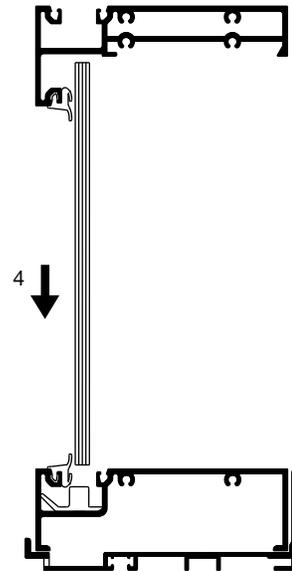
4. Set glass in place following the four step procedure. **See DETAIL X.** Be careful not to disturb exterior gasket while installing glass. Center glass into opening and rest on setting blocks pressed against exterior gaskets.

### GLAZING SEQUENCE

1. Into Deep Pocket
2. Swing to Plane
3. Slide to Shallow Pocket
4. Down onto Setting Blocks



**DETAIL X**



**NOTE:**

Frame members for Series FF450 shown. Series FF451, FT451, FF600, FF601, and FT601 will be similar.

5. Install interior gaskets. Horizontal gasket runs through. Start at corners and work towards center. Tight butt joined corners are critical to avoid leakage. Seal gasket corners.

# GLAZING (CONTINUED)

## EXTERIOR GLAZING

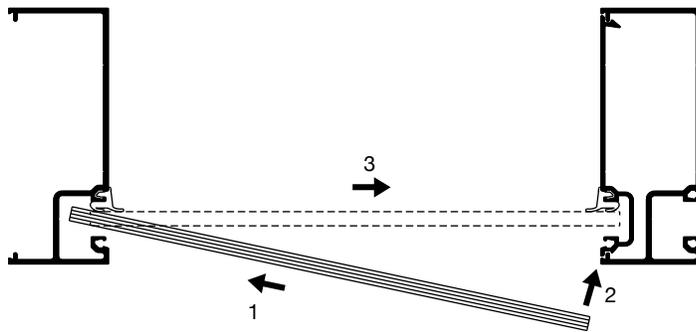
**NOTE:**  
Frame members for Series FF450 shown.  
Series FF451, FT451, FF600, FF601, and  
FT601 will be similar.

1. Set glass in place following the four step procedure. See **DETAIL Y**. Be careful not to disturb interior gasket while installing glass. Center glass in the opening.

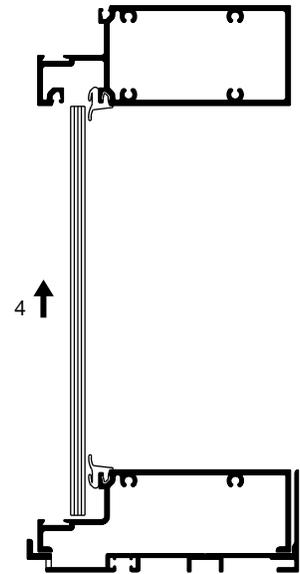
**NOTE: All glazing pockets must be clean of debris before glazing to prevent blockage of weeps or drains.**

### GLAZING SEQUENCE

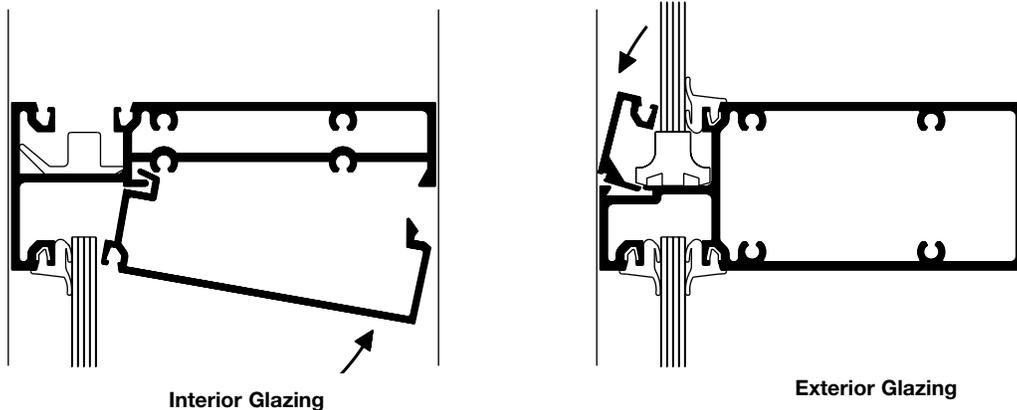
1. Into Deep Pocket
2. Swing to Plane
3. Slide to Shallow Pocket
4. Raise into Top Horizontal



**DETAIL Y**



2. Install setting blocks, two per glass lite, in horizontal/sill members. Check deadload charts and shop drawings for correct setting block locations. Rest glass on setting blocks pressed tight against interior gaskets.
3. Snap-in glazing beads. See **DETAIL Z**.

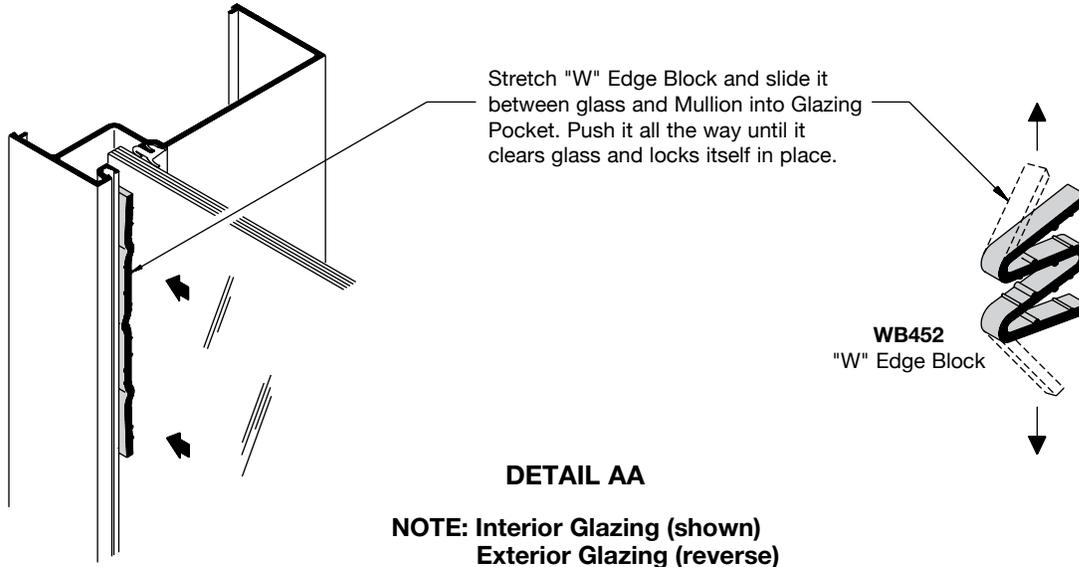


**DETAIL Z**

4. To prevent glass from shifting in the opening, one **WB452 "W"** Edge Block should be installed into vertical's deep glass pocket at center point or as recommended by glass manufacturer. See **DETAIL AA** on Page 22.

# GLAZING (CONTINUED)

## EXTERIOR GLAZING



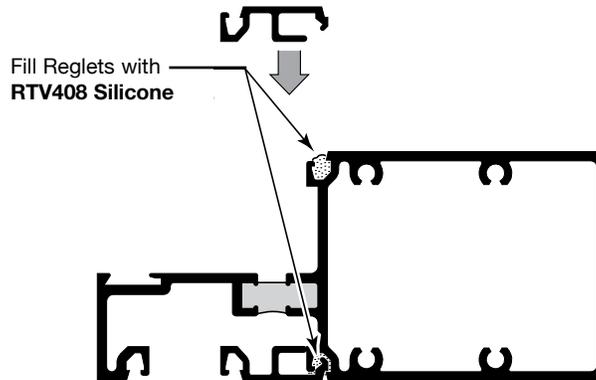
5. Install remaining gaskets. Horizontal gaskets run through. Start at corners and work towards center. Tight butt joined corners are critical to avoid leakage.

## TRANSITION GLAZING

Roll-in transition adaptors and glazing beads for 1/4" (6) spandrel are supplied as required. Glazing adaptor cutting length is D.L.O. minus 1/32". Roll-in adaptors need to be installed when setting glass and held in place temporarily with a piece of gasket. Glazing beads for 1/4" (6) glazing are used for interior glazing applications only.

**NOTE: Always install Water Deflectors before rolling in vertical adaptors. Use deflectors for 1" (25) glazing.**

6. Apply **RTV408 Silicone** full length of reglet and install glazing adaptor centering in opening. **See DETAIL BB.**



**DETAIL BB**

**NOTE:**  
FT451 Exterior Glazing Horizontal shown. Series FF450, FF451, FF600, FF601, and FT601 will be similar.

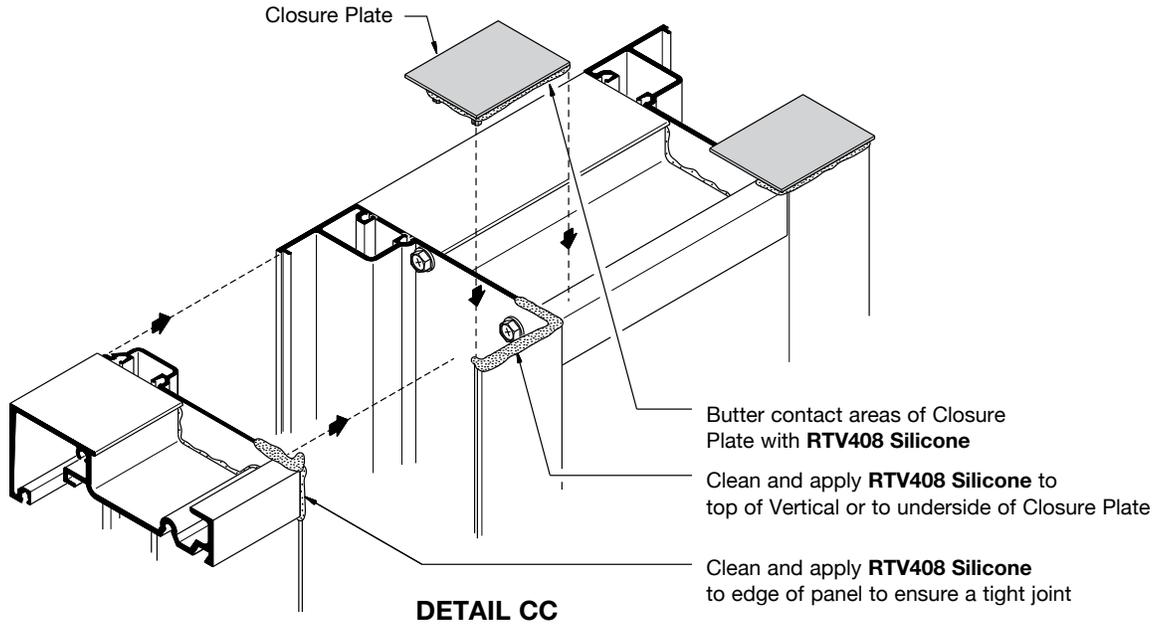
# GLAZING (CONTINUED)

## FLUSH IN (F.I.) - Exterior Glazing

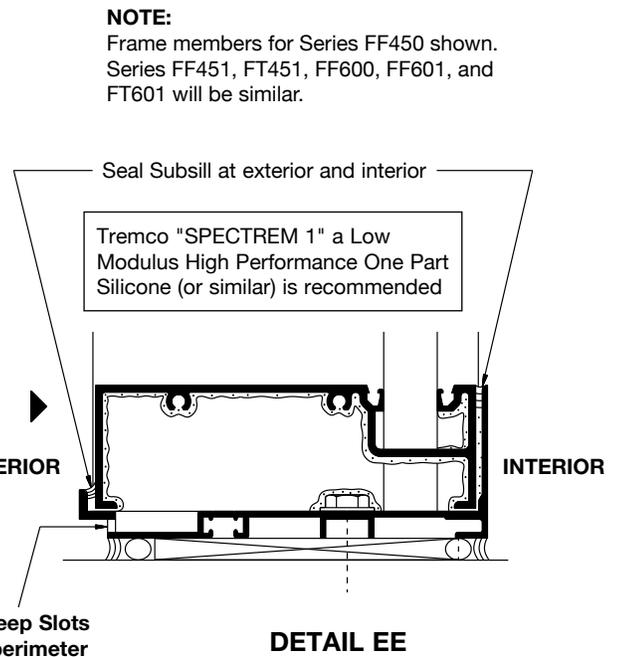
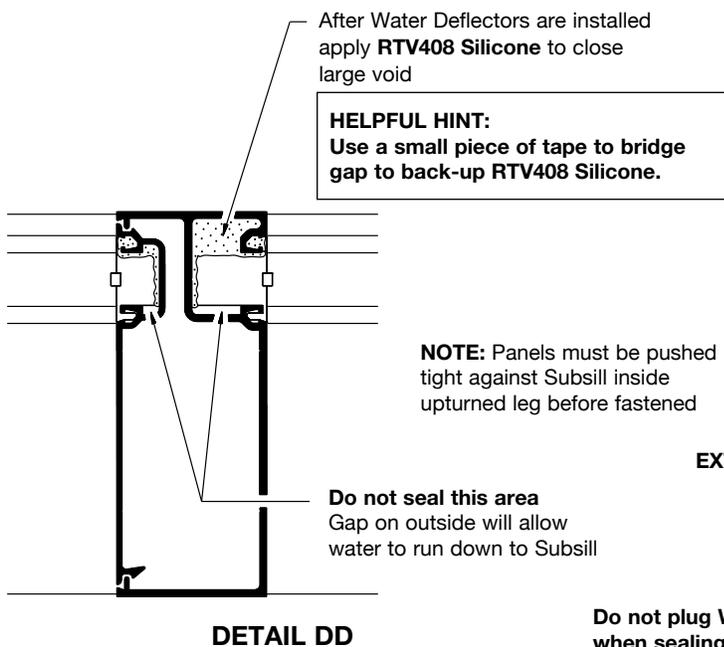
With Flush-In glazing, the glass is flush to inside. Use interior glazing members in reverse.

Follow standard procedure for FRAME FABRICATION and ASSEMBLY except the following steps:

1. Silicone closure plates to vertical members on outside. See **DETAIL CC**.



2. Set subsill in place as shown on Page 16, Step 1, **DETAIL O**. Do not reverse subsill. Weep slots must always be outside. See **DETAIL EE**.
3. Install panels reversed (glazing pocket to inside). See **DETAIL DD**.



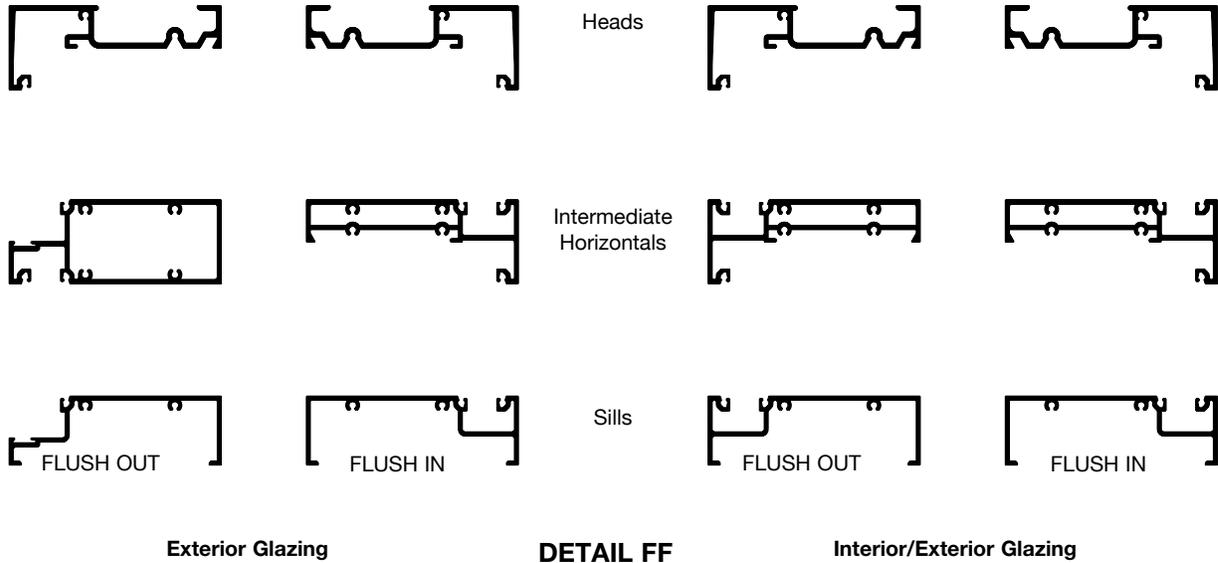
# GLAZING (CONTINUED)

## FLUSH IN FLUSH OUT (F.I.F.O.) - Exterior or Interior Glazing

Carefully check shop drawings to select the correct members before assembling units.

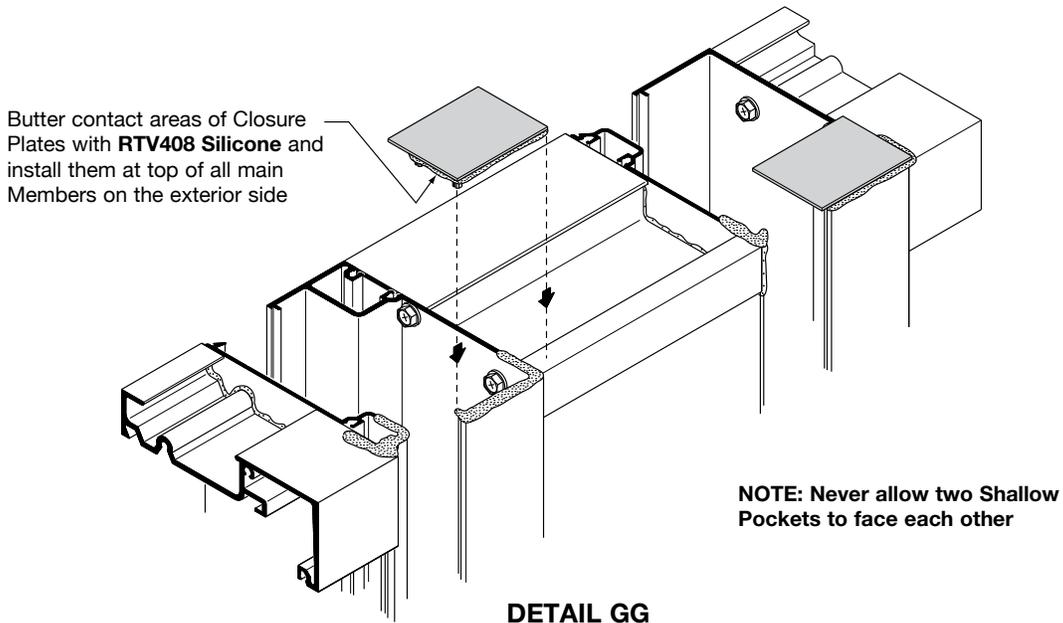
If **Exterior glazing** is required FLUSH IN and FLUSH OUT panels should be built with different components.

If FLUSH IN and FLUSH OUT panels are built using the same components a combination of **Interior/Exterior glazing** will be required. See **DETAIL FF**.



Follow standard procedure for FABRICATION and ASSEMBLY except the following steps.

- Use **RTV408 Silicone** to seal closure plates to vertical members on outside. See **DETAIL GG**.



- Set Subsill in place as shown on Page 16, Step 1. **Do not reverse Subsill. Weep slots must always be outside.** See **DETAIL DD** and **EE** on Page 23 for FLUSH IN panels installation.

# GLAZING (CONTINUED)

## CENTER GLAZED ENTRANCE FRAMES

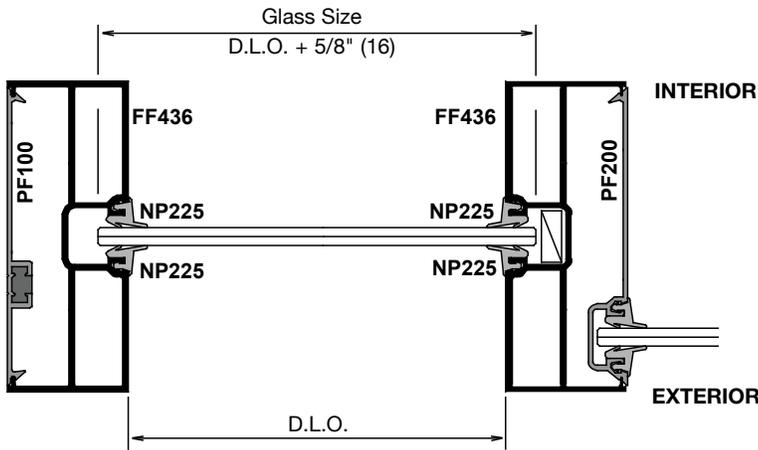
ENTRANCE FRAME HEIGHT equals FLUSH FRONT HEIGHT plus bottom clearance. (Door jambs run to floor).

**NOTE:** Glass above door is centered in frame.

### TRANSOM GLAZING

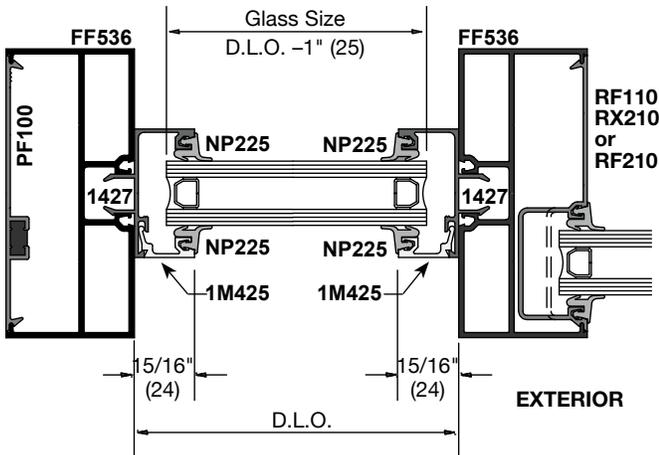
Glass Sizes				
	SERIES FF450	SERIES FF451/FT451	SERIES FF600	SERIES FF601/FT601
Glass Width	D.L.O. + 5/8" (16)	D.L.O. - 1" (25)	D.L.O. + 5/8" (16)	D.L.O. - 1" (25)
Glass Height	D.L.O. - 1/8" (3)			

**SERIES FF450 for 1/4" (6) and 3/8" (9.5) glazing;  
SERIES FF600 is similar.**

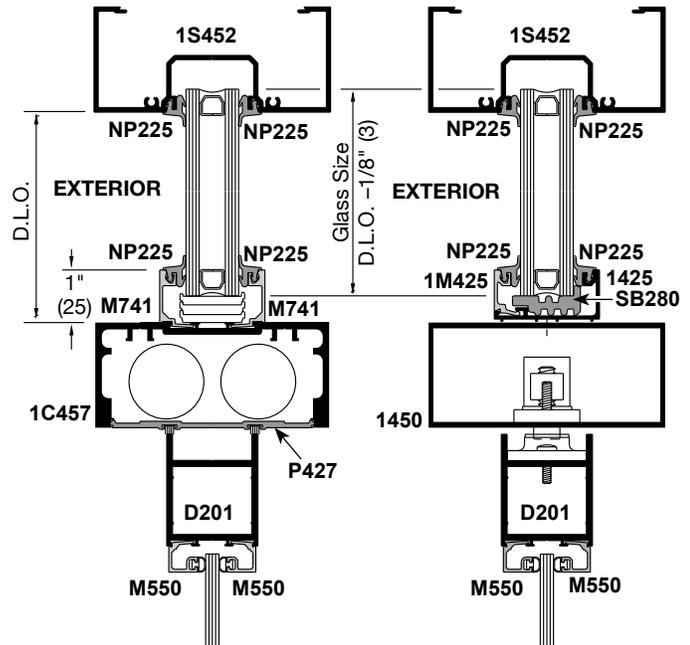
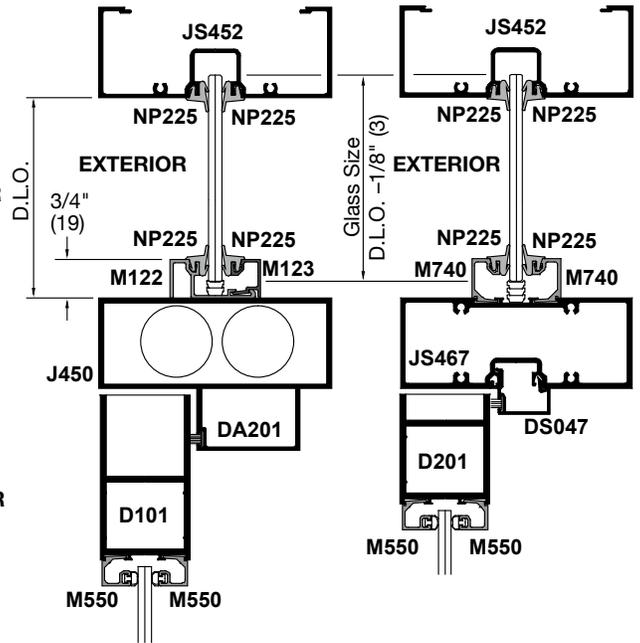


DETAIL HH

**SERIES FF451/FT451 for 1" (25) glazing;  
SERIES FF601/FT601 is similar.**



DETAIL II



NOT TO SCALE

# GLAZING (CONTINUED)

## OFFSET GLAZED ENTRANCE FRAMES

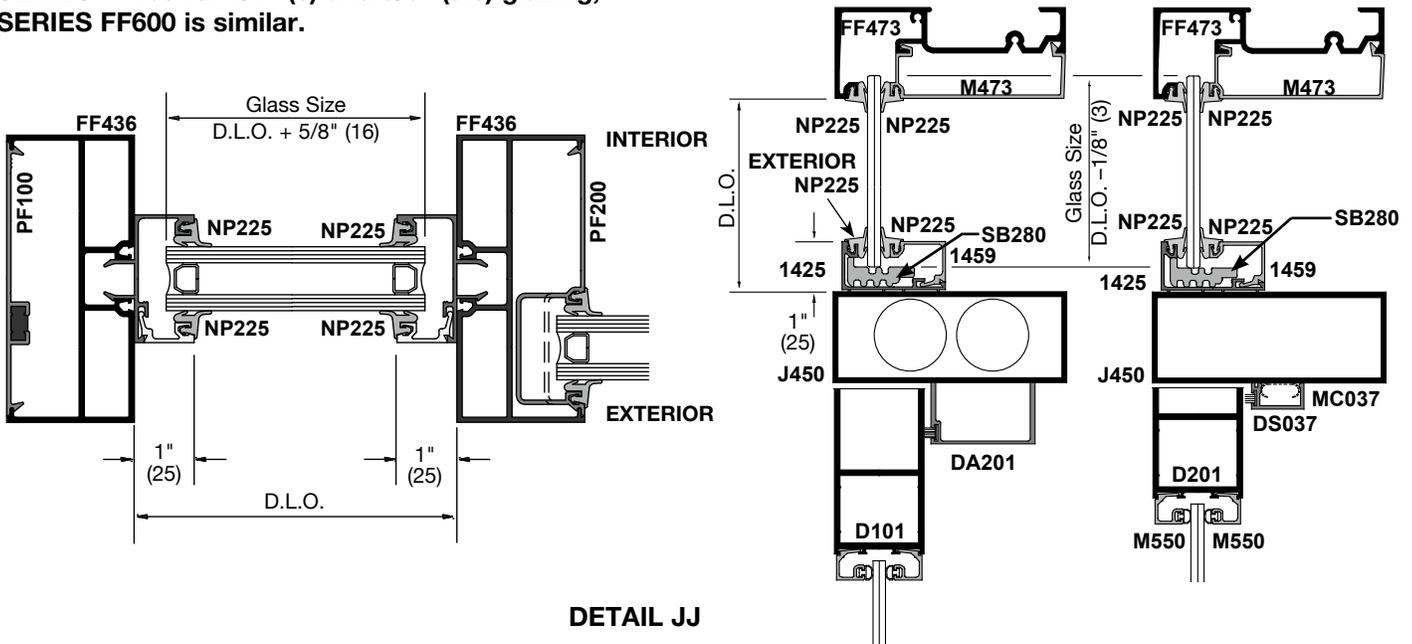
ENTRANCE FRAME HEIGHT equals FLUSH FRONT HEIGHT plus bottom clearance. (Door jambs run to floor).

**NOTE:** Glass above door is offset in frame.

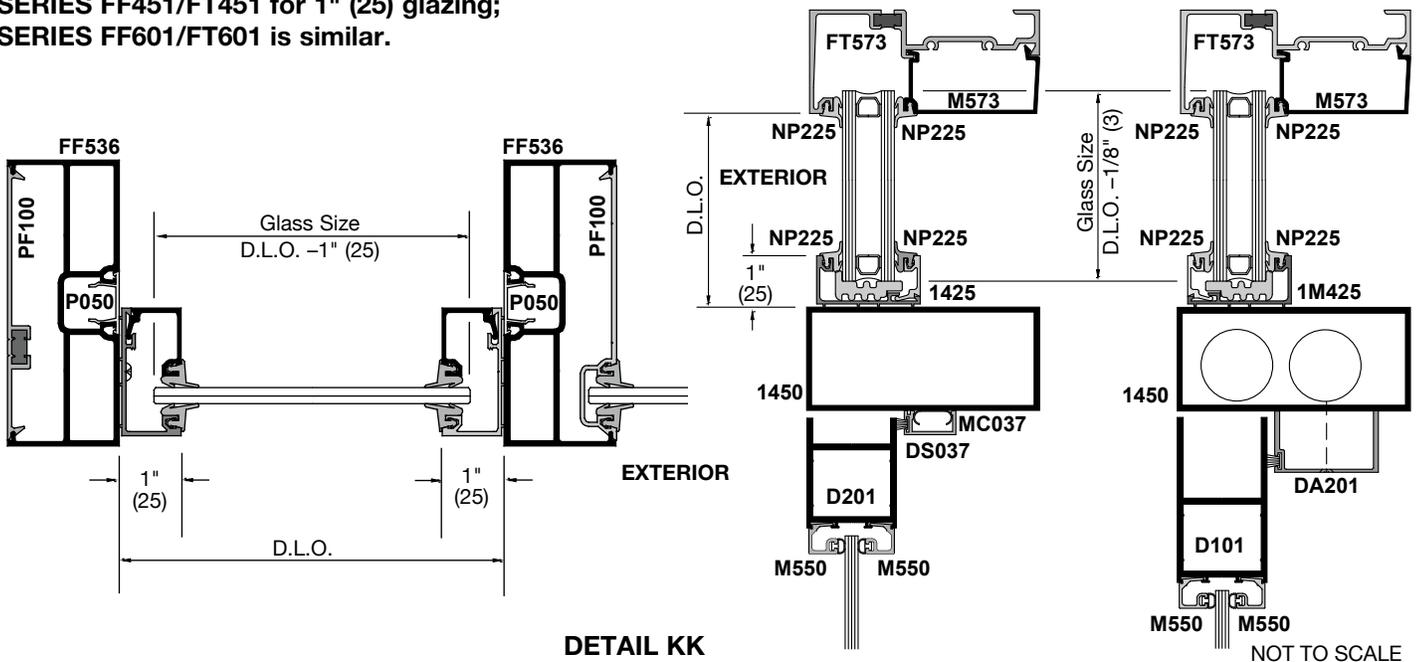
### TRANSOM GLAZING

Glass Sizes				
	SERIES FF450	SERIES FF451/FT451	SERIES FF600	SERIES FF601/FT601
Glass Width	D.L.O. + 5/8" (16)	D.L.O. - 1" (25)	D.L.O. + 5/8" (16)	D.L.O. - 1" (25)
Glass Height	D.L.O. - 1/8" (3)			

SERIES FF450 for 1/4" (6) and 3/8" (9.5) glazing;  
 SERIES FF600 is similar.



SERIES FF451/FT451 for 1" (25) glazing;  
 SERIES FF601/FT601 is similar.



# OPTIONAL CORNER SYSTEM

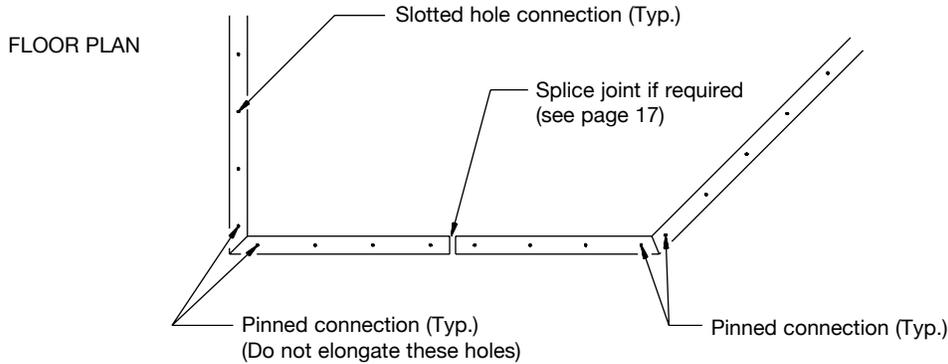
## CORNER CONDITIONS

Subsill should be mitered as required.

Corner members should be cut the same length as verticals.

Subsill must be pinned to structure on both sides of corner to prevent movement at mitered joint.

Elevations with corners at both ends may require a splice to accommodate thermal movement. **See DETAIL LL.**

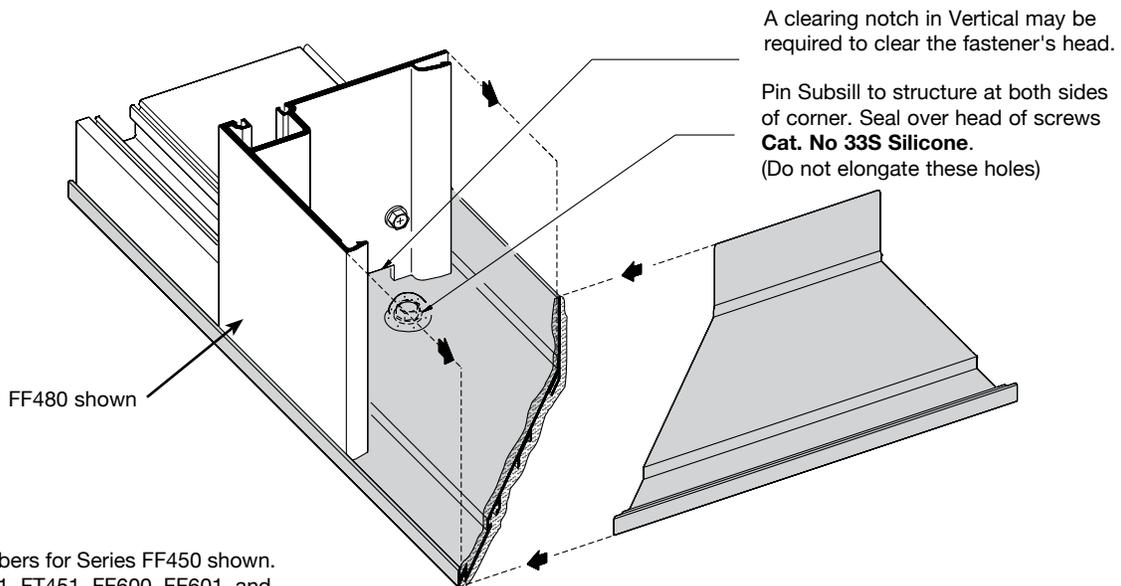


**DETAIL LL**

It is recommended that elevations with corners at both ends have at least one expansion member to allow for minor adjustments.

## 90° OUTSIDE CORNER

1. Install mitered Subsill on one side of corner only. Secure it to structure and seal over head of fasteners with **Cat. No. 33S Silicone**.
2. Set corner panel ending with FF480 (FF580/FT580) first. **See DETAIL MM.** Attach panel to structure at one point for safety.

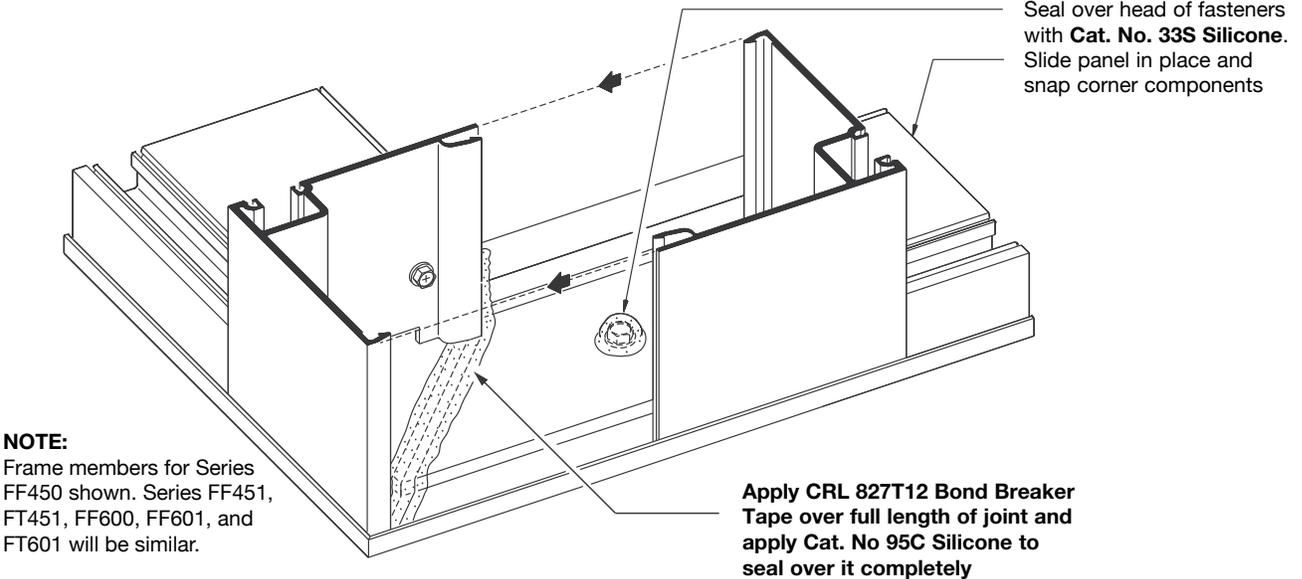


**NOTE:**  
Frame members for Series FF450 shown.  
Series FF451, FT451, FF600, FF601, and  
FT601 will be similar.

**DETAIL MM**

## OPTIONAL CORNER SYSTEM (CONTINUED)

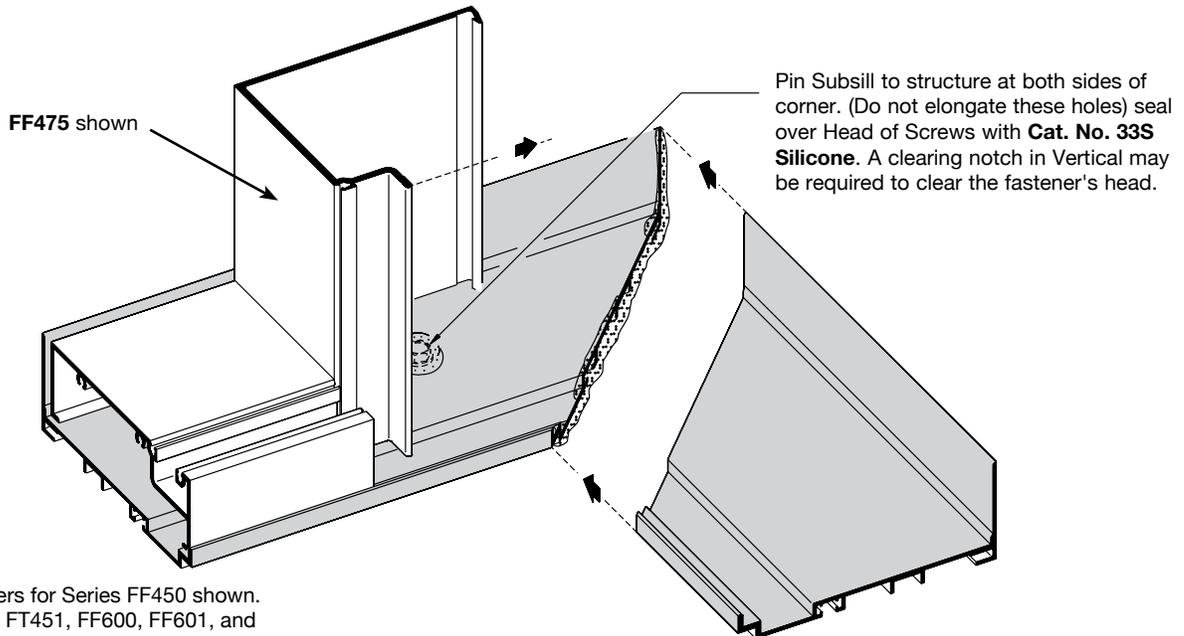
3. Install Subsill on the other side of the corner. Secure it to structure. Completely seal joint and over head of fasteners with **Cat. No. 33S Silicone**. See **DETAIL OO**.
4. Set corner panel on the other side and snap panels together. See **DETAIL OO**.
5. Secure panels at head as indicated on Step 3, Page 17.



DETAIL OO

## 90° INSIDE CORNER

1. Install mitered Subsill on one side of corner only. Secure it to structure and seal over head of fasteners with **Cat. No. 33S Silicone**.
2. Set corner panel ending with FF475 (FF575/FT575) first. Secure it to structure at one point for safety. **SEE DETAIL PP**.

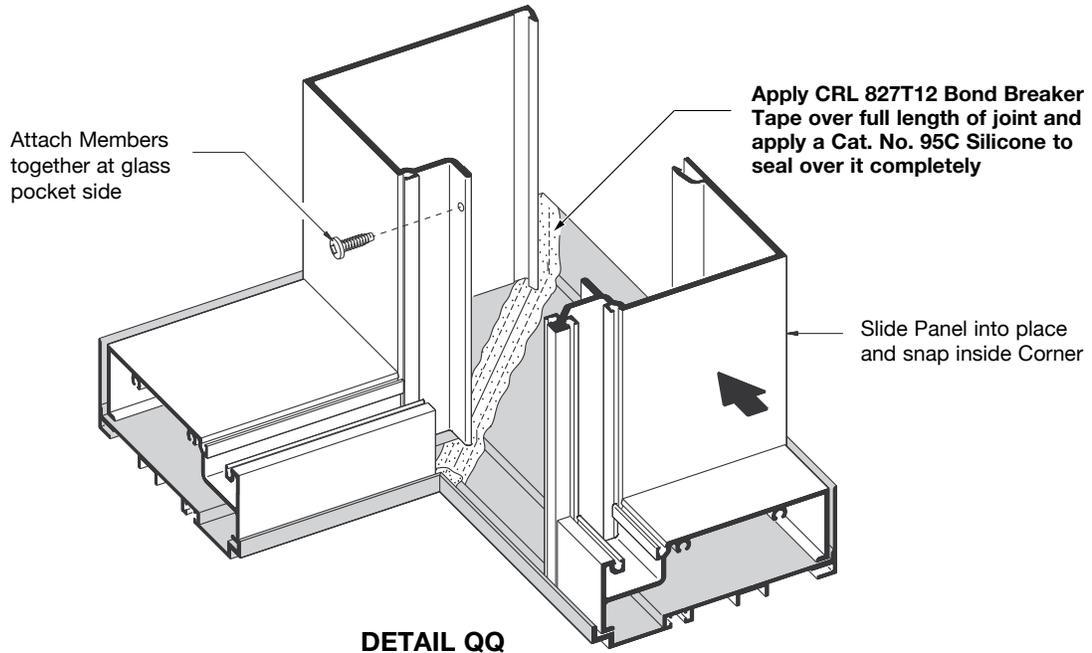


**NOTE:**  
Frame members for Series FF450 shown. Series FF451, FT451, FF600, FF601, and FT601 will be similar.

DETAIL PP

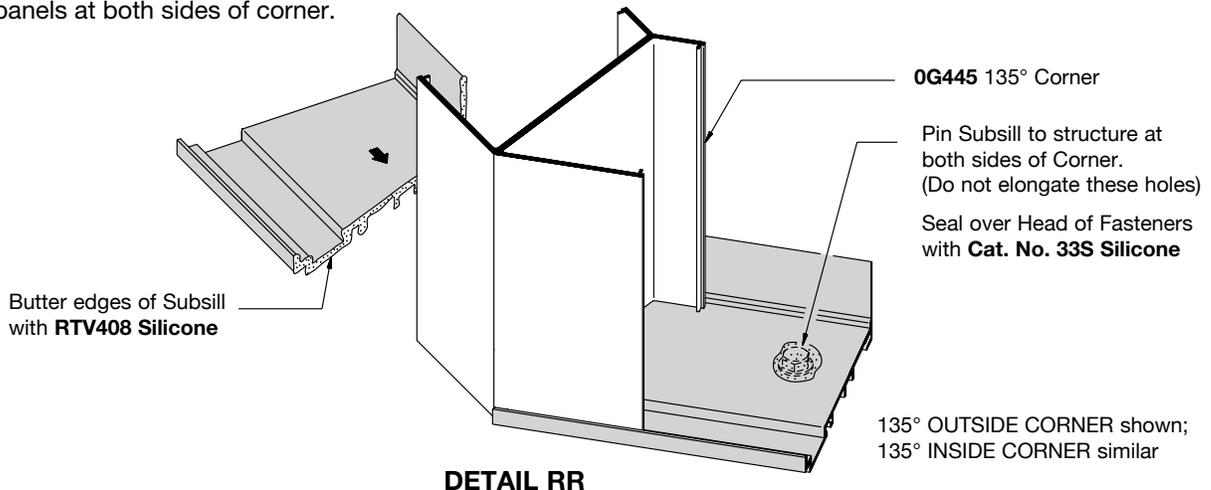
## OPTIONAL CORNER SYSTEM (CONTINUED)

3. Install subsill on the other side of the corner and secure it to structure. Completely seal mitered joint and over head of fasteners with **Cat. No. 95C Silicone**. See **DETAIL QQ**.
4. Set corner panel on the other side and snap panels together. Inside corner has only one snap point. Tie components together at pocket side with #10 screws, 24" (610) O.C. See **DETAIL QQ**

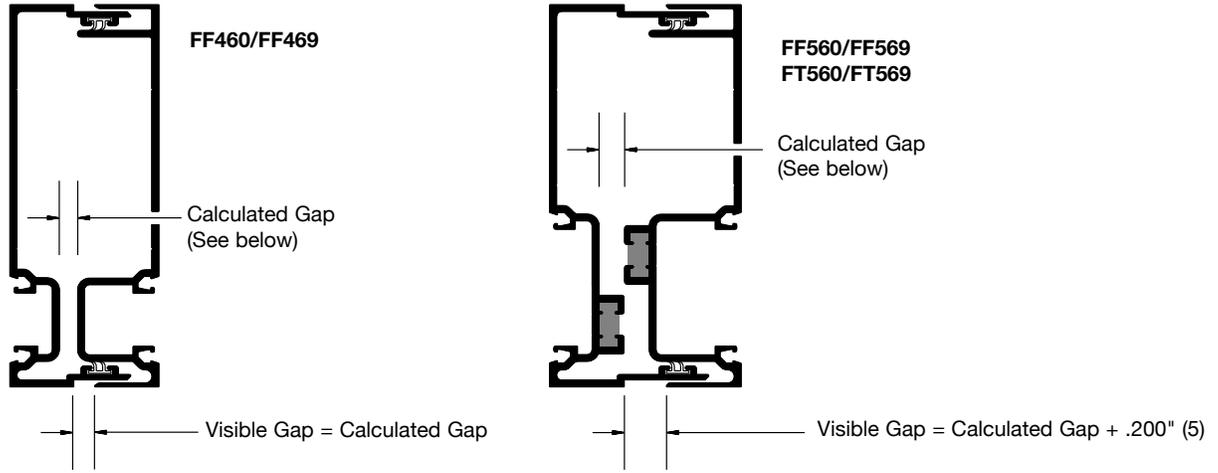


## 135° CORNERS

1. Install mitered Subsill on one side of corner only. Secure it to structure and seal over head of fasteners with **Cat. No. 33S Silicone**. See **DETAIL RR**
2. Apply **RTV408 Silicone** to mitered edge.
3. Set corner member in place.
4. Butter mitered edge of Subsill for the other side and install tight against previously installed half. Secure to structure with and seal over head of fasteners with **Cat. No. 33S Silicone**.
5. Snap-in panels at both sides of corner.



# EXPANSION MULLIONS



Expansion Mullions must be used to accommodate thermal movement in long run elevations.

They should be spaced as required by job conditions and project specifications.

Two piece Mullions allow for a 3/8" (9.5) maximum movement.

Gap between half members should be based on the temperature at the time of installation.

Maximum distance between Expansion Mullions should be:

$$\text{In Feet} = \frac{2422.5}{\text{Temperature difference } ^\circ\text{F}}$$

$$\text{In Meters} = \frac{410.21}{\text{Temperature difference } ^\circ\text{C}}$$

### EXAMPLE

Temperature Difference	Unit °F	120° (from 30° to 150°)	Unit °C	66.7° (from -1.1° to 65.6°)
Intermediate Vertical Spacing	feet	4'	meters	1.22 m
Maximum Distance Between Expansion Mullions	feet	$\frac{2422.5}{120} = 20.18'$	meters	$\frac{410.21}{66.7} = 6.15 \text{ m}$

USE ONE EXPANSION MULLION EVERY FIVE BAYS

GAP AT THE TIME OF INSTALLATION SHOULD BE BASED ON THE FOLLOWING RATIO:

$$\frac{\text{Maximum temperature} - \text{Actual temperature}}{\text{Maximum temperature} - \text{Minimum temperature}}$$

If Installed at	°F	70°	°C	21.11°
Gap at Time of Installation	inches	$\left(\frac{150^\circ - 70^\circ}{150^\circ - 30^\circ}\right) \times .375''$ = .25"	mm	$\left(\frac{65.6^\circ - 21.11^\circ}{65.6^\circ + 1.1^\circ}\right) \times 9.52 \text{ mm}$ = 6.4 mm

**NOTE:** Expansion mullion for 1" (25) glazing features a .200" (5) visible gap at the closed position therefore the calculated gap, .25" (6.4) will result in a visible gap of .25" + .200" = .450" (6.4 + 5 = 11.4)

# DOOR GLAZING INSTRUCTIONS

Door may be glazed either Installed or Laid horizontal.  
NOTE: Doors are more easily glazed in horizontal position. If glazing horizontally, leveling screw adjustments occur after hanging door.

Raise adjustable leveling screw to maximum retracted position.  
See **DETAIL A**.

Install glass stops, with glazing gaskets on one side of door only.  
If using square stops, install vertical stops first.  
If using beveled stops, install horizontal stops first.

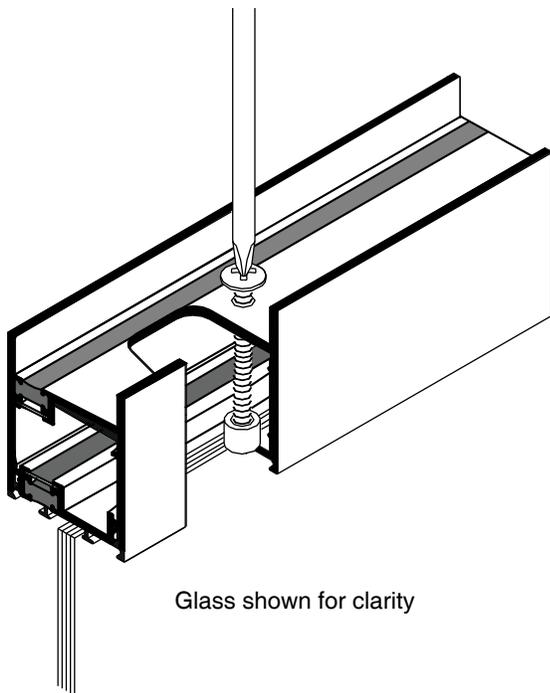
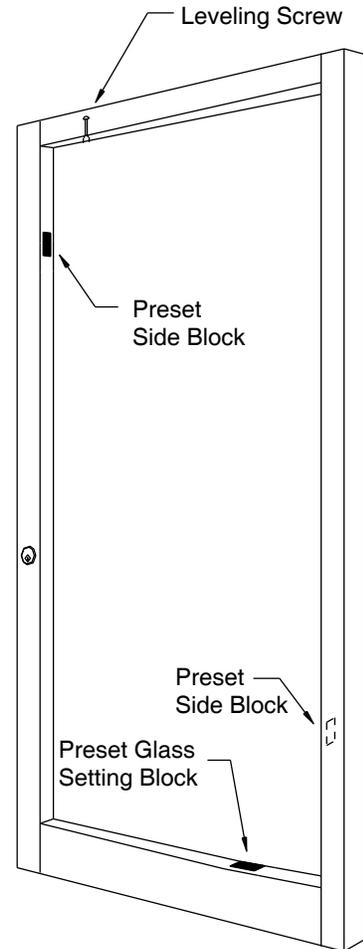
Center glass in opening resting on setting blocks.

Snap-in remaining glass stops.

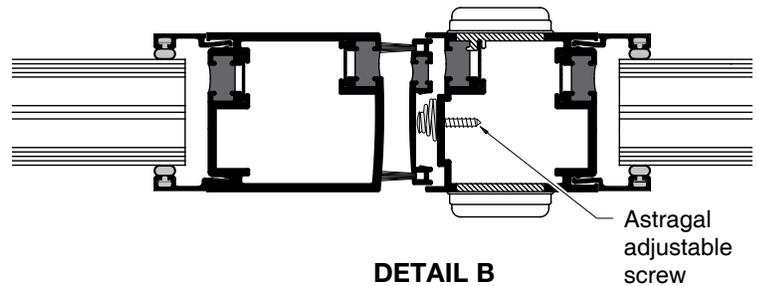
Turn leveling screw as required to maintain a uniform clearance between door top rail and header.

On pair of doors with astragal adjust screws to keep proper meeting stiles clearance. See **DETAIL B**.

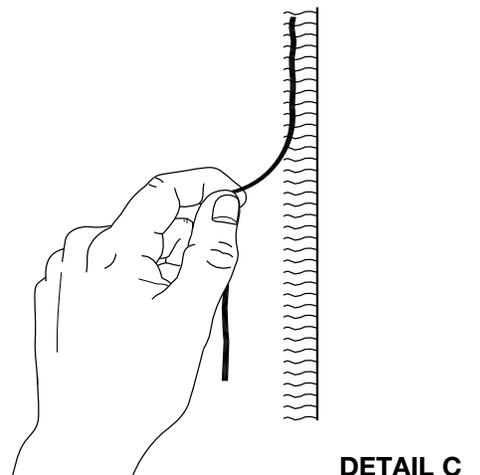
On all weather stripped door stiles pull the string to release weatherstrip pile after doors are installed. See **DETAIL C**.



**DETAIL A**



**DETAIL B**



**DETAIL C**

**SERIES FF450, FF451, FT451, FF600, FF601, AND FT601**

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This Concludes the Installation Manual for your product. We hope that this guide has been helpful. Should you need further assistance, our knowledgeable Technical Sales Department is available at no charge during regular business hours. Please have your Order Number ready before calling.



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**Shower Doors** .....Ext: 17740

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Automotive Glazing Supplies, Truck Sliders, and RV Windows



# GUIDE TO SEALANTS

**NOTE: All sealants must be tooled to ensure proper adhesion.**

## WATERPROOFING

- **33S ACETIC CURE SILICONE**

Sill to Subsill, End Dams, Screw Heads, and Threshold to Door Frame Sealing.

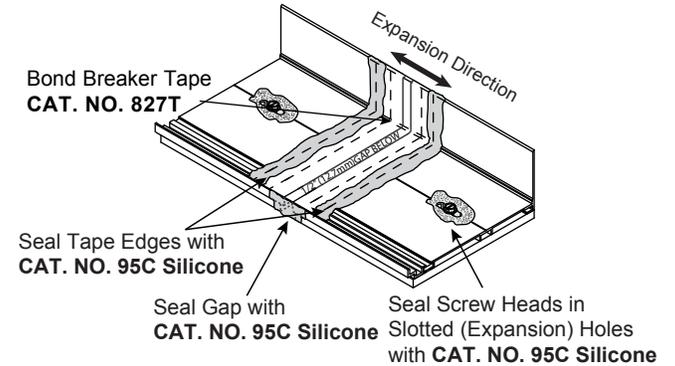


**NOTE: Not for use near insulating glass units with butyl sealant.**

## EXPANSION

- **95C NEUTRAL CURE SILICONE**

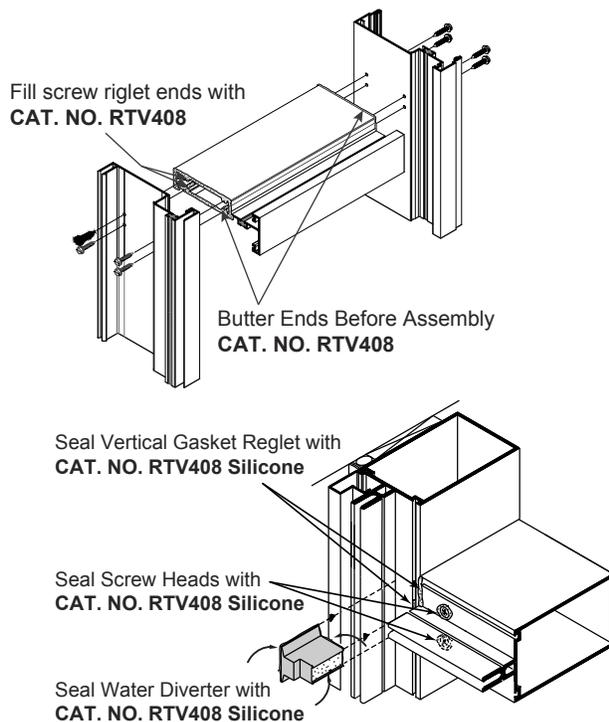
Expansion Joints.



## JOINT ADHESIVE

- **RTV408 NEUTRAL CURE SILICONE**

Small Joints, End Joints and Buttered Surfaces, Water Diverters, End Dams, and Reglet Fills.

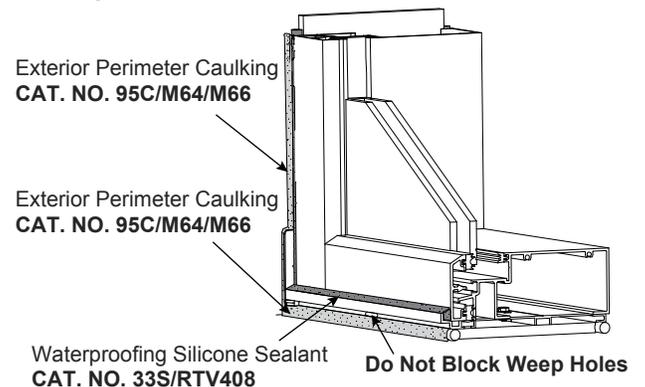


**NOTE: I.G. butyl contact OK.**

## PERIMETER

- **95C NEUTRAL CURE SILICONE (Preferred)**
- **M64 (SMOOTH) MODIFIED POLYURETHANE**
- **M66 (TEXTURED) MODIFIED POLYURETHANE**

Perimeter Seals, Expansion Joints, Sill and Threshold Beds; Concrete, Wood, and Steel Openings.



## STRUCTURAL

- **ALL STRUCTURAL SEALANTS REQUIRE TESTING AND APPROVAL.**

Glass-to-Glass or Glass-to-Metal