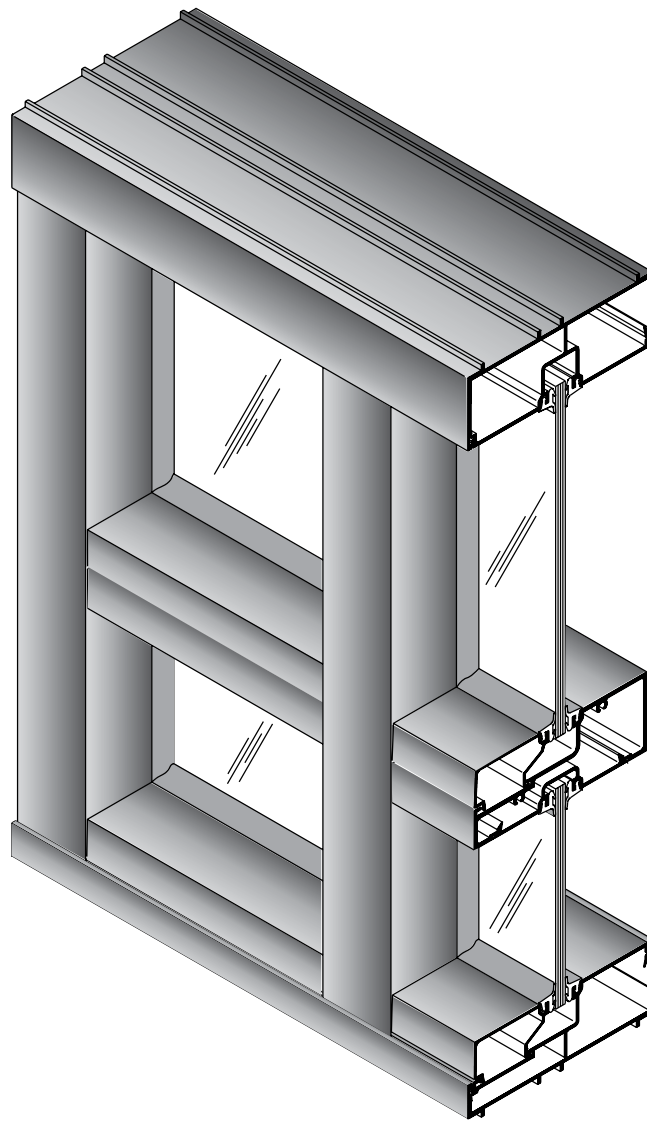


# INSTALLATION AND GLAZING INSTRUCTIONS

SERIES 400-S, 450-S, 451-S, AND IT451-S

## CENTER GLAZED STACKING SYSTEMS



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Phone: (800) 262-5151 • Fax: (866) 262-3299  
crlaurence.com • usalum.com • crl-arch.com

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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.***

## ORDER OF ASSEMBLY AND INSTALLATION

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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, 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.

## SERIES 400-S, 450-S, 451-S, AND IT451-S

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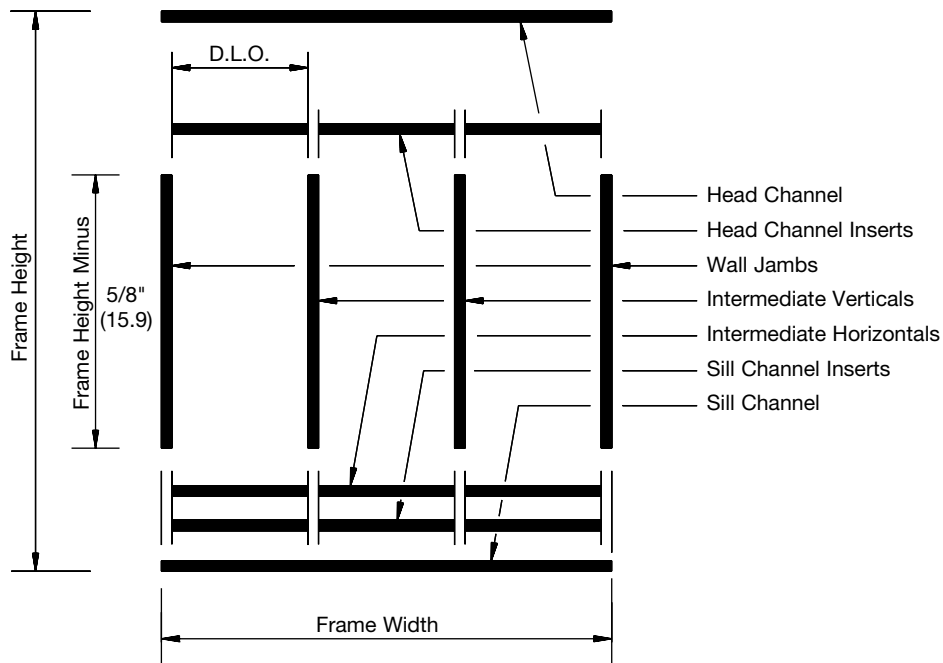
14. **SEALANTS.** Check shop drawings, installation instructions, architectural drawings and shipping lists to become thoroughly familiar with all sealants referenced in these instructions, which must be a one part elastomeric Acetic or Neutral Cure silicone and must be applied according to the silicone manufacturer's recommendations.
15. **APPLICATION.** Structural silicone must be applied from the interior and weather seal from the exterior after the interior structural silicone has fully cured.
16. **MAXIMUM ALLOWABLE STRESS ON SILICONE.** The maximum allowable size of the glass lite is controlled by the width and depth of the silicone joint combined with the specified design windload (PSF or Pa). The stress on the structural silicone must not exceed 20 PSI (137 KPa) for a 6:1 safety factor. Check Structural Silicone Chart in the Architectural Design Manual for this product series.
17. **ARCHITECT.** It is the responsibility of the architect to secure approval of the system and request from the Glazing Contractor the compatibility and adhesion test reports described below.
18. **GLAZING CONTRACTOR.** 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.
19. **U.S. ALUMINUM.** It is the responsibility of U.S. Aluminum to supply a system to meet the architect's specifications.
20. **Job Site Essentials.** See pages 25, 26, and 27.

## FRAME FABRICATION AND ASSEMBLY

Measure ROUGH OPENING to determine FRAME DIMENSION allowing 1/4" (6.4) minimum clearance for shimming and caulking around perimeter.

1. Cut members to size

<b>Head and sill channels:</b>	FRAME WIDTH If opening exceeds 24' (7.3m) in width splice sleeves must be used at splice joints. <b>See page 20 DETAIL DD.</b>
<b>Wall jambs and verticals:</b>	FRAME HEIGHT minus 5/8" (15.9) +0"
<b>Head and sill fillers:</b>	D.L.O. -1/32" (0.8) +0"
<b>Tubular horizontal members:</b>	D.L.O. -1/32" (0.8)
<b>Open back horizontal members:</b>	D.L.O. minus 1/32" (0.8)
<b>Intermediate horizontal fillers:</b>	D.L.O. minus 1/32" (0.8)
<b>Horizontal glazing beads:</b>	D.L.O. minus 1/32" (0.8)
<b>Vertical spandrel adaptors:</b>	See page 16
<b>Horizontal spandrel adaptors:</b>	D.L.O. minus 1/8" (3.2)

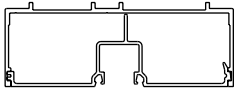


**DETAIL A**

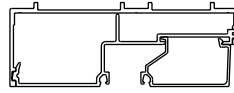
2. Fabricate 3/16" x 1/2" (4.8 x 12.7) weep slots in sill channel, two per glass lite, at quarter points. Weep slots may be drilled in face or bottom of sill channel. **See DETAIL I** on page 9.

# ANCHOR CLIP JOINERY

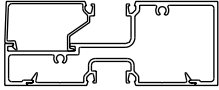
The following schematic details show proper horizontal member selection



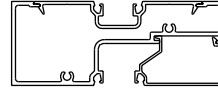
CS418/CS419 for Series 400-S  
 CS468/CS469 for Series 450-S  
 CS568/CS569 for Series 451-S  
 CT458/CT459 for Series IT451-S



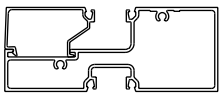
CS413/CS414/M403 for Series 400-S  
 CS463/CS464/M453 for Series 450-S  
 CS563/CS564/IM453 for Series 451-S  
 CT453/CT454/IM453 for Series IT451-S



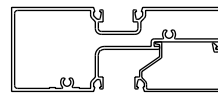
JS413/RS200/M403 for Series 400-S  
 JS463/RS200/M453 for Series 450-S  
 1S463/1S200/IM453 for Series 451-S  
 IT433/IX200/IM453 for Series IT451-S



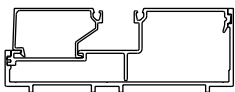
JS413/RS200/M403 for Series 400-S  
 JS463/RS200/M453 for Series 450-S  
 1S463/1S200/1M453 for Series 451-S  
 IT433/IX200/IM453 for Series IT451-S



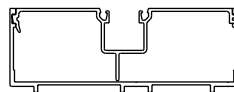
JH413/M403 for Series 400-S  
 JH463/M453 for Series 450-S  
 1H463/1M453 for Series 451-S



JH413/M403 for Series 400-S  
 JH463/M453 for Series 450-S  
 1H463/1M453 for Series 451-S



CS413/CS414/M403 for Series 400-S  
 CS463/CS464/M453 for Series 450-S  
 CS563/CS564/1M453 for Series 451-S  
 CT453/CT454/IM453 for Series IT451-S



CS418/CS419 for Series 400-S  
 CS468/CS469 for Series 450-S  
 CS568/CS569 for Series 451-S  
 CT458/CT459 for Series IT451-S

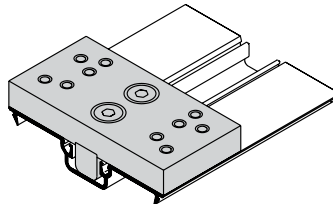
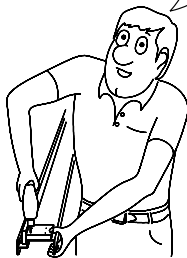
EXTERIOR GLAZING

INTERIOR GLAZING

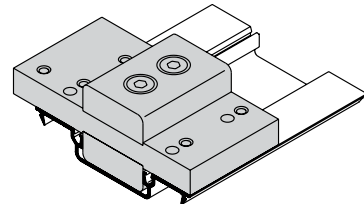
## DETAIL B

3. Mark on verticals the location of horizontal members and drill holes for assembly screws. The use of drill jigs is recommended. See **DETAIL C**. See page 6 for hole locations.

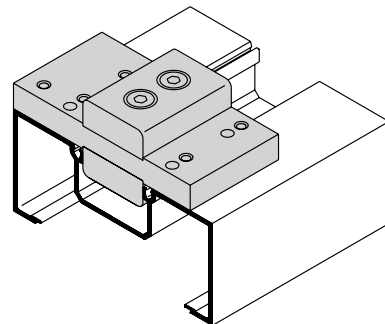
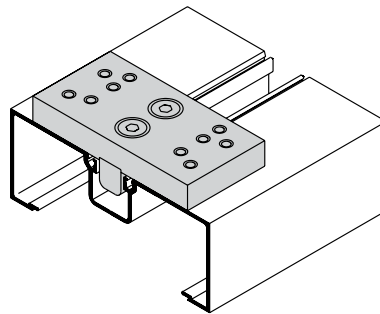
**HELPFUL HINT:**  
 Spot drill then remove drill jig to complete hole pattern. This will help keep bits sharp longer and reduce possibility of drill jig moving during drilling.



**DJ025**  
 Drill Jig for  
 SERIES 400-S and 450-S



**DJ125**  
 Drill Jig for  
 SERIES 451-S and IT451-S

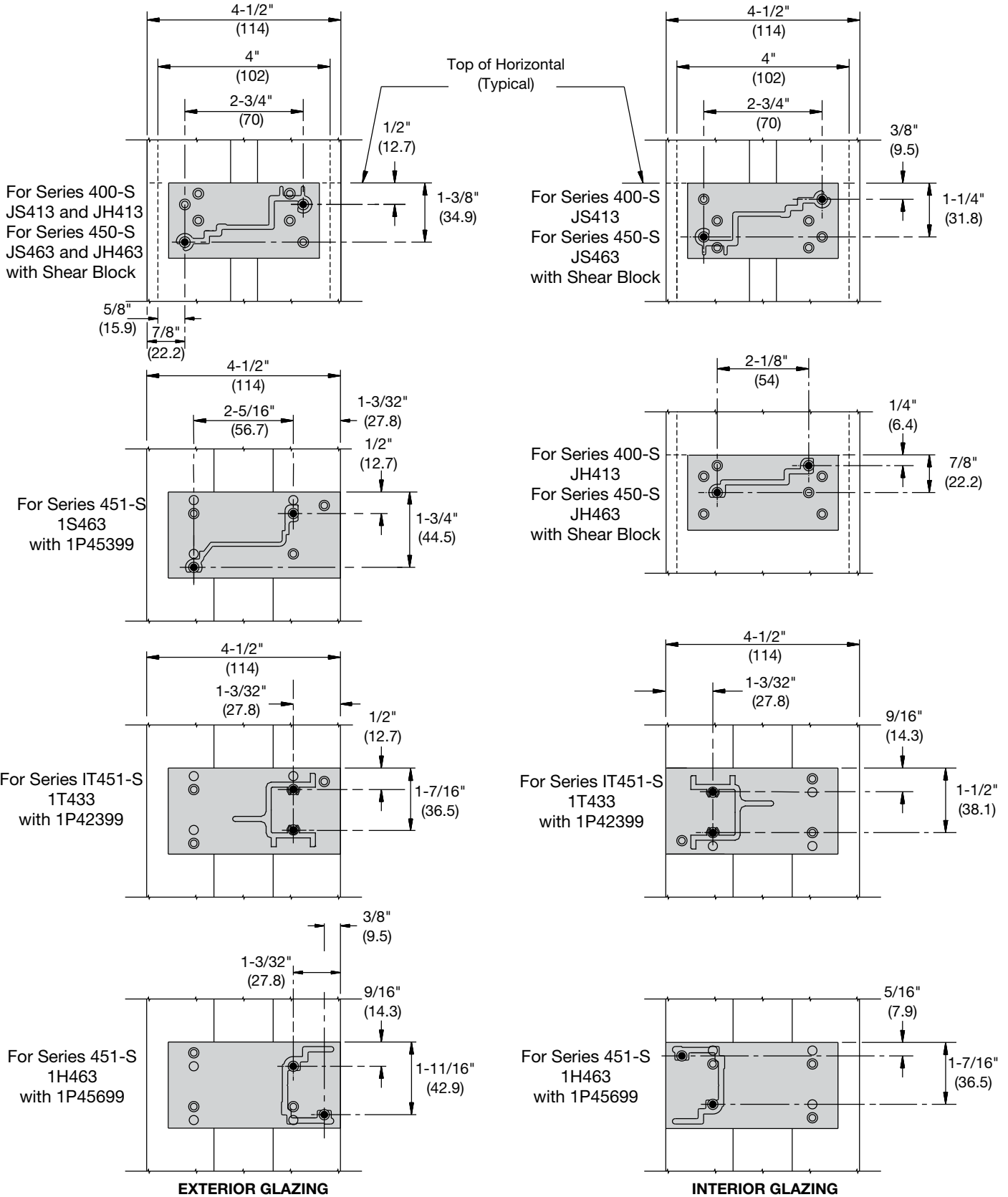


## DETAIL C

**NOTE:** For larger project we offer our Accufab Pro Tool. For more information, visit [usalum.com](http://usalum.com)

# SERIES 400-S, 450-S, 451-S, AND IT451-S

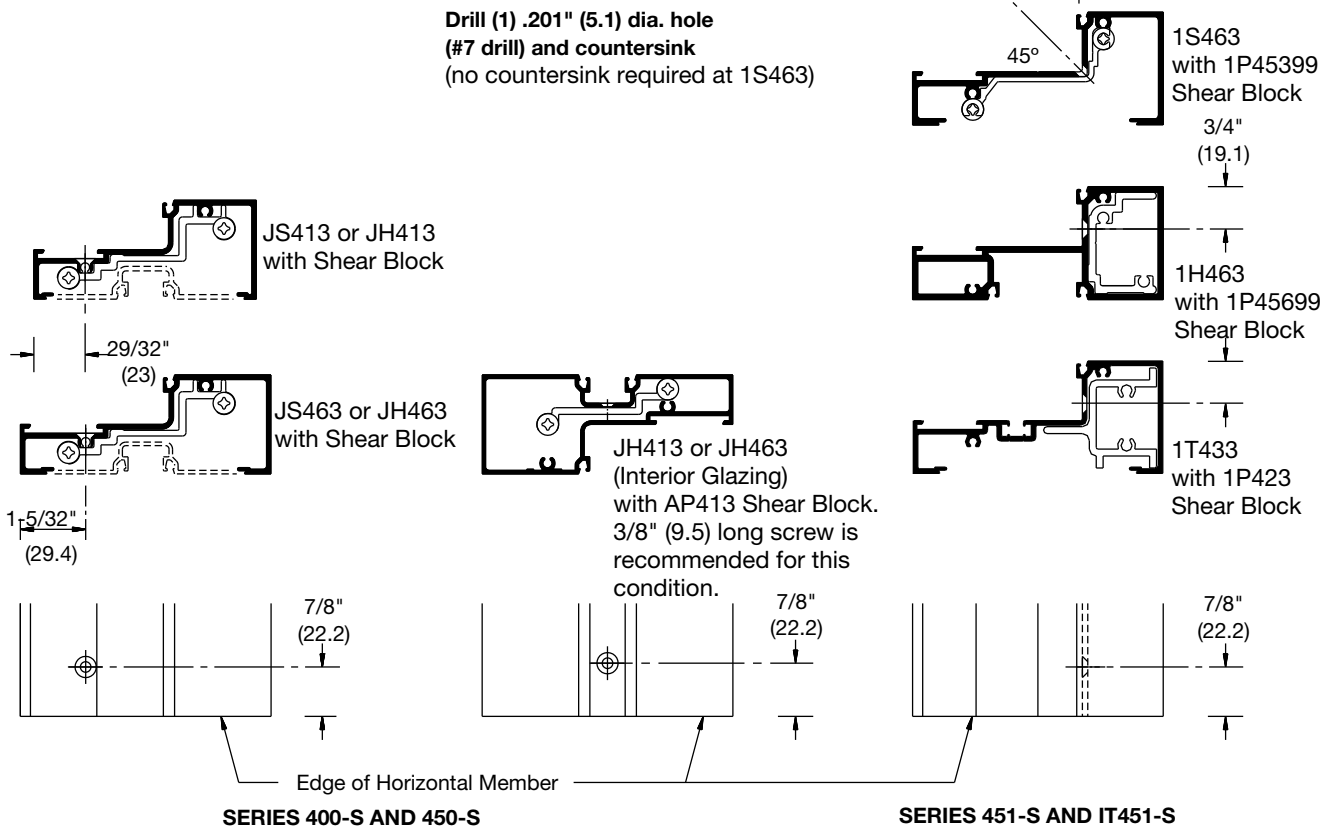
Use DJ025 Drill Jig for Series 400-S and 450-S and DJ125 Drill Jig for 451-S and IT451-S  
 Drill (2) .144" (3.7) dia. holes (#27 drill) per joint



DETAIL D

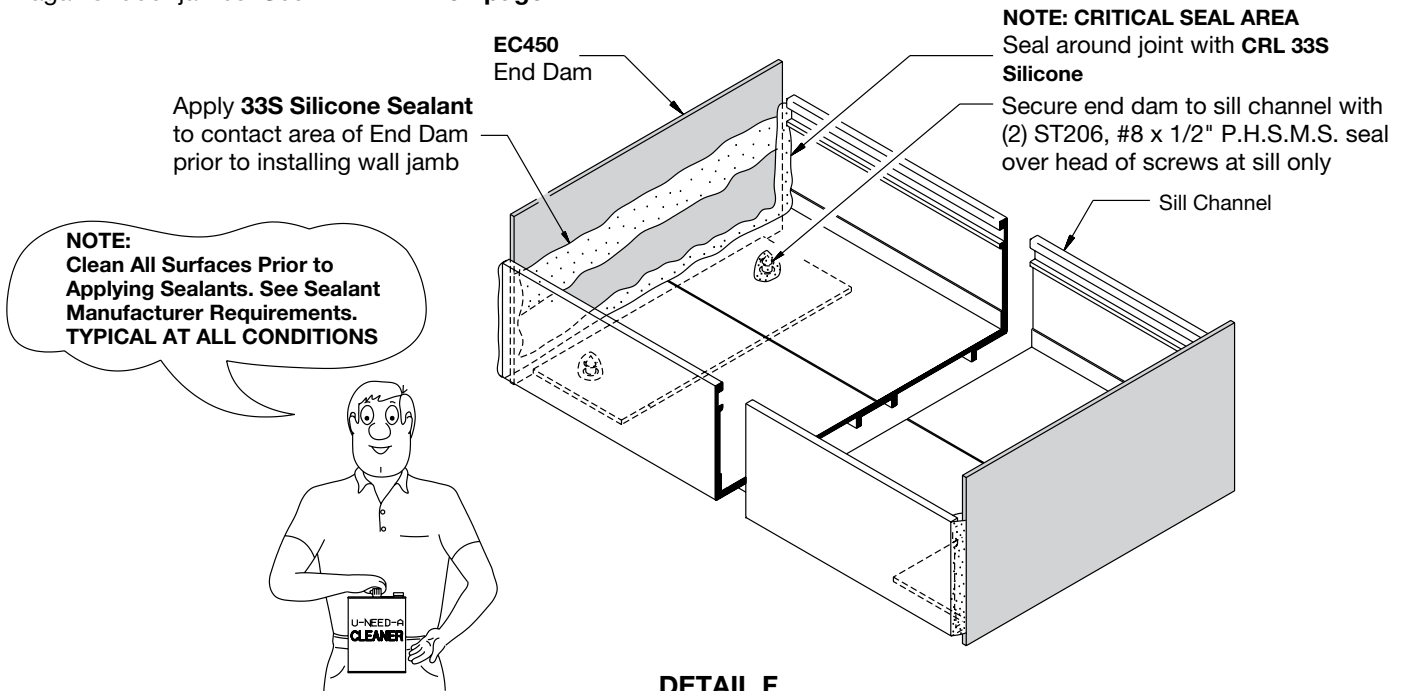
# SERIES 400-S, 450-S, 451-S, AND IT451-S

4. Prepare end of Horizontals for ST240, #10 x 1/2" F.H.S.M. Anchor Screws. See **DETAIL E**.



**DETAIL E**

5. Apply end dams to head and sill channels at ends of opening and secure with screws. Seal around joint using **CRL RTV408 Silicone** to control water infiltration. See **DETAIL F**. Do not apply end dams to ends that butt against door jambs. See **DETAIL FF** on page 21.



**DETAIL F**



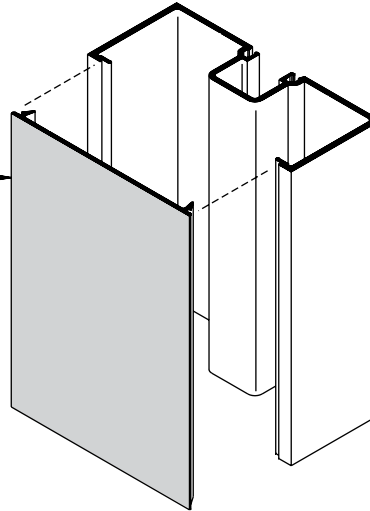
## FRAME INSTALLATION

1. Set head and sill channels in place plumb and square; shim as required to level and anchor to structure. Locate fasteners 6" (152.4) each side of verticals and 24" (609.6) O.C. or as required. Holes for fasteners should be elongated laterally to allow for thermal expansion. Using **CRL 33S Silicone** seal over head of fasteners. **Pin head and sill to structure at one point only per cut length.** (This hole is not elongated). Sill should be shimmed at fasteners location and under loading points. **See DETAIL I, on page 9.** For head and sill splice joints **see DETAIL DD, on page 19.** Make sure sill channel remains clean of debris during installation to prevent blockage of weep slots.
2. Install urethane baffles into sill channel at weep slot locations. (Use silicone to hold them in place as necessary). **See DETAIL I, on page 9.**
3. Apply jamb filler to back of wall jamb. **See DETAIL G.**

Flat filler is required at Series 400-S. Optional at Series 450-S, 451-S, and IT451-S

**NOTE: Flat filler to be full length of jambs at SERIES 400-S. if used at SERIES 400-S it could be cut to 6" (152.4) pieces and placed at center of jamb anchors**

DETAIL G

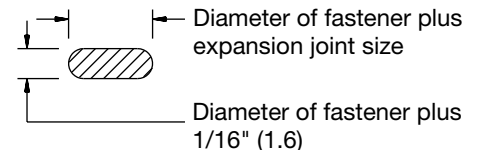


4. Install wall jamb into head and sill channels. Shim and plumb as required. **See DETAIL H.**

Shim as required  
**NOTE: Do not shim behind End Dam to allow for thermal movement**

**NOTE: CRITICAL SEAL AREA.** Carefully seal over head of Head and Sill fasteners using **CRL 33S Silicone**

**NOTE: The projection of some wedge type fasteners in close proximity to vertical members will require a simple clearing notch on vertical for installation. Sleeve type anchors offer minimal projection.**

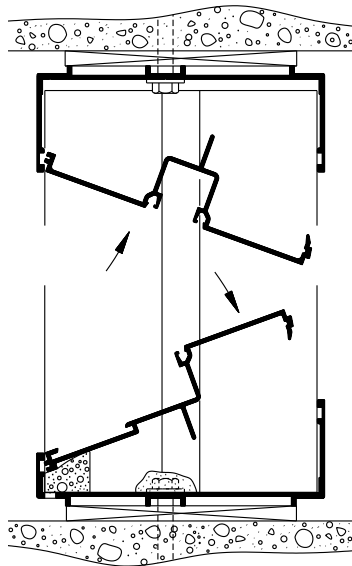


ELONGATED HOLE SIZE FORMULA

DETAIL H

## SERIES 400-S, 450-S, 451-S, AND IT451-S

5. Snap-in head and sill fillers for the first glass bay. See **DETAIL I**.

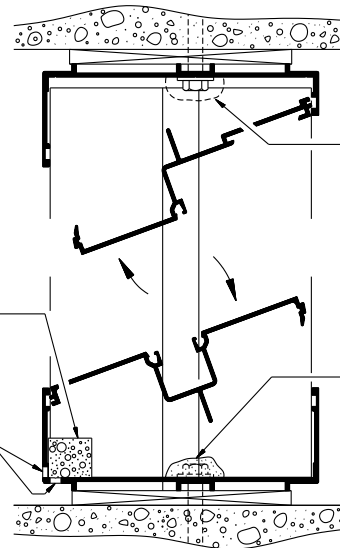


**EXTERIOR GLAZING**

Install urethane baffles at Weep Hole locations

3/16" x 1/2" (4.8 x 12.7) Weep Slots, two per glass bay (on bottom or face of sill)

**NOTE:** For best water performance locate on bottom of sill channel.



**INTERIOR GLAZING**

**NOTE:** Apply **CRL 33S Silicone** to seal over head of fasteners at head when there is no interior perimeter seal to prevent air infiltration

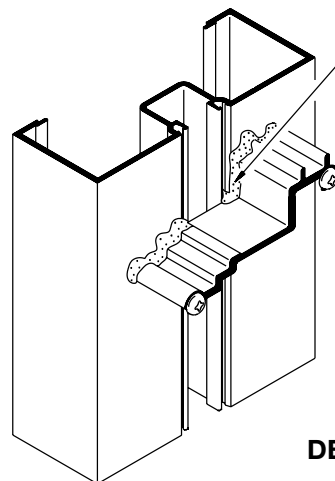
**NOTE:**  
**CRITICAL SEAL AREA**  
Carefully apply **CRL 33S** to seal over head of fasteners (at sill only). (Typ.)

### DETAIL I

If tubular horizontals are being used follow steps on page 10.

#### USING OPEN BACK HORIZONTALS

6. Install next Vertical tight against head and sill fillers. **NOTE: Verticals are not symmetrical. Never allow two shallow pockets to face each other. Verticals must be secured at top and bottom when end reactions exceed 500lbs. (2224N.)**
7. Snap-in head and sill inserts for the second glass bay and repeat steps 5 and 6 until all Verticals are installed and all head and sill inserts are snapped in place. At the last glass bay install wall jamb in place before snapping-in head and sill inserts.  
**NOTE: A check should be made every four bays to monitor accumulation of horizontal member cutting tolerances.**
8. Butter anchor clip contact areas and joints prior to horizontal installation. See **DETAIL J**.



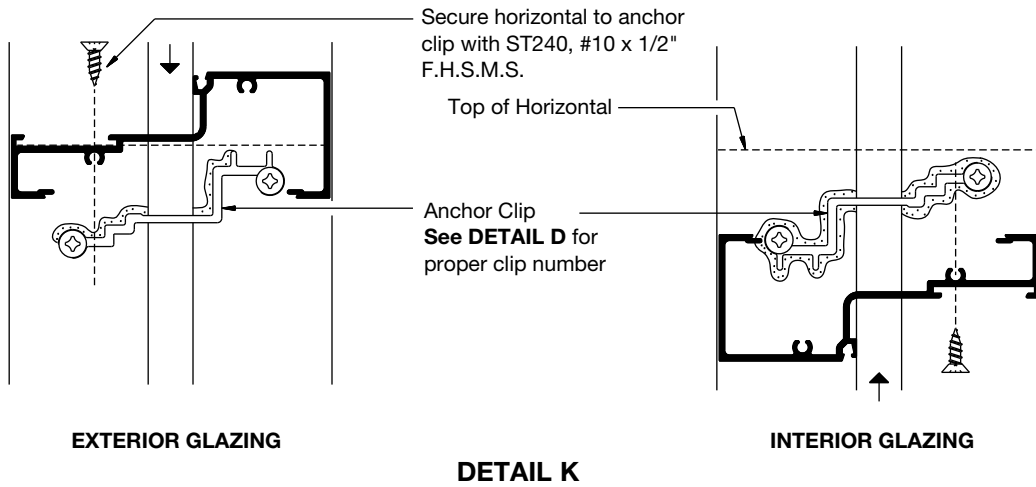
Apply **CRL RTV408 Silicone** to seal joint between Vertical and Anchor Clip immediately before Horizontal installation

**NOTE:** Exterior glazing shown. Seal under Anchor Clip for interior glazing. See **DETAIL K** on Page 10.

### DETAIL J

## SERIES 400-S, 450-S, 451-S, AND IT451-S

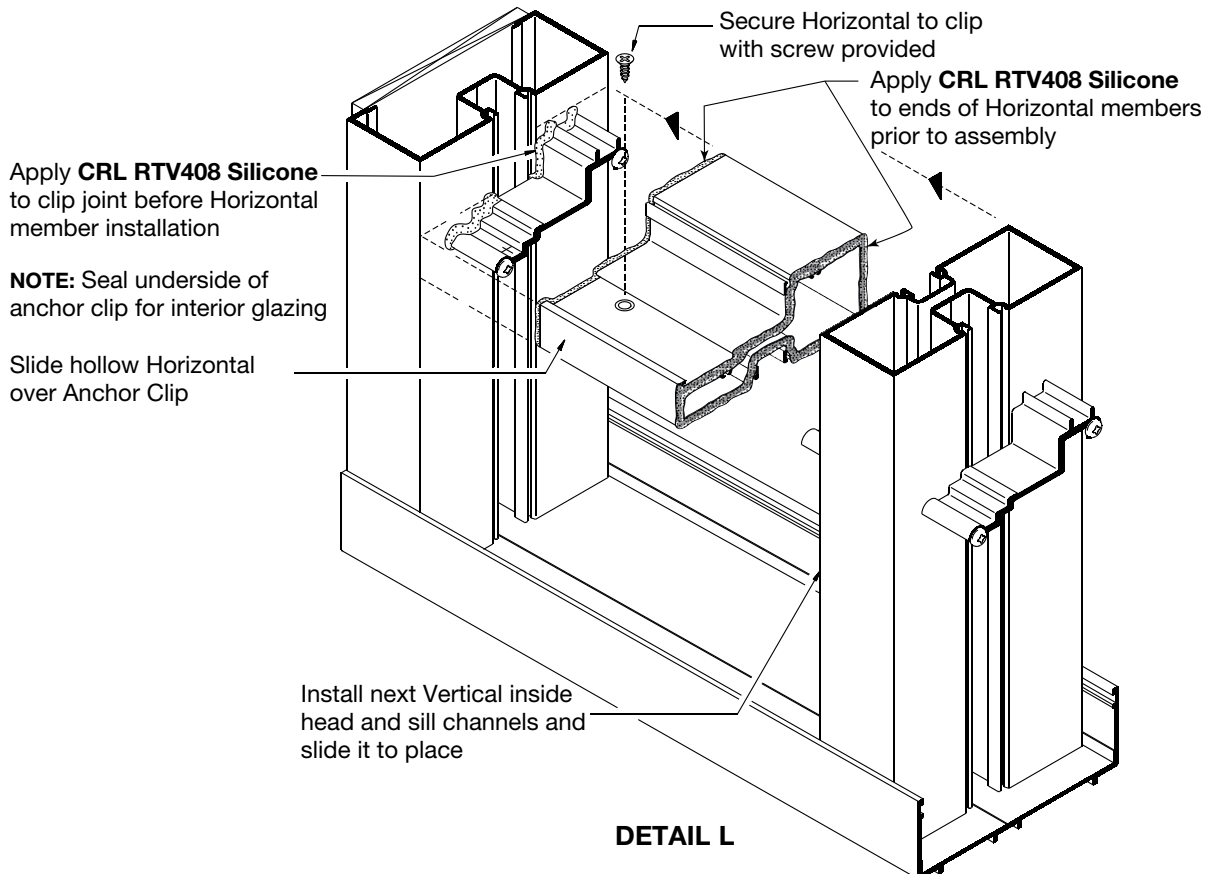
9. Set Horizontals over anchor clips and secure with screws provided. **See DETAIL K.**



## USING TUBULAR HORIZONTALS

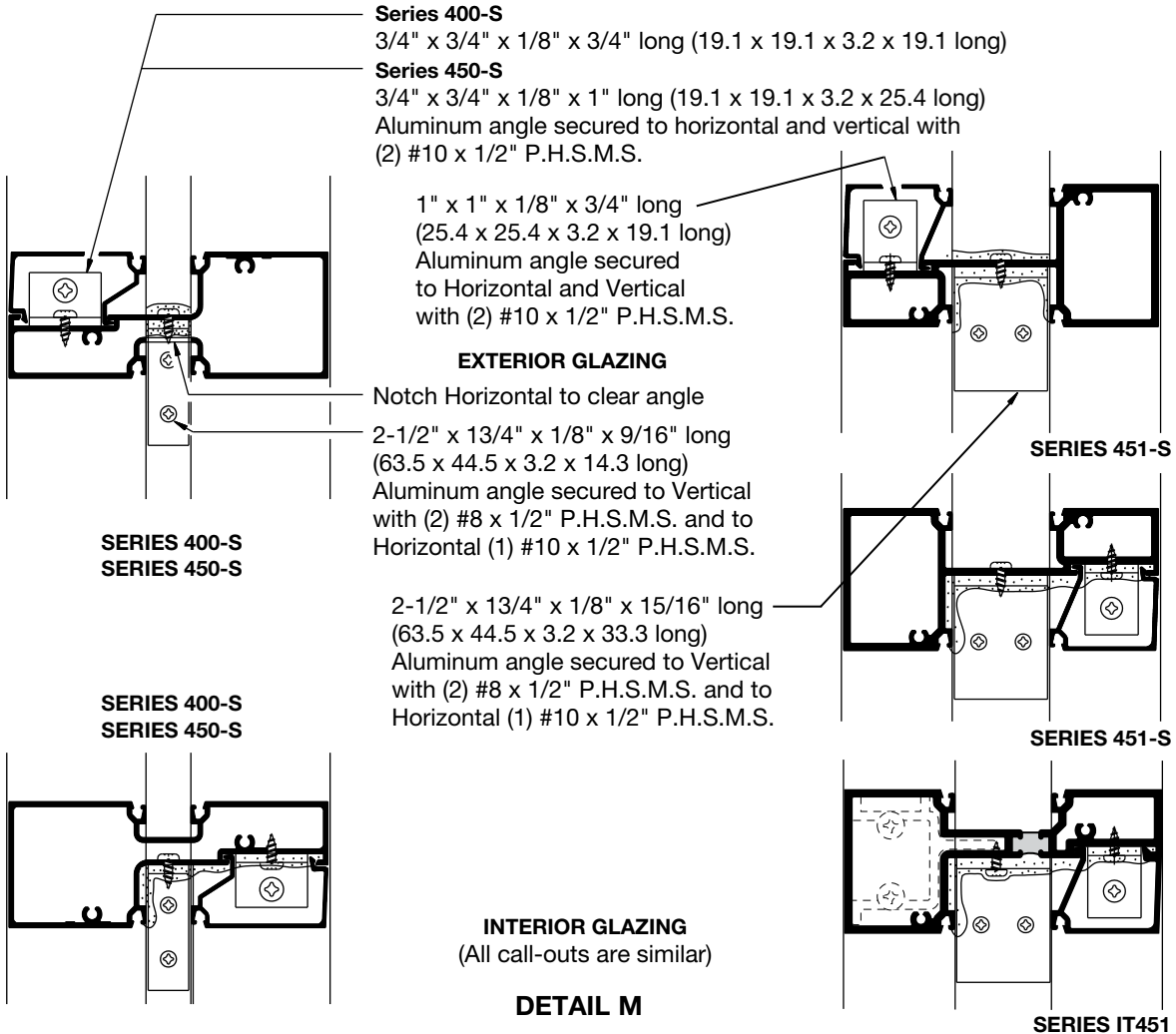
1. Butter anchor clip contact areas and end of Horizontals with **CRL RTV408 Silicone** as shown on **DETAIL L**.
2. Slide hollow Horizontal over anchor clip. **See DETAIL L.**
3. Install next Vertical tight against head and sill fillers. **NOTE:** Verticals are not symmetrical. **Never allow two shallow pockets to face each others.**

**Verticals must be secured at top and bottom when end reactions exceed 500lbs. (2224N.)**

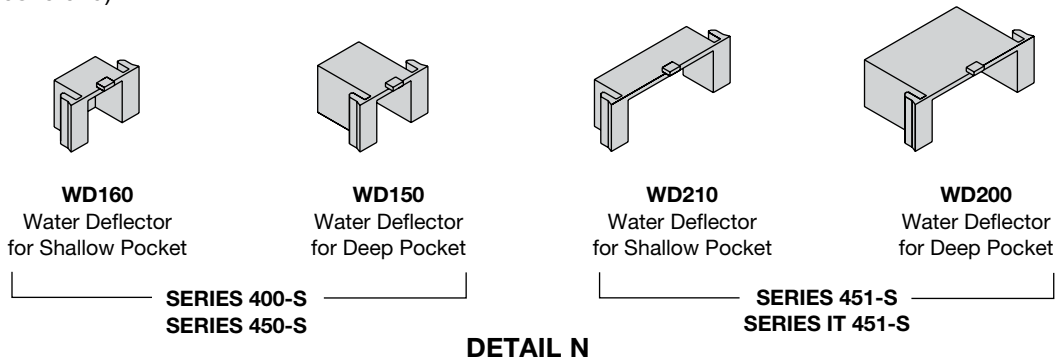


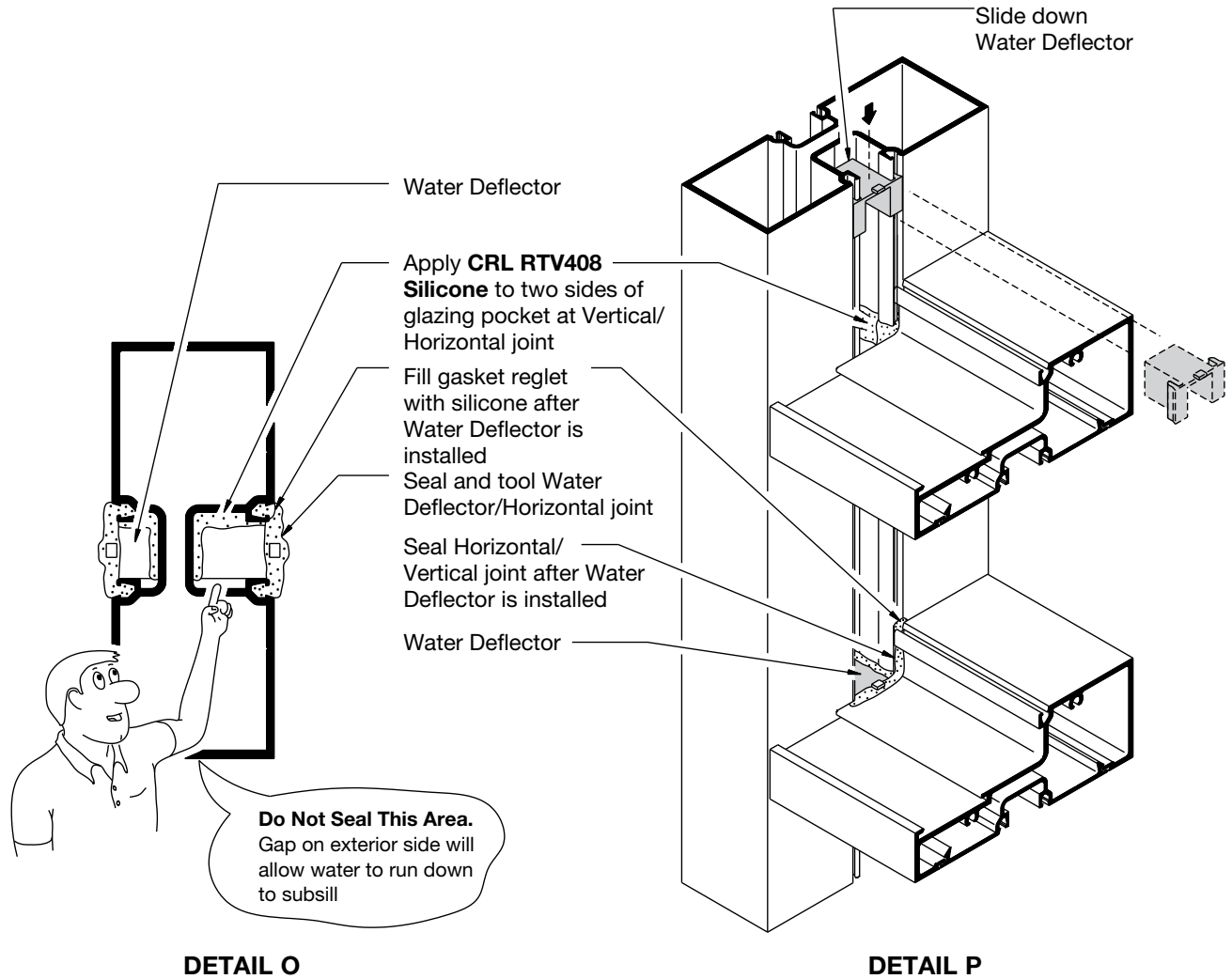
**SERIES 400-S, 450-S, 451-S, AND IT451-S**

4. The tubular Horizontal at the last bay requires the use of custom angle clips at one end. **See DETAIL M.** Do not use deflectors shown on step 6 on these conditions. Anchor clips that fit into glazing pockets will act as water deflectors. Seal around clips as shown on **page 12, DETAIL O.**



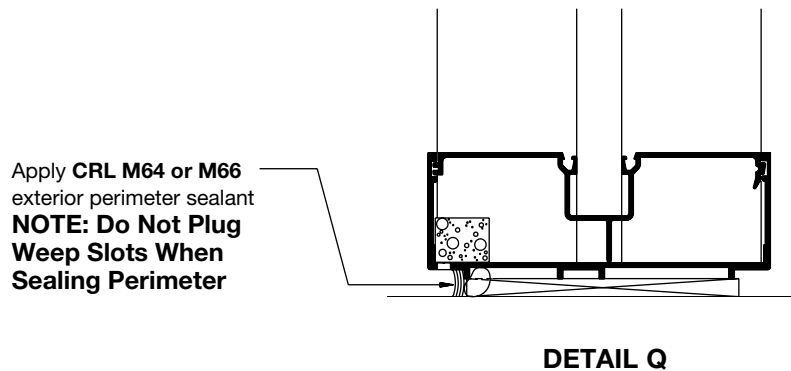
5. Apply **CRL RTV408 Silicone** to vertical glazing pocket and gasket reglet at vertical/horizontal intersection. Silicone must be applied to two sides of pocket only. Clearance at outside will allow water to run down to sill channel. **See DETAILS O and P,** on page 12.
6. Insert water deflector into glazing pocket and slide it down into position. **See DETAIL P,** on page 12. Top of deflector must be flush with horizontal glazing pocket.  
**NOTE:** Water deflectors at door jambs must be sealed all around to prevent water from running to floor. (Water will drain at opposite end).





## INTERIOR GLAZING

1. When interior glazing a multi-story building exterior perimeter sealing must be done before glazing, unless caulking is to be done from exterior as a secondary operation. **See DETAIL Q.**



## EXTERIOR GLAZING

Perimeter sealing may be done later.

## GLAZING

GLASS SIZES\*

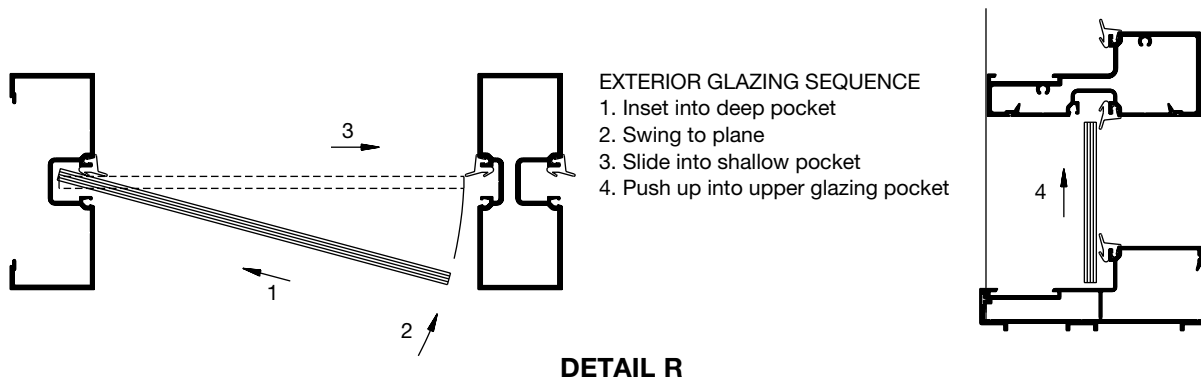
SERIES 400-S AND 450-S = Daylight Opening + 5/8" (15.9)  
 SERIES 451-S and IT451-S = Daylight Opening + 7/8" (22.2)

**\*NOTE: These formulae do not take into account glass tolerances. Consult glass manufacturer before ordering glass.**

**Cut glazing gaskets to size. Gasket should be cut 1/8" (3.2) longer per foot of aluminum member to allow for shrinkage. Same gaskets are used for interior and exterior.**

## EXTERIOR GLAZING

1. Install interior gaskets. Vertical gaskets run through. Start at corners and work towards center. Tight butt joined corners are critical to avoid leakage. Seal ends of horizontal gaskets prior to abutting to vertical gaskets.  
**NOTE: All glazing pockets must be clean of debris before glazing to prevent blockage of weeps or drains.**
2. Set glass in place following the four step procedure. See **DETAIL R**. Be careful not to disturb interior gasket while installing glass. Center glass in the opening.



3. Install setting blocks in horizontal/sill members. Check deadload charts and shop drawings for correct setting block locations.

Use SB140 Setting Block for Series 400-S and 450-S



Use SB200 Setting Block for Series 451-S and IT451-S



4. Rest glass on setting blocks pressed against interior gaskets.

## INTERIOR GLAZING

5. Install setting blocks, two per glass lite, into horizontal and sill members. Check deadload charts and shop drawings for correct setting block locations.



Use (1) SB045 at Intermediate Horizontal and (3) SB045, stacked at Sill



Use SB200 at Sill  
 For Series IT451-S use at Sill and Intermediate Horizontal



Use SB240 at two piece Intermediate Horizontal



Use SB110 at Tubular Horizontal

SERIES 400-S and 450-S

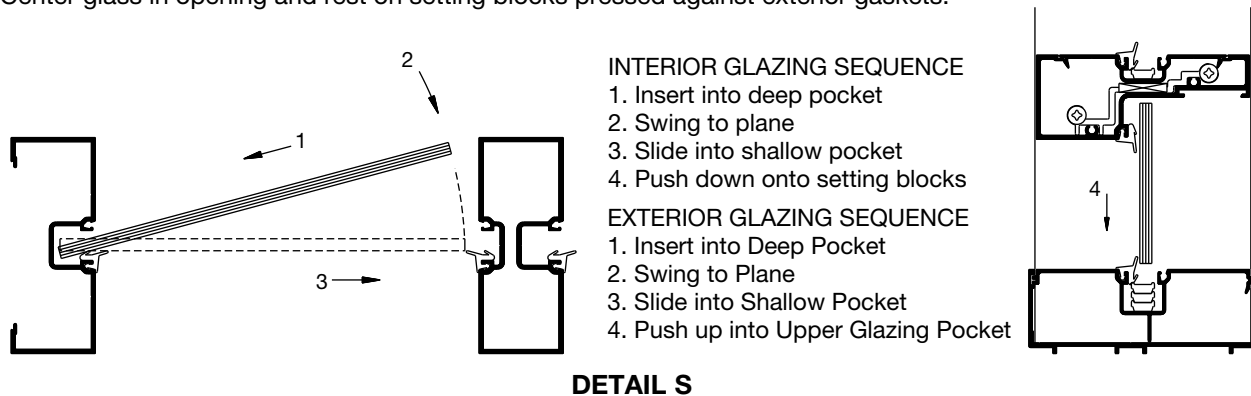
SERIES 451-S

## SERIES 400-S, 450-S, 451-S, AND IT451-S

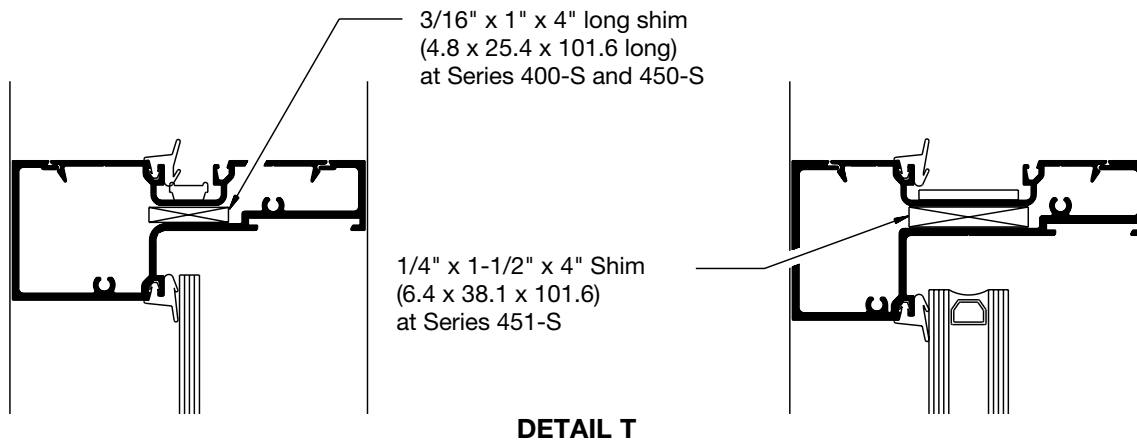
6. Install exterior gaskets. Vertical gaskets run through. Start at corners and work towards center. Tight butt joined corners are critical to avoid leakage. Seal ends of horizontal gaskets prior to abutting to vertical gaskets.

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

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



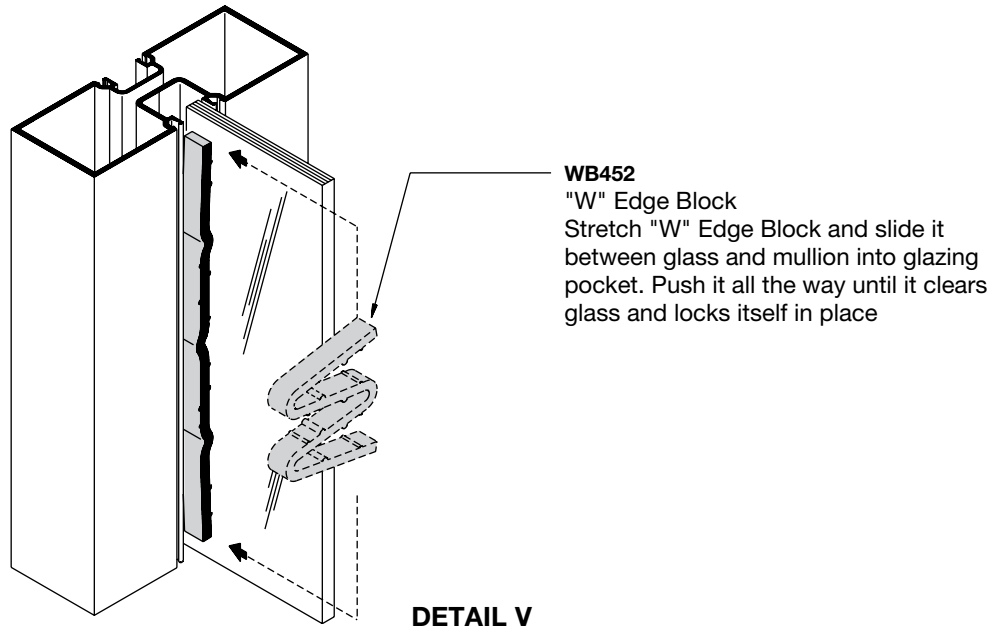
**NOTE:** Shimming under filler at setting block locations is required for interior glazing applications using two piece horizontals. **See DETAIL T.** (Shimming not used for IT451-S)



9. Snap-in glazing beads. **See DETAIL U.**



10. To prevent glass from shifting in the opening one "W" Edge Block should be installed into deep glass pocket of the Vertical at center point or as recommended by glass manufacturer. **See DETAIL V** on page 15.

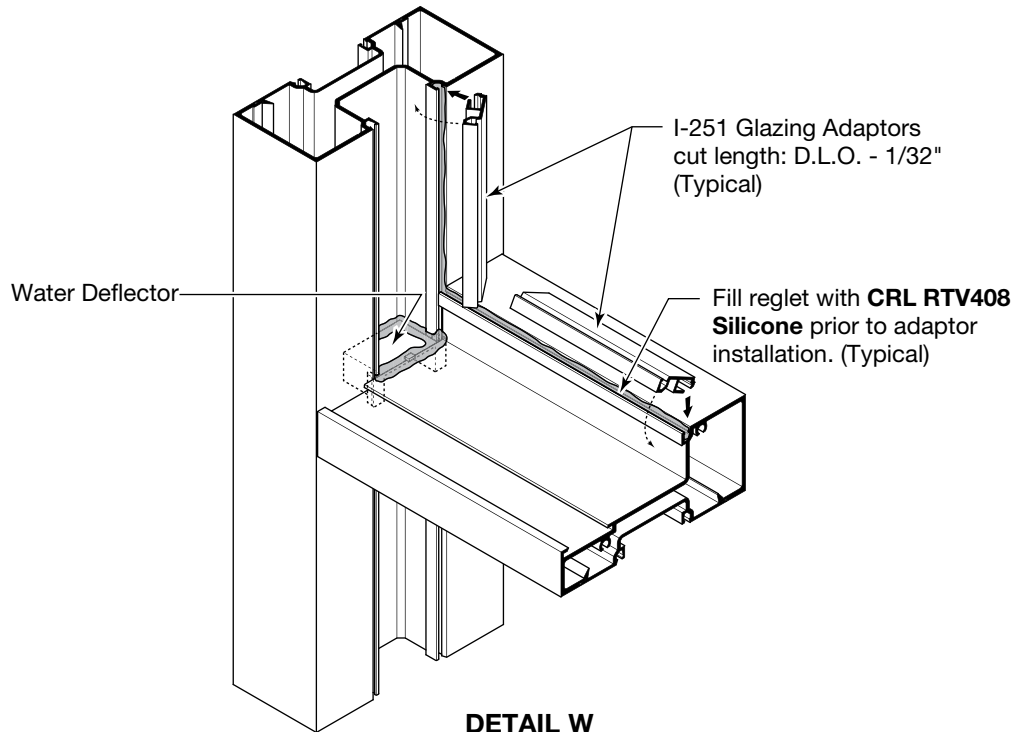


11. Install remaining gaskets. Vertical gaskets run through. Start at corners and work toward center. Tight butt joined corners are critical to avoid leakage. Seal ends of horizontal gaskets prior to abutting to vertical gaskets.

## TRANSITION GLAZING

Transition adaptors for 1/4" spandrel are supplied as required. Adaptors are cut Daylight Opening (DLO) minus 1/32". Run continuous bead of silicone sealant into reglet and install adaptors. **See DETAIL W.**

**NOTE:** Always install water deflector before rolling in adaptors. Use deflectors for 1" (25) glazing.





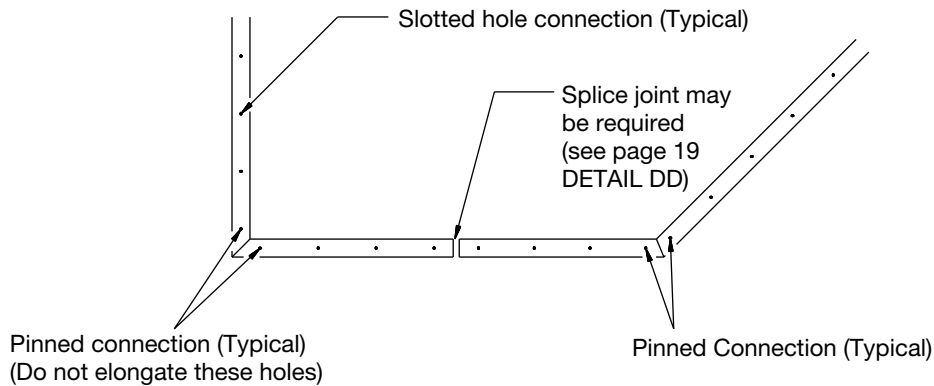
## 90° CORNER CONDITIONS

Head and sill channels should be mitered as required.

Corner members should be cut the same length as intermediate verticals.

Head and sill channel **must be pinned to structure on both sides of corner**, to prevent movement at mitered joint. (Do not elongate the hole where it is pinned)

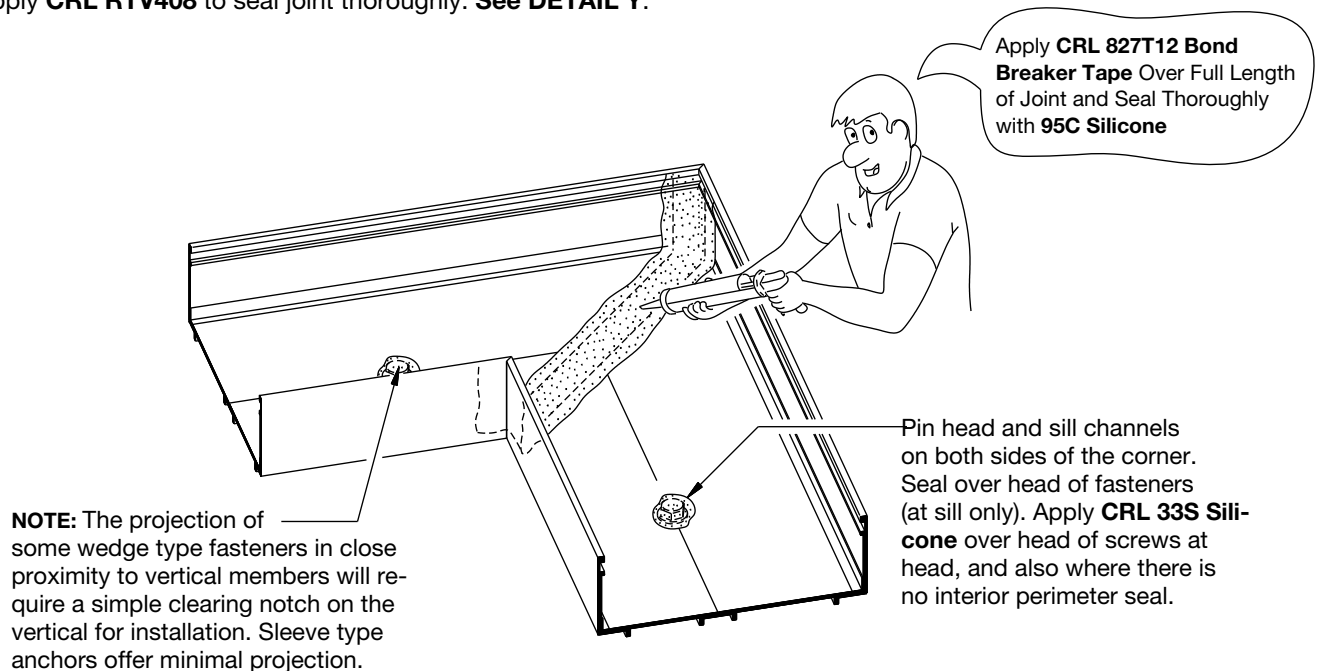
Elevations with corners at both ends require a splice joint to accommodate thermal movement. **See DETAIL X.**



FLOOR PLAN

DETAIL X

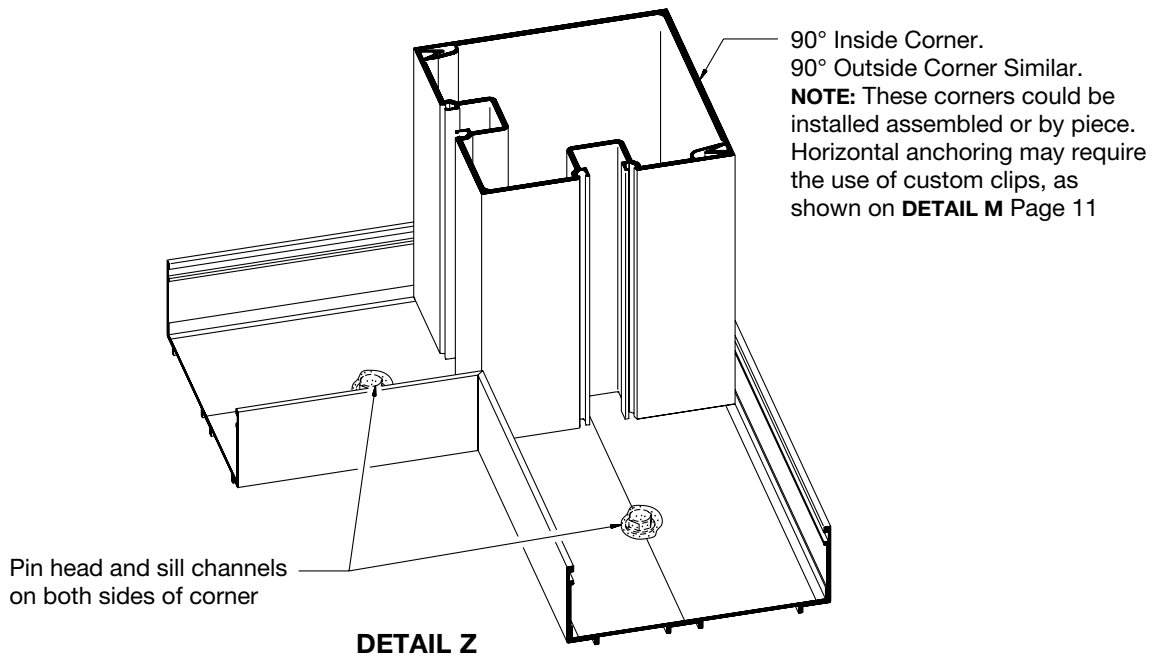
1. Install mitered head and sill channels in place and secure them to structure. **See DETAIL Y.**
2. Apply **CRL RTV408** to seal joint thoroughly. **See DETAIL Y.**



DETAIL Y

## 90° INSIDE AND OUTSIDE CORNERS

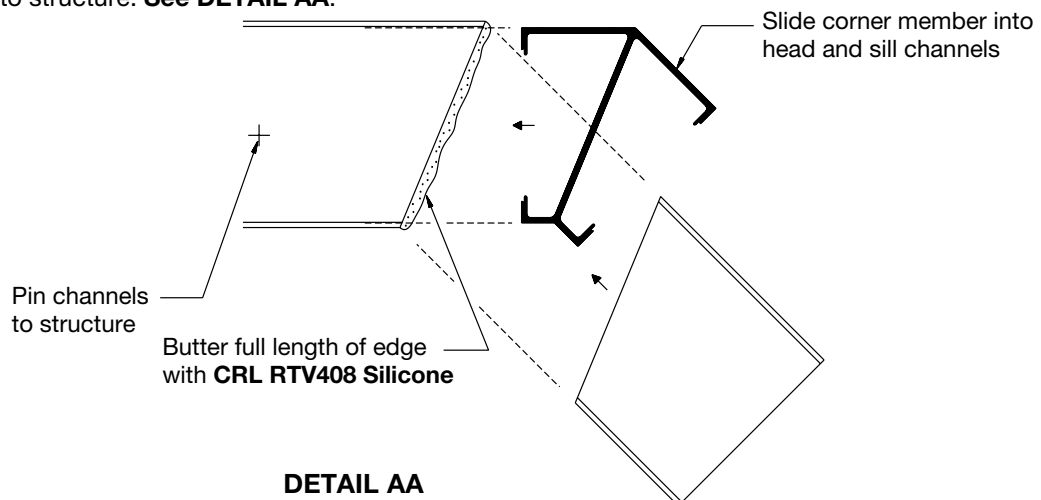
3. Install 90° corner post, assembled together as a vertical. Series 400-S and 450-S corners offer deep glazing pockets. Series 451-S and IT451-S corner post have one shallow pocket. Plan installation accordingly.  
**Never allow two shallow pockets to face each other.**



## 135° INSIDE AND OUTSIDE CORNERS

USING JS640/JS645 CORNER MEMBER

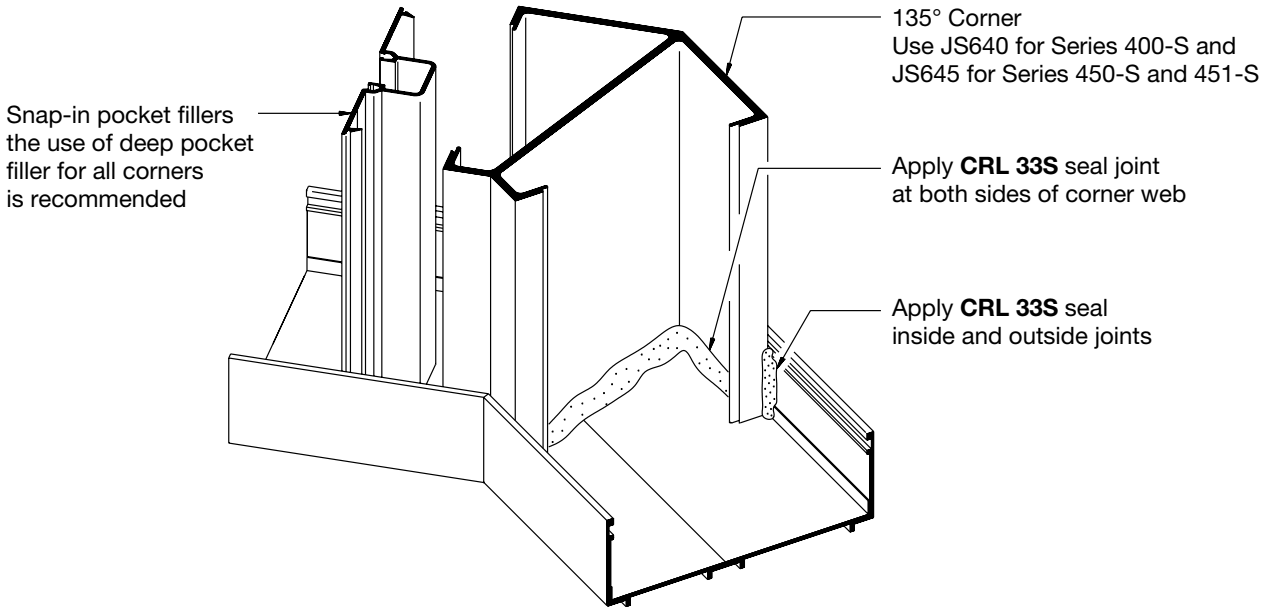
1. Install mitered head and sill channels on one side of corner and secure to structure. Apply **CRL RTV408 Silicone** to edge of channels. **See DETAIL AA.**
2. Set 135° corner in place, inside head and sill channels.
3. Install head and sill channels on the other side of corner. Press tight against installed channels to ensure a good joint and secure to structure. **See DETAIL AA.**



4. Apply **CRL RTV408 Silicone** to both sides of corner web at sill and over head of fasteners. Fill all voids with sealant. **See DETAIL BB**, on page 18.

## SERIES 400-S, 450-S, 451-S, AND IT451-S

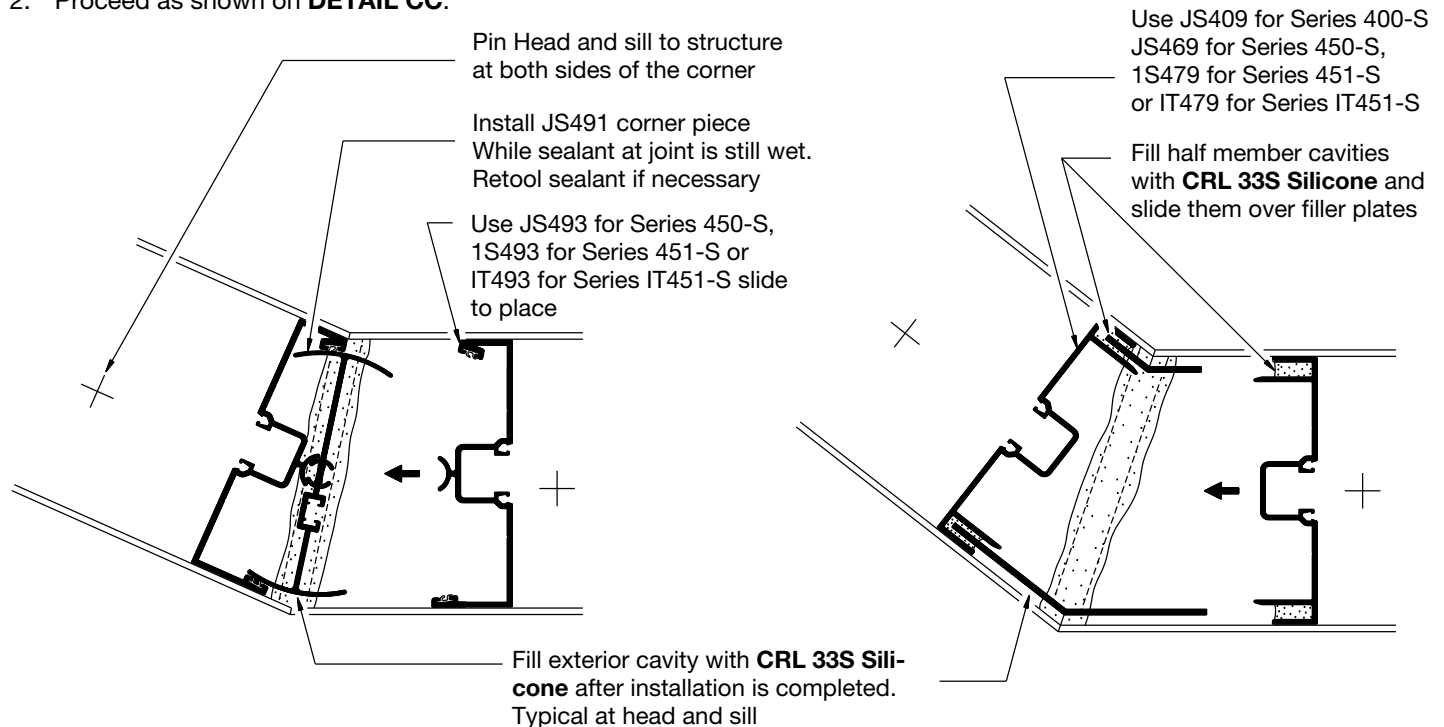
5. Snap-in glazing fillers. To simplify deep/shallow pocket planning the use of two deep pocket fillers is recommended. See **DETAIL BB**. (Not used for IT451-S)



**DETAIL BB**

## CUSTOM ANGLE INSIDE AND OUTSIDE CORNERS

1. Miter head and sill channels to the required angle, and install as shown on **DETAIL Y**, page 16.
2. Proceed as shown on **DETAIL CC**.



**0° TO 24° ANGLE INSIDE OR OUTSIDE CORNER**  
(Not available for Series 400-S)

**ANY ANGLE INSIDE OR OUTSIDE CORNER**

**DETAIL CC**

## HORIZONTAL EXPANSION JOINTS

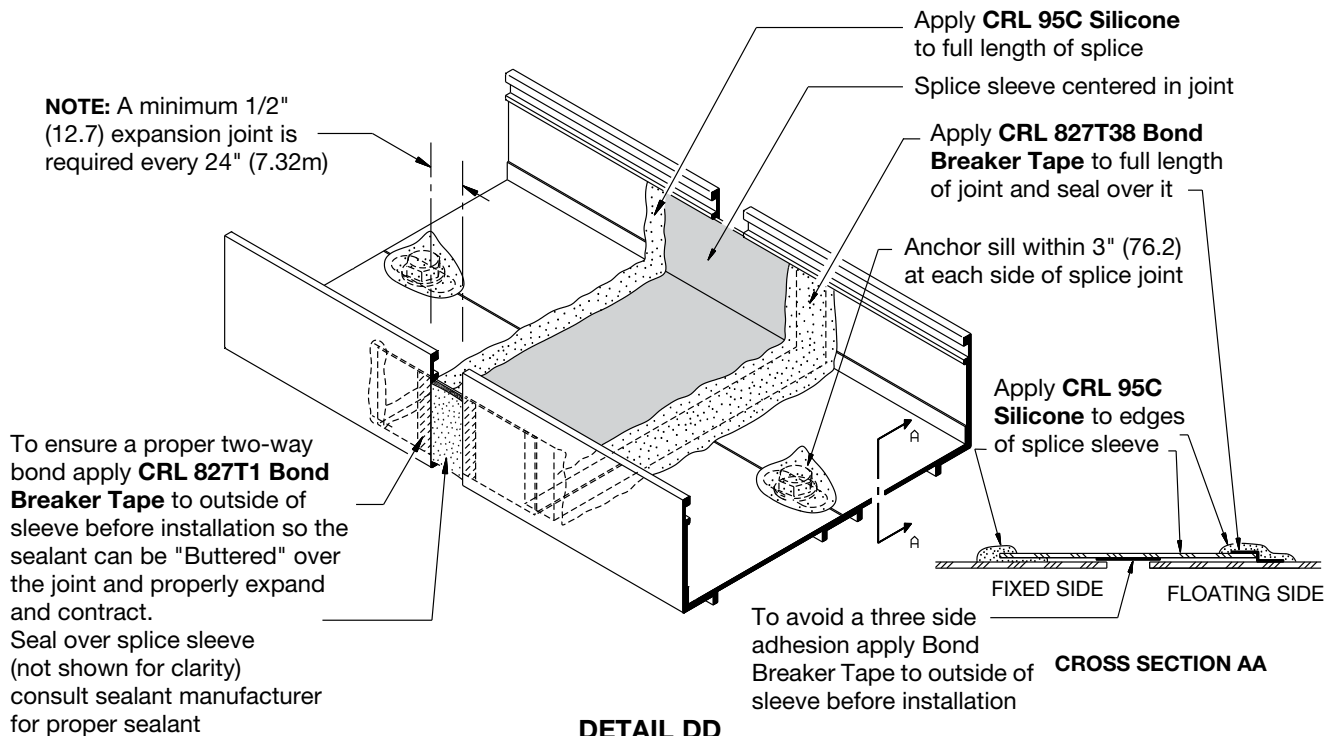
Elevations exceeding 24' (7.32m) in width require splice sleeves to accommodate thermal movement. Joints width should be calculated according to job conditions and architectural specifications.

Linear expansion for aluminum, in inches	= Length (") x F° difference in temperature x .000129
Linear expansion for aluminum, in millimeters	= Length (m) x C° difference in temperature x .02322

**Locate splice joints near center of D.L.O.**

Elongate holes for installation fasteners at head and sill channels to allow for thermal movement.

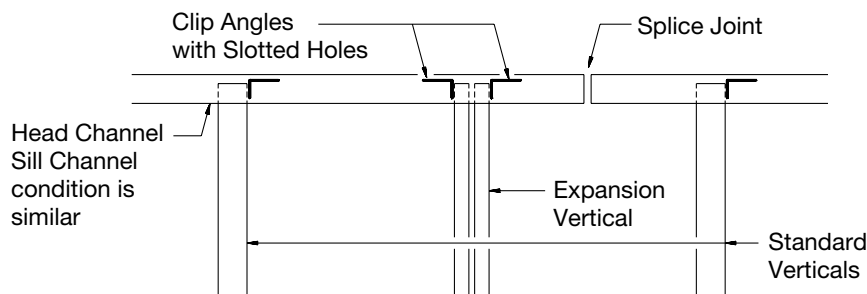
**Pin head and sill channels at one point only per cut length.** (This hole is not elongated).



**DETAIL DD**  
**SILL CHANNEL SPLICE FOR INTERIOR GLAZING SHOWN**  
**OTHER CHANNEL SPLICES ARE SIMILAR**

Two-piece Expansion Verticals are recommended for long run elevations with Intermediate Horizontals. **Their location should be determined according to job conditions and architectural specifications.**

**NOTE:** If Verticals need to be secured at top and bottom (see step 6, on page 9) two-piece expansion verticals must be used near splice joints. **See DETAIL EE.** Two-piece Verticals allow for 3/8" (9.5) maximum movement



**DETAIL EE**

## ENTRANCE FRAMES

1. Cut door jambs to FRAME HEIGHT minus 5/8" (15.9), except at condition 1 on page 21.  
Door jambs run to floor.

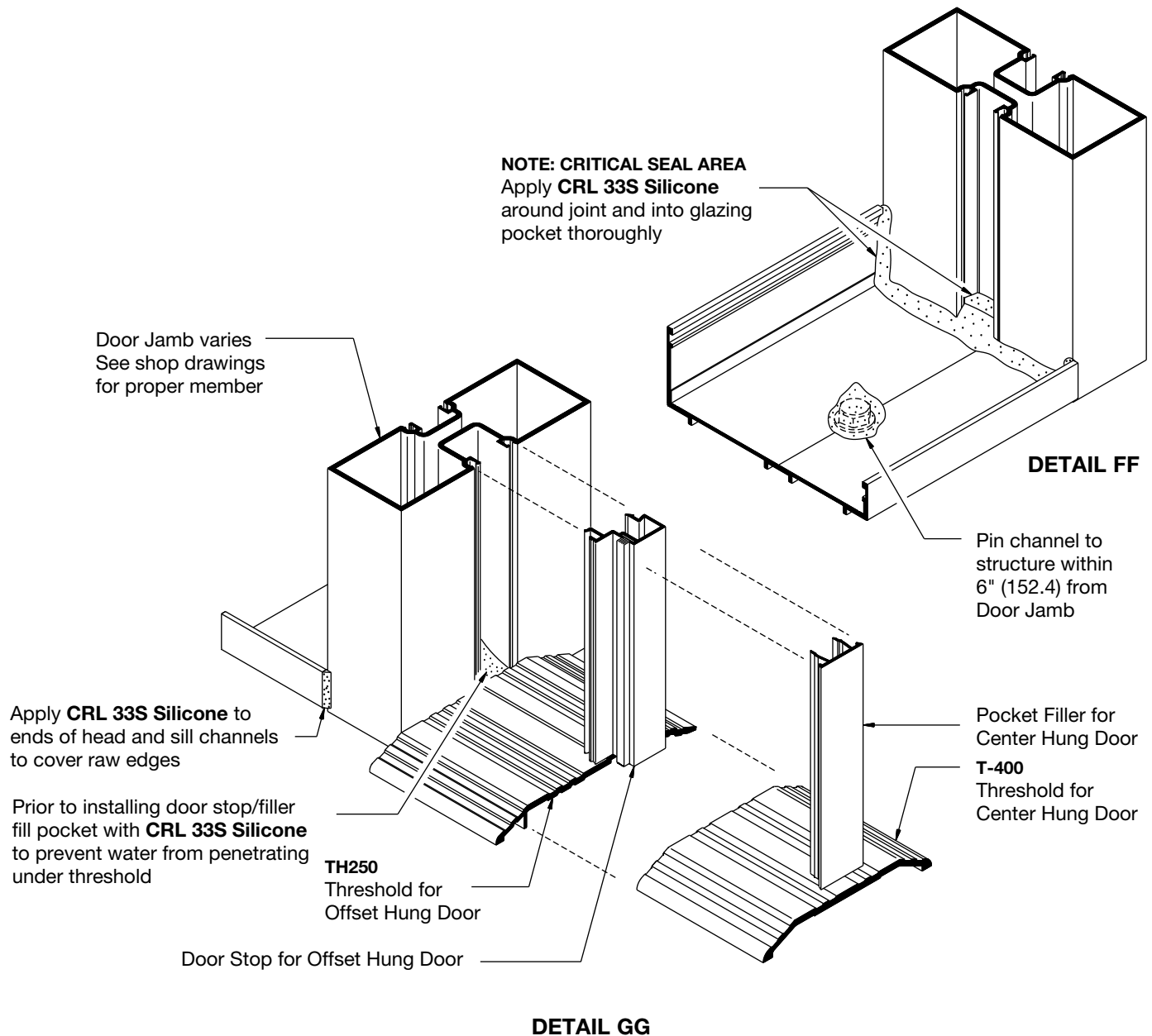
**Door jambs must be anchored at top and bottom.**

Sill and head channels are 1/4" (6.4) deeper than Vertical members; in conditions where they butt against door jamb apply **CRL RTV408 Silicone** to end of channels to cover raw edges. **See DETAIL GG.**

### SILL CHANNEL:

Butts against door jamb. Seal thoroughly around joint. **See DETAIL FF.**

Pin sill channel within 6" (152.4) from door jamb to prevent movement.



# SERIES 400-S, 450-S, 451-S, AND IT451-S

## HEAD CHANNEL:

Door without transom: Head channel may run continuous or butt against door jamb. See **DETAIL HH**.

Door with transom: Head channel runs continuous. See **DETAIL HH** below.

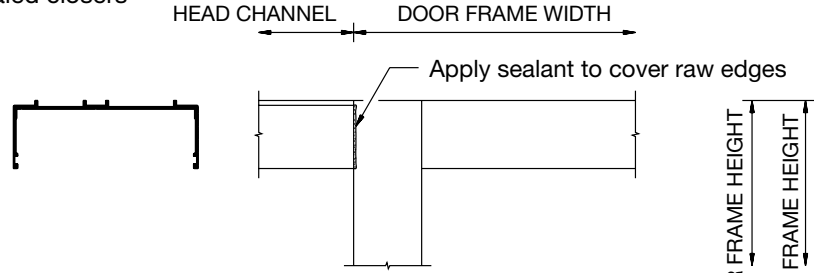
Transom glazing may require the use of glazing sash at door jambs and header. See shop drawings to determine transom glass sizes.

## ENTRANCE FRAMES

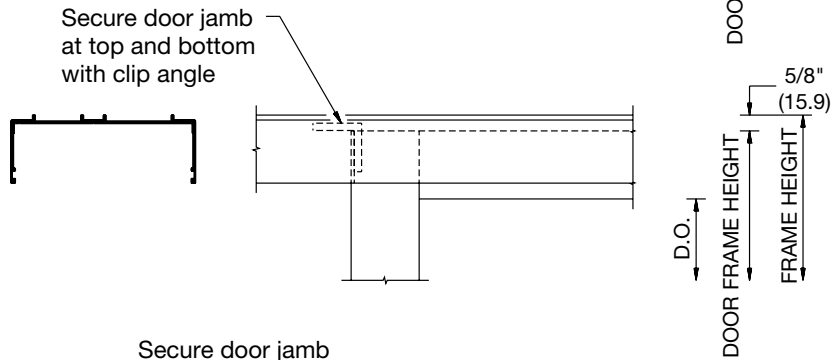
### DOORS WITHOUT TRANSOM

**NOTE:** Doors with overhead concealed closers must follow condition 1.

**Condition 1:**  
Head channel butts against door frame

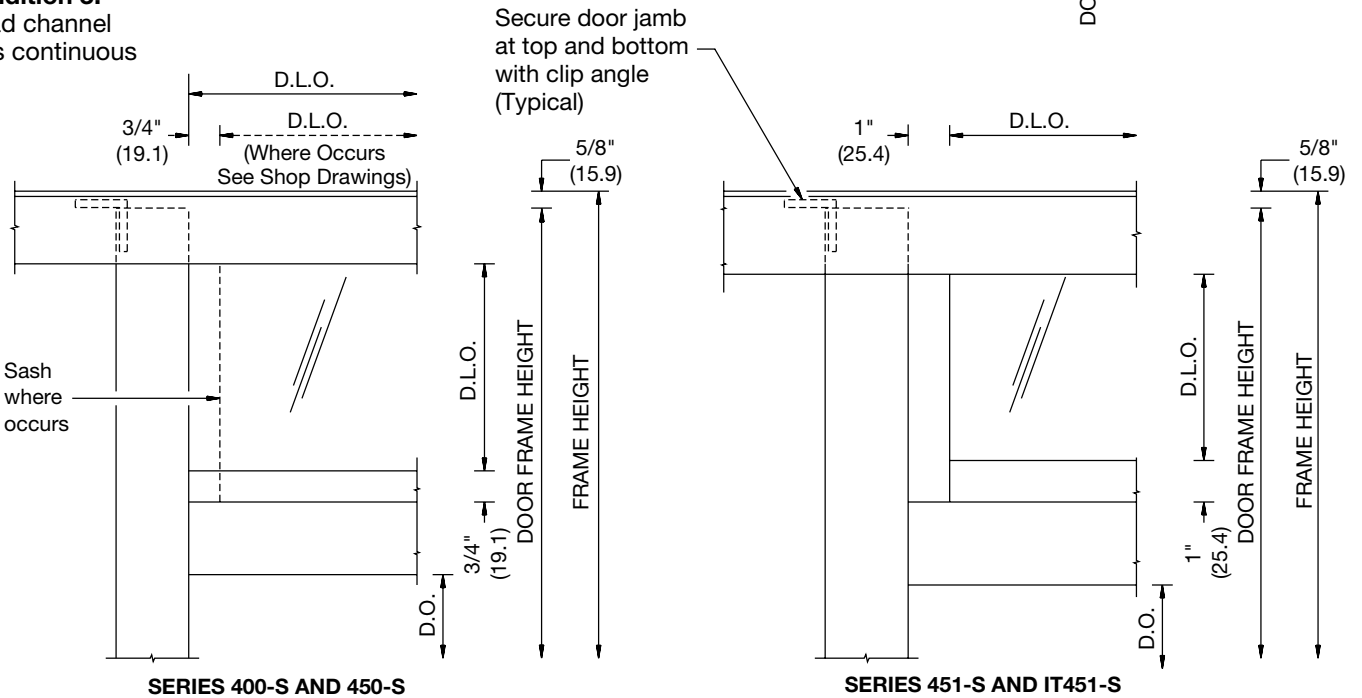


**Condition 2:**  
Head channel runs continuous



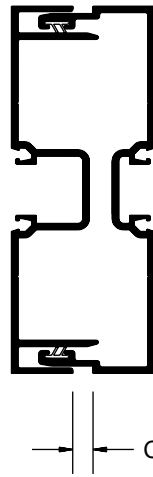
### DOORS WITH TRANSOM

**Condition 3:**  
Head channel runs continuous

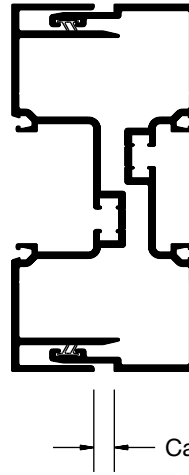


DETAIL HH

## EXPANSION MULLIONS



JS419/JS410 for  
SERIES 400-S  
JS469/JS460 for  
SERIES 450-S



1S479/1S470 for  
SERIES 451-S  
1T479/1T470 for  
Series IT451-S

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



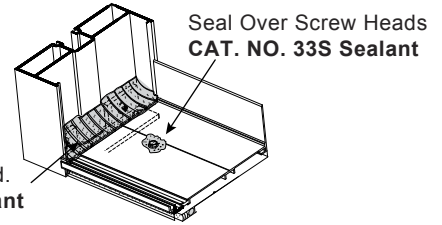
# GUIDE TO SEALANTS

## WATERPROOFING

- **33S ACETIC CURE SILICONE**

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

Fill with Sealant to Create a Water Shed.  
CAT. NO. 33S Sealant

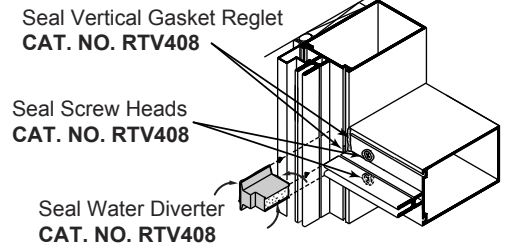
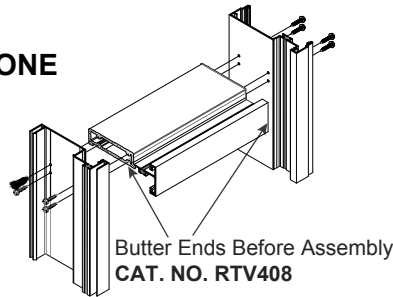


Sill to Subsill, End Dams, Screw Heads and Threshold to Door Frame Sealing.

## JOINT ADHESIVE

- **RTV408 NEUTRAL CURE SILICONE**

NOTE: I.G. butyl contact OK.



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

## PERIMETER

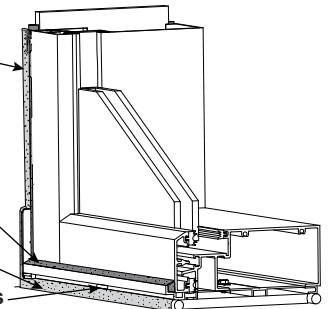
- **95C NEUTRAL CURE SILICONE**
- **M64 (SMOOTH) MODIFIED POLYURETHANE**
- **M66 (TEXTURED) MODIFIED POLYURETHANE**

Exterior Perimeter Caulking  
CAT. NO. 95C/M64/M66

Waterproofing Silicone Sealant  
CAT. NO. 33S/RTV408

Exterior Perimeter Caulking  
CAT. NO. 95C/M64/M66

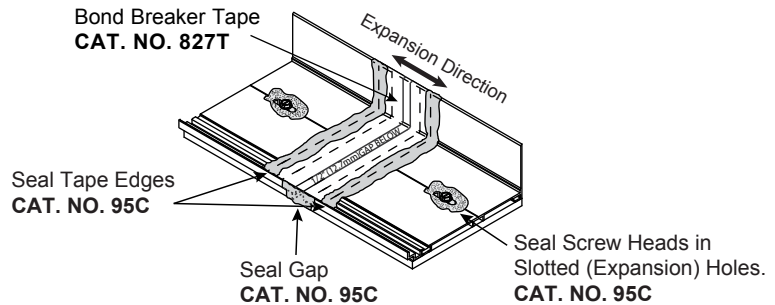
Do Not Block Weepholes



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

## EXPANSION

- **95C NEUTRAL CURE SILICONE**



Expansion Joints.

## STRUCTURAL

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

Glass to Glass or Glass to Metal.





# JOB SITE ESSENTIALS

Helpful Tools and Supplies for Installing CRL U.S. Aluminum Entrances, Storefronts, Windows, and Curtain Wall Systems



**CRL 95C Silicone Building Sealant**  
CAT. NO. 95C



**CRL RTV408 Neutral Cure Silicone**  
CAT. NO. RTV408



**CRL 33S Acetic Cure Silicone**  
CAT. NO. 33S



**CRL M64 Smooth Texture Modified Polyurethane Construction Sealant**  
CAT. NO. M64



**CRL M66 Grainy Texture Modified Polyurethane Construction Sealant**  
CAT. NO. M66



**CRL12:1 Ratio Strap Frame Caulkin Gun**  
CAT. NO. GA1203



**CRL Complete Set of Seven All Stainless Steel Spatulas**  
CAT. NO. AB958G



**CRL BOCBR Series Open Cell Backer Rod**



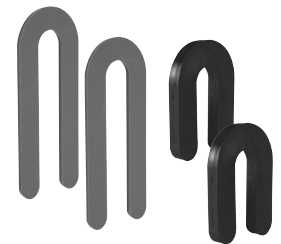
**CRL Backer Rod Roller Tool**  
CAT. NO. SBRR



**CRL Soft-Face Power Hitter**  
CAT. NO. ST57532



**CRL Saint-Gobain/Norton V2100 Thermalbond® Structural Glazing Spacer Tape**



**CRL PHS Series Plastic Horseshoe Shims**



**CRL Bond Breaker Tape**  
CAT. NO. 827T2



**CRL Glass Cutter**  
CAT. NO. S1050

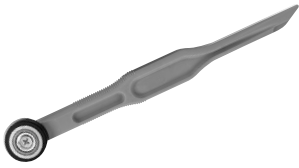


**CRL Running Pliers**  
CAT. NO. PPG1

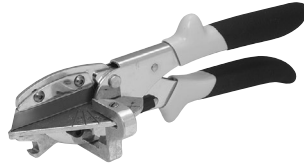


**CRL Vacuum Cup**  
CAT. NO. S7950

**SERIES 400-S, 450-S, 451-S, AND IT451-S**



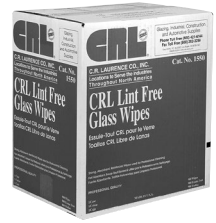
**CRL Gasket Roller  
CAT. NO. VR10**



**CRL Gasket Cutter  
CAT. NO. MC80N**



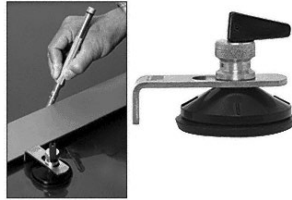
**CRL Glass Cleaner  
CAT. NO. 1973**



**CRL Glass Wipes  
CAT. NO. 1550**



**CRL Tape Measure  
CAT. NO. 54125**



**CRL Glazier's Rule Holder  
CAT. NO. RH670**



**CRL Phenolic L Square  
CAT. NO. L48**



**CRL Spring Clamp  
CAT. NO. JC3202HT**



**CRL Glass Marking Pencils  
CAT. NO. GM44**



**CRL Belt Sander  
CAT. NO. LD321**



**CRL Glass Grinding Belts  
CAT. NO. CRL3X21120X**



**CRL All Terrain Dolly  
CAT. NO. ATD1**



**CRL Gloves  
CAT. NO. KF1TL**



**CRL Utility Knife  
CAT. NO. K82**



**CRL Utility Knife Blades  
CAT. NO. 1992C**



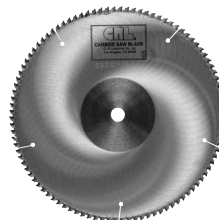
**CRL Cordless Driver/Drill  
CAT. NO. LD147**



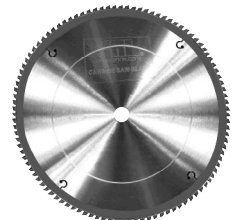
**CRL Cordless Screwdriver  
CAT. NO. LD823**



**CRL Portable  
Miter Saw 10"  
CAT. NO. LS1040**



**CRL Nordic Carbide  
Saw Blade  
CAT. NO. CSB10X100AX**



**CRL Cougar Carbide  
Saw Blade  
CAT. NO. CT10X100**

**SERIES 400-S, 450-S, 451-S, AND IT451-S**

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**CRL Door Jack  
CAT. NO. DJ1**



**CRL Hard Hat  
CAT. NO. ES3452**



**CRL Digital Level Tool  
CAT. NO. 406065**



**CRL Portable Ladder  
CAT. NO. 6206**