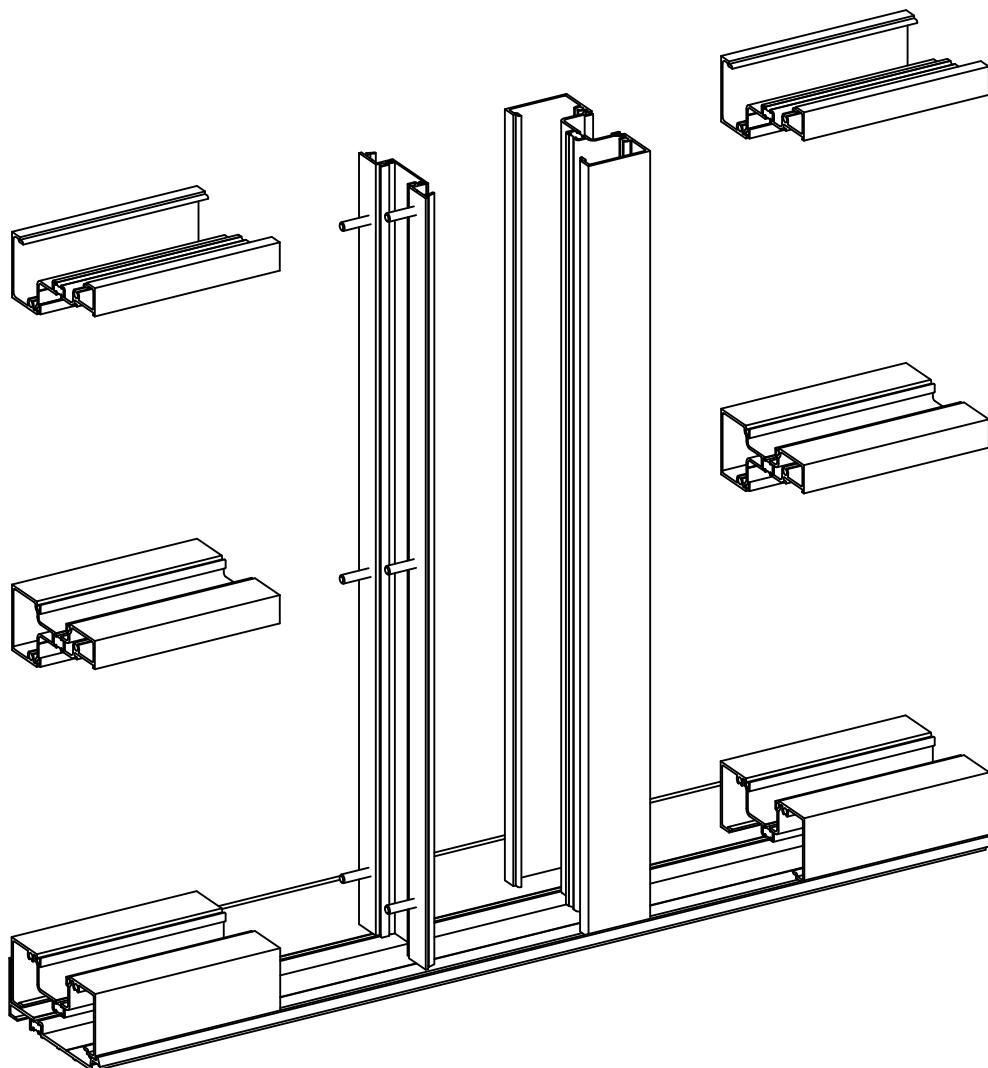


INSTALLATION

TRIFAB® 451/451T-IR

SCREW SPLINE ASSEMBLY



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INSTRUCTIONS

These instructions show the general installation sequence and procedure for typical installation.
They supplement the shop details and notations on installation and glazing.

| SECTION | PAGE | |
|----------------|-------------|------------------------------|
| I | 3-4 | GENERAL NOTES |
| II | 5 | TAKEOFF GUIDE |
| III | 6 | CUT FORMULAS |
| IV | 7, 8 | PARTS IDENTIFICATION |
| V | 9 | BASIC FRAMING DETAILS |
| VI | 10, 11 | FABRICATION |
| VII | 12-14 | INSTALLATION |
| VIII | 15, 16 | GLAZING |
| IX | 17 | MISCELLANEOUS DETAILS |

Laws and building and safety codes governing the design and use of glazed entrance, window, and curtain wall products vary widely. Kawneer does not control the selection of product configurations, operating hardware, or glazing materials, and assumes no responsibility therefor.

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HANDLING, STORING, AND PROTECTION OF ALUMINUM

The material must be protected against damage. The following precautions are recommended to assure early acceptance of your products and workmanship.

- A. HANDLE CAREFULLY** - Don't drop from the truck. Stack with adequate separation so material will not rub together. Store off the ground. Protect against elements and other construction trades. Wear hand protection to prevent injury due to sharp edges of cut extrusions.
- B. KEEP MATERIAL AWAY FROM WATER, MUD AND SPRAY** - Prevent cement, plaster, or other materials from damaging the finish.
- C. PROTECT THE MATERIALS AFTER ERECTION** - Protect by wrapping with Kraft paper or by erecting Visqueen or canvas splatter screen. Cement, plaster, terrazzo, other alkaline solutions and acid based materials used to clean masonry are very harmful to the finish and should be removed with water and mild soap IMMEDIATELY.

GENERAL INSTALLATION NOTES

The following practices are recommended for all installations:

- A. CHECK SHOP DRAWINGS, INSTALLATION INSTRUCTIONS and GLAZING INSTRUCTIONS** to become thoroughly familiar with the project. The SHOP DRAWINGS take precedence and include specific details for the project. The INSTALLATION INSTRUCTIONS are of a general nature and cover most common conditions.
- B. All materials are to be INSTALLED PLUMB, LEVEL, AND TRUE.**
- C. All work should start from bench marks and/or column lines as established by the ARCHITECTURAL DRAWINGS and the GENERAL CONTRACTOR. Check mullion spacing from both ends of masonry opening to prevent dimensional build-up of day light opening.**
- D. 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 your work.**
- E. Isolate all aluminum to be placed directly in contact with uncured masonry or incompatible materials with a heavy coat of zinc chromate or bituminous paint.**
- F. Check all materials on arrival for quantity and be sure you have everything required to begin installation.**
- G. 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, priming, tooling, adhesion, etc.**
- H. PERIMETER FASTENING** - "Fastening" means any method of securing one part to another or to adjacent materials. These instructions specify only those fasteners used within the system. Due to varying perimeter conditions and job performance requirements, anchor fasteners are not specified in these instructions. Refer to the Shop Drawings or consult a structural engineer for fastener type, sizing, and location.
- I. CHECK OPENINGS** - Make certain that the opening 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 your work.
- J. BUILDING CODES** - Glass and glazing codes governing the design and use of products vary widely. Kawneer does not control the selection of product configurations, operating hardware, or glazing materials, and assumes no responsibility for these design considerations. It is the responsibility of the owner, specifier, architect, general contractor and the installer to make these selections in strict conformance with all applicable codes.
- K. 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 time of installation. For example, a 12 foot unrestrained length of aluminum extrusion can expand or contract 3/32" over a 50° F temperature change. Any movement potential should be accounted for at the time of installation.

L. FIELD TESTING - It is recommended that a Water Hose Test be conducted once a sufficient portion of the framing is installed, glazed and caulked to ensure proper installation. The Water Hose Test shall be conducted in accordance with AAMA 501.2. In addition, larger projects should have periodic Water Hose Tests as additional precautionary measures.

M. GASKET INVENTORY ROTATION - These high quality rubber extrusions are coated with silicone lubricant. Silicone will dry over time leaving a white "chalky" residue. Please rotate your stock "FIRST IN - FIRST OUT". If the rubber becomes dry, you may use water ONE TIME to reconstitute the silicone, after that, use a soap water solution.

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| | 451 IR - CENTER SET OUTSIDE GLAZED | 451T IR - CENTER SET OUTSIDE GLAZED |
|--|---------------------------------------|--|
| SCREW SPLINE FRAMING | | |
| Mullion and Filler | 451-CG-001 451-CG-002 | 451T-CG-001 451T-CG-002 |
| Jamb | 451-CG-001 | 451T-CG-001 |
| Head | 451-CG-003 | 451T-CG-003 |
| Horizontal | 451-CG-011 | 451T-CG-011 |
| Sill | 451-CG-001 | 451T-CG-001 |
| Glass Stop | 451-CG-004 | 451-CG-004 |
| Flashing | 451-HP-037 | 451T-HP-037 |
| Spline Screw | 028-856 | 028-856 |
| End Dam | 450114 | 450114 |
| Drill Fixture | 451-VG-201 | 451-VG-201 |
| 90° SNAP CORNERS | | |
| No Pocket Corner Half | 450-017 | 450-017 |
| One Pocket Corner Half | 451-CG-015 | 451T-CG-015 |
| One Pocket Corner Half (OPPOSITE OF 451-XX-015) | 451-CG-035 | 451T-CG-035 |
| Two Pocket Corner Half | 451-CG-016 | 451T-CG-016 |
| MISCELLANEOUS | | |
| Flat Filler - Non Thermal | 450-026 | 450-026 |
| HP Flashing Clip - 12" Long | 451-HP-127 | 451-HP-127 |
| OPTIONAL MULLIONS & STEEL REINFORCING | | |
| Medium Weight Mullion | 451-CG-001A | 451T-CG-001A |
| Heavy Weight Mullion | 451-CG-013 | 451T-CG-013 |
| Extra Heavy Weight Mullion | 451-CG-113 | 451T-CG-113 |
| Expansion Mullion Male Half with Weathering | 451-CG-540 | 451T-CG-540 |
| Expansion Mullion Female Half | 451-CG-010A | 451T-CG-010A |
| GLAZING MATERIALS | | |
| Water Deflector | 451-105 | |
| Sill Setting Block | 027-073 | |
| Horizontal Setting Block | 027-081 | |
| Side Block | 480-520 | |
| Standard Push-on Gasket | 027-074 | |
| ANCHORS | | |
| Fastener / Shim Support - 3" LONG | 450-126 | |
| Fastener / Shim Support - 12" LONG | 451-CG-363 | |

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| FRAMING MEMBER (CENTER) | CUT FORMULA |
|------------------------------------|-----------------------|
| MULLIONS AND MULLION FILLERS | FRAME HEIGHT - 1/2" |
| JAMBS | FRAME HEIGHT - 1/2" |
| CORNER MULLIONS | FRAME HEIGHT - 1/2" |
| FLASHING | FRAME WIDTH PLUS 1/4" |
| EXPANSION MULLIONS | FRAME HEIGHT - 1/2" |
| HEAD MEMBERS | DLO |
| HORIZONTALS & HORIZONTAL FILLERS | DLO |
| SILL MEMBERS | DLO |
| GLASS STOPS | DLO-1/16" |
| | |
| | |
| | |
| | |
| | |

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E.C. 97904-31

SECTION IV - PARTS IDENTIFICATION

| PART NO. | DESCRIPTION | ILLUSTRATION | PART NO. | DESCRIPTION | ILLUSTRATION |
|-------------|--|--------------|-------------|---------------------------------------|--------------|
| 027-073 | SILL SETTING BLOCK (451/451T) | | 451-CG-002 | POCKET FILLER | |
| 027-074 | STANDARD PUSH ON GASKET | | 451-CG-003 | HEAD | |
| 027-081 | HORIZONTAL SETTING BLOCK (451/451T) | | 451-CG-004 | GLASS STOP | |
| 028-856 | #12x1-1/8 PHTF TYPE "AB" (SPLINE SCREW) | | 451-CG-010A | TUBULAR EXPANSION MULLION FEMALE HALF | |
| 063-040 | BALL POINT BIT FOR 128-242 | | 451-CG-011 | HORIZONTAL | |
| 128-242 | OPTIONAL BALL POINT SPLINE SCREW #12x1 SOCKET HEAD | | 451-CG-013 | HEAVY WEIGHT MULLION | |
| 450-017 | 90° NO POCKET CORNER HALF | | 451-CG-015 | ONE POCKET CORNER HALF | |
| 450-114 | END DAM | | 451-CG-016 | TWO POCKET CORNER HALF | |
| 451-105 | WATER DEFLECTOR (451/451T) | | 451-CG-035 | ONE POCKET CORNER HALF | |
| 480-520 | SIDE BLOCK | | 451-CG-037 | HP SILL FLASHING | |
| 451-CG-001 | MULLION JAMB SILL | | 451-CG-113 | HEAVY WEIGHT MULLION | |
| 451-CG-001A | MEDIUM WEIGHT MULLION | | 451-HP-127 | HP SILL CLIP 12" LONG | |

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E.C. 97904-31

| PART NO. | DESCRIPTION | ILLUSTRATION | PART NO. | DESCRIPTION | ILLUSTRATION |
|--------------|--|--------------|-------------|--|--------------|
| 451-CG-363 | FLAT FILLER/SHIM SUPPORT (12" LONG) | | 451T-CG-037 | HP SILL FLASHING | |
| 451-CG-540 | EXPANSION MULLION W/WEATHERING MALE HALF | | 451T-CG-113 | HEAVY WEIGHT MULLION | |
| 451T-CG-001 | MULLION JAMB SILL | | 451T-CG-540 | EXPANSION MULLION W/WEATHERING MALE HALF | |
| 451T-CG-001A | MEDIUM WEIGHT MULLION | | 451-VG-201 | DRILL FIXTURE SCREW-SPLINE (451/451T) | |
| 451T-CG-002 | POCKET FILLER | | | | |
| 451T-CG-003 | HEAD | | | | |
| 451T-CG-010A | TUBULAR EXPANSION MULLION FEMALE HALF | | | | |
| 451T-CG-011 | HORIZONTAL | | | | |
| 451T-CG-013 | HEAVY WEIGHT MULLION | | | | |
| 451T-CG-015 | ONE POCKET CORNER HALF | | | | |
| 451T-CG-016 | TWO POCKET CORNER HALF | | | | |
| 451T-CG-035 | ONE POCKET CORNER HALF | | | | |

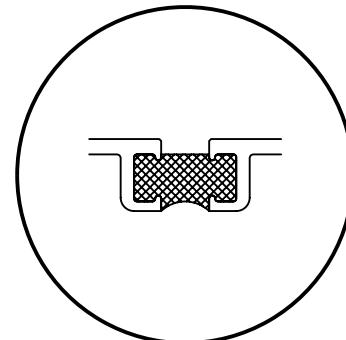
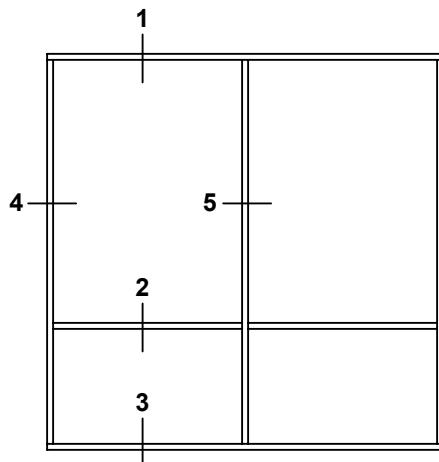
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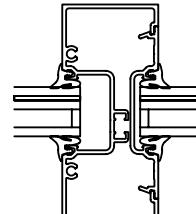
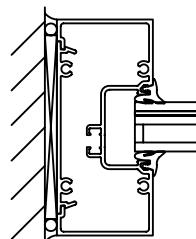
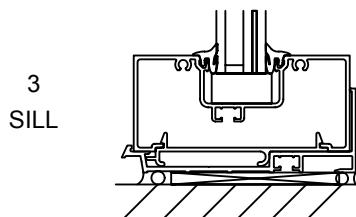
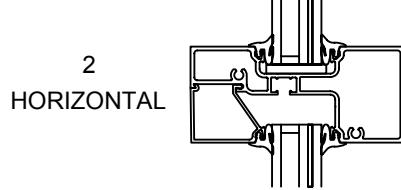
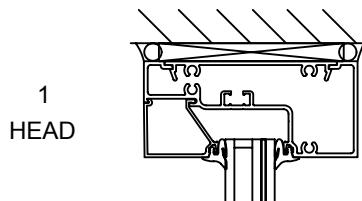
SECTION V - BASIC FRAMING DETAILS

The Screw Spline System is a fabrication and erection method that permits the pre-assembly of single units in the shop or at the job site. These units are then erected by mating the male mullion half of one unit with the female half of the unit already installed.



**TRIFAB® 451T-IR
THERMALLY BROKEN MEMBERS**

ELEVATION IS NUMBER KEYED TO DETAILS



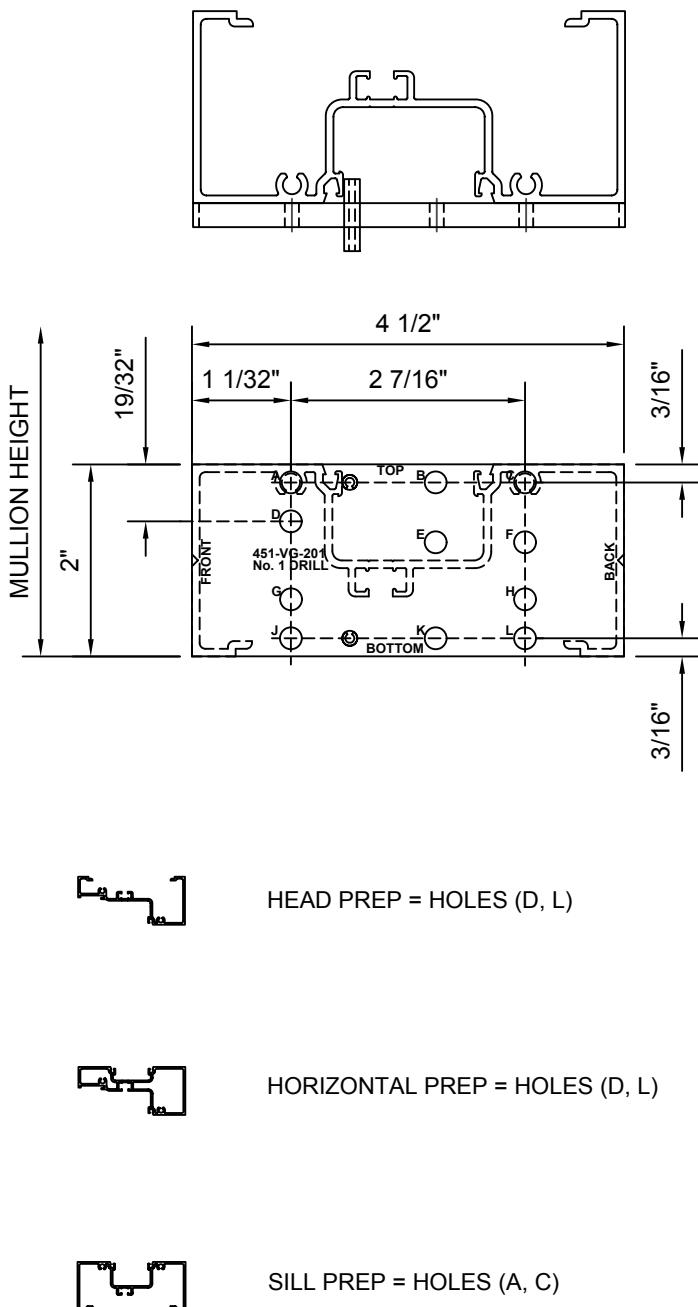
**5
VERTICAL**

FRAME FABRICATION AND ASSEMBLY

STEP A: Measure the opening to determine length of vertical and horizontal framing members. For all units that require sill flashing, allow a minimum of 7/16" for high performance flashing when measuring vertical lengths. Allow 1/4" min. clearance at the head, sill, and jamb to facilitate installation and provide space for caulking. If job conditions are uncertain, or masonry openings are irregular, or high-performance flashing is used, allow extra clearance to accommodate construction tolerance.

STEP B: Cut vertical members to required length. At desired horizontal locations drill the proper holes in the vertical members for attachment of the spline screws, as shown below.

TRIFAB 451/451T (FRAMING)
PLACE ONTO MULLION AS SHOWN BELOW



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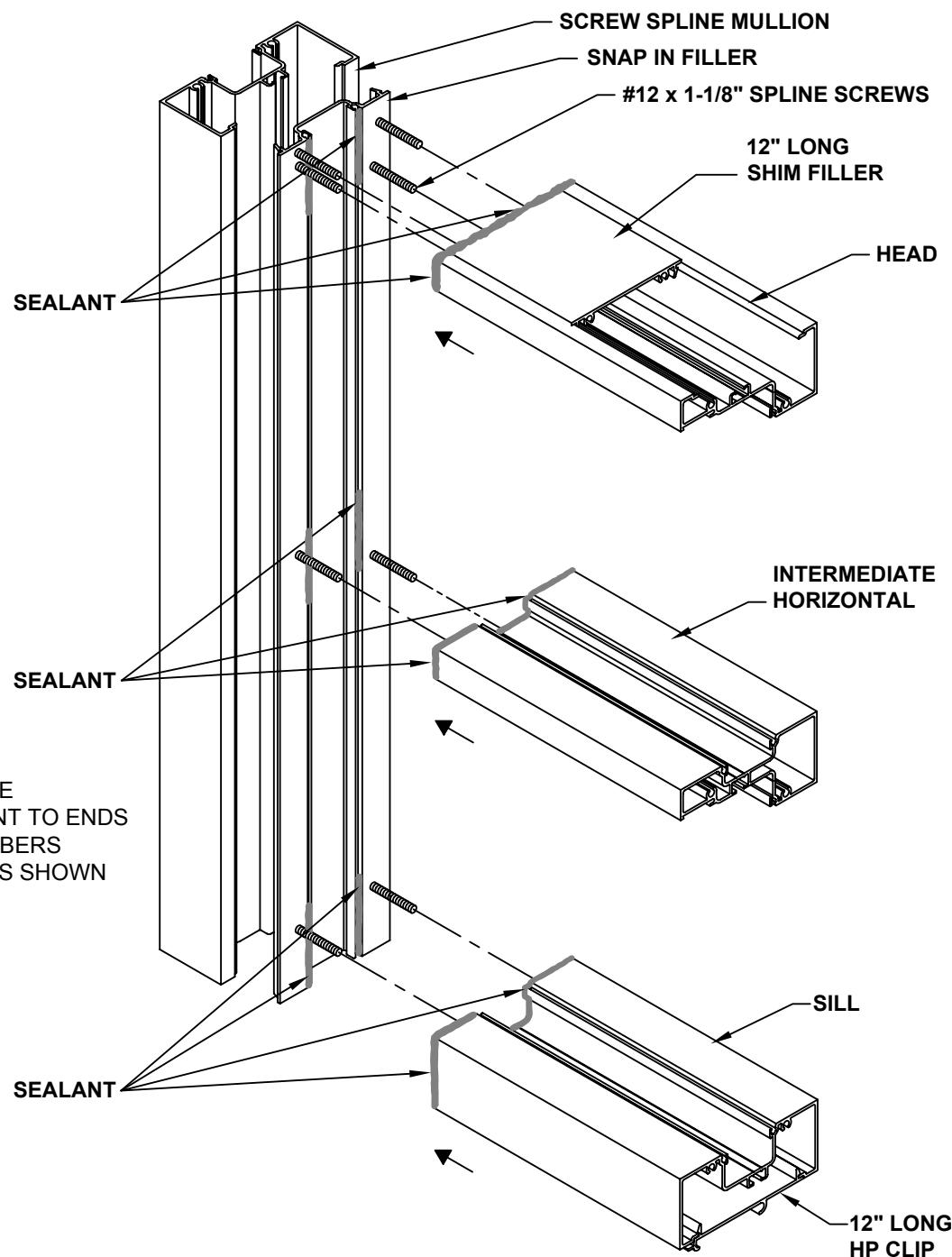
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FRAME FABRICATION & ASSEMBLY

SCREW SPLINE ASSEMBLY

- STEP A:** Cut horizontals to length and apply sealant to the ends ensuring a good seal to the vertical member.
- STEP B:** Assemble the units using two 028-856 screws (#12 x 1-1/8" PH) at each horizontal and sill; and four at head member as shown below. Be sure that each unit is fabricated with a male and female mullion half.
- NOTE:** Every unit must have at least one deep vertical pocket.
- STEP C:** When an entrance is required, Shear Block joinery must be used to attach horizontals to the immediate door frame. The other side of the sidelite will be fabricated for screw spline joinery as usual.



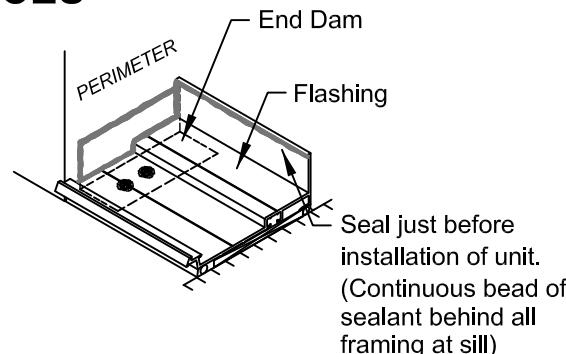
NOTE:

IT IS IMPORTANT THAT THE
INSTALLER APPLY SEALANT TO ENDS
OF ALL HORIZONTAL MEMBERS
AND GLAZING REGLETS AS SHOWN
TO ENSURE GOOD SEAL.

INSTALLATION OF END DAMS AND SPLICES

Pin End Dam to Flashing prior to installation.
Seal any fastener shanks than pierce flashing.

Install flashing at the sill and attach it to the floor. The flashing should be shimmed up a minimum of 1/4" to make sure that it is flat and level. It should run the full width of the opening - 1/4", and be interrupted only at entrances. The flashing must be carefully sealed at each end. Use end dams for all typical perimeter conditions, and seal the end dams to the flashing and perimeter conditions as shown below.



Note:

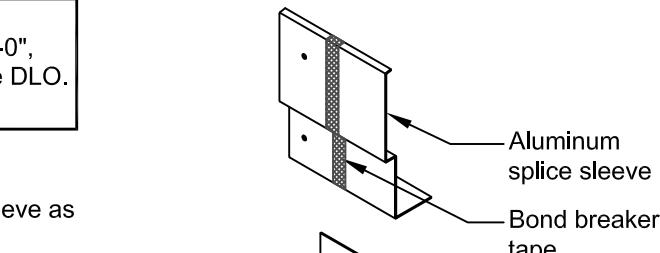
If the opening is over 24'-0" wide a splice joint is required every 12'-0", with a 1/2" joint between head and sill members at the center of the DLO. Do not locate splice directly under a vertical mullion.

Apply bond breaker tape to the underside of the aluminum splice sleeve as show on center.

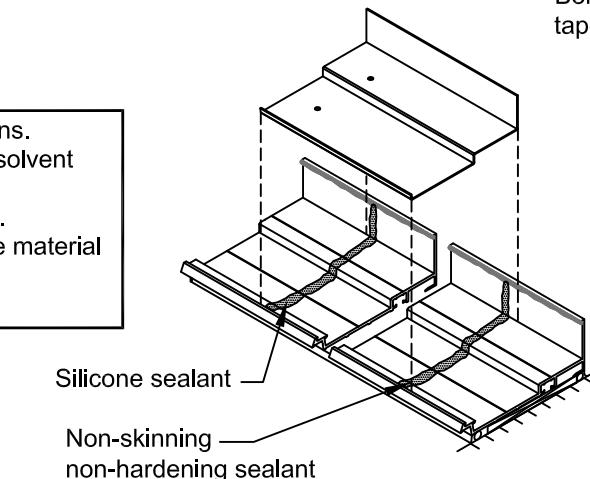
Clean splice area with solvent.

Note: For temperatures below 40°, take the following precautions. Just prior to installing the sleeve, wipe flashing material with a solvent or cleaning solution recommended by the sealant manufacturer. This will remove any condensation or frost that may be present. Caution: Carefully follow the recommendations contained in the material safety data sheet provided by the solvent / cleaning solution manufacturer regarding health and fire / explosion risks.

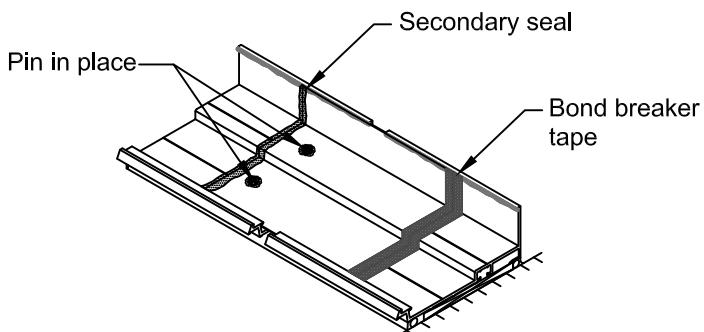
Apply heavy bead of silicone sealant on one receptor and bead of non-skimming, non-hardening sealant on the other receptor. Install splice sleeve so that bond breaker tape aligns with splice joint as shown.



Pin splice sleeve on the side with the silicone joint and seal over heads of pins. Apply a secondary silicone seal on the pinned side as shown.

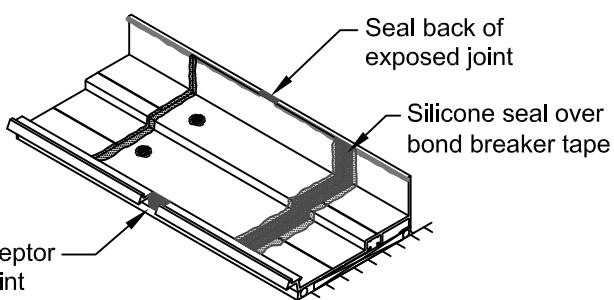


Apply bond breaker tape over the joint between the splice and receptor on the bead of non-skimming, non hardening sealant side of splice.



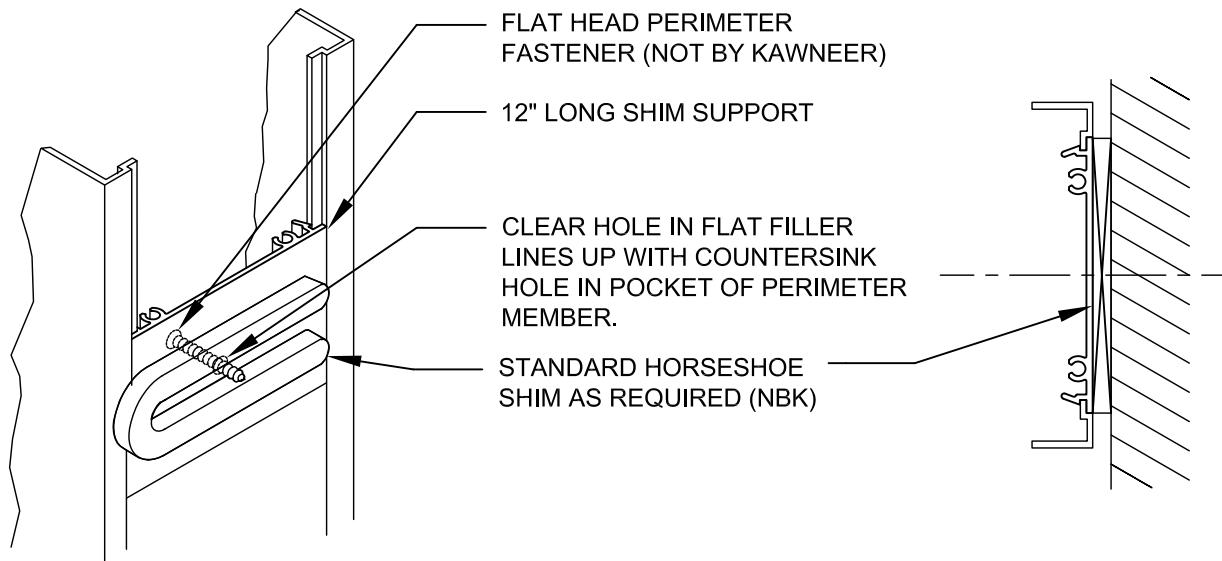
Apply silicone sealant over the bond breaker tape to create a water tight joint as shown.

Seal exposed joint at the back of the sill flashing, and force sealant up under the splice sleeve in the front.



SHIM INSTALLATION

Install support shims at head, sill and jamb. Place between pocket filler and perimeter condition at perimeter anchor locations.



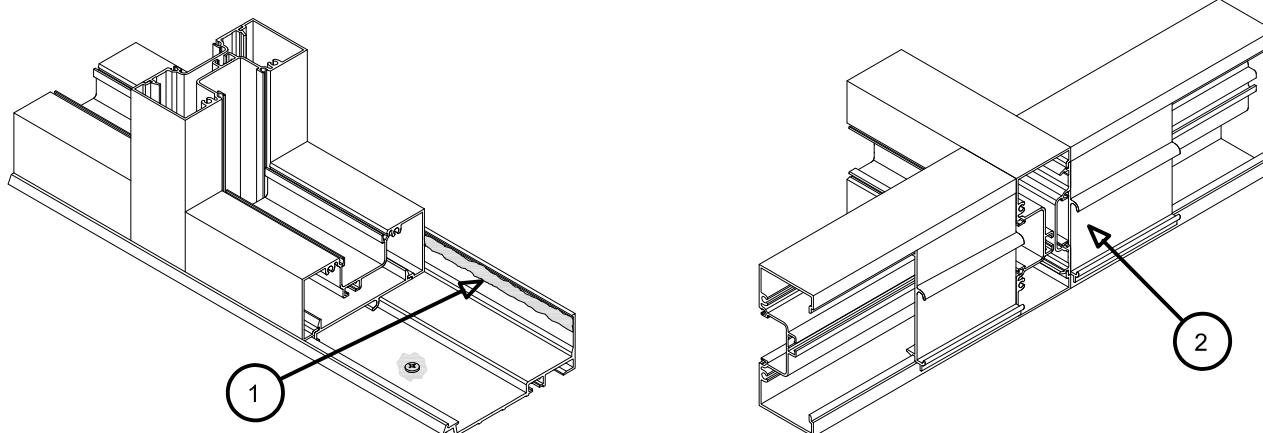
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HP SILL FLASHING

STEP 1: Apply sealant to the upstanding leg on the flashing.

STEP 2: Install HP interlocking sill clip into sill on each side of the vertical and crimp in place to prevent sliding.



HP SILL FLASHING (Continued)

STEP 3: Position assembled frame onto sill tilted out at approximately 20 degrees 1A. Allow the interlocking sill clip to engage with the lug of the flashing, and rotate to vertical position.

STEP 4: Caulk both interior and exterior at head, jamb and under sill flashing with high quality sealant. Do not block weep holes in flashing.

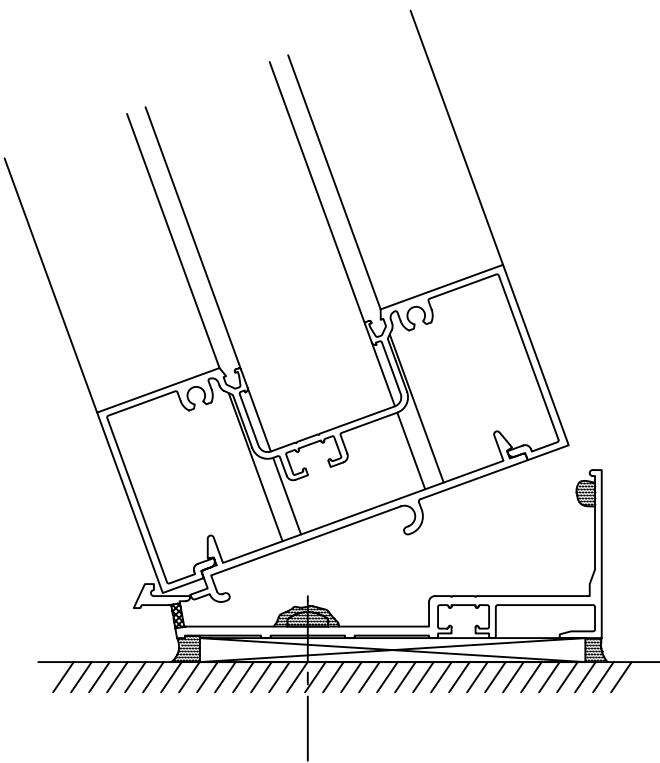


FIGURE 1A

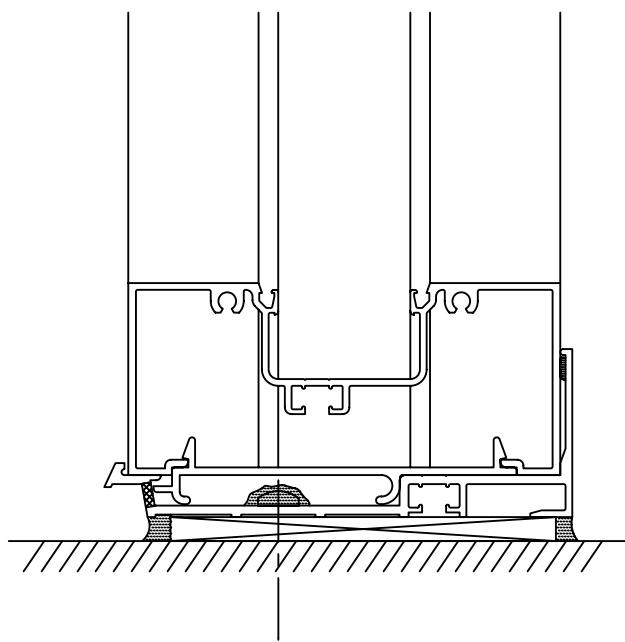
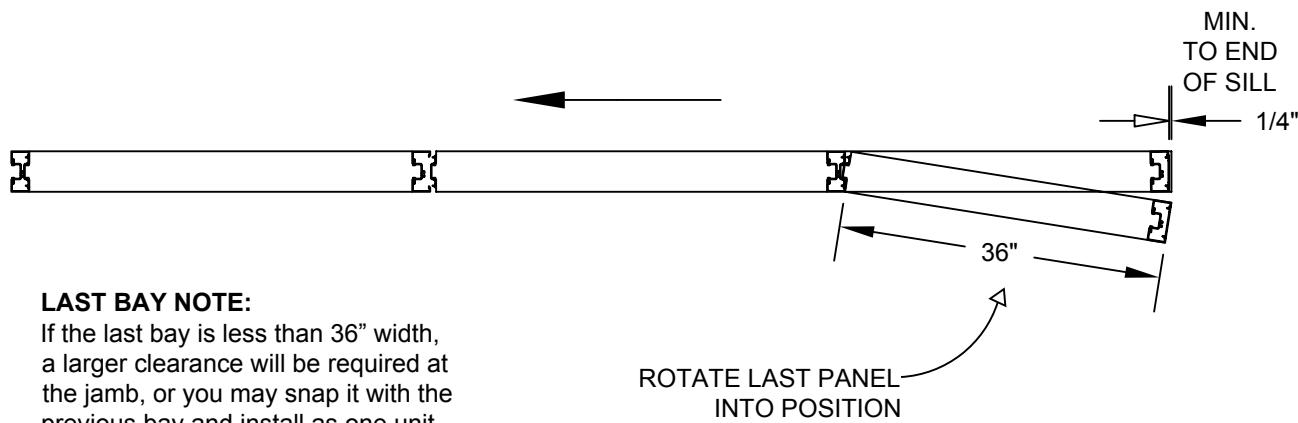


FIGURE 1B

NOTE:

HP flashing must extend beyond the edge of the frame by 1/4" minimum.



LAST BAY NOTE:

If the last bay is less than 36" width, a larger clearance will be required at the jamb, or you may snap it with the previous bay and install as one unit.

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WATER DEFLECTOR

Install water deflectors on Intermediate Horizontals by removing the paper backing from the water deflectors. Install on a clean, dry surface centered in the glazing pocket and seal. (Figure 1) Be sure to extend Water Deflector past glass edge below. (Figure 2)

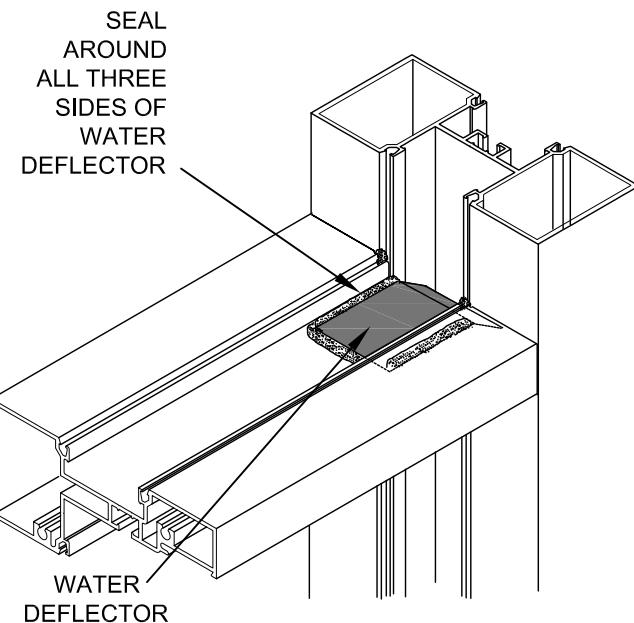


FIGURE 1

COLD WEATHER NOTE:

For temperatures below 40° the following precautions should be taken. Just prior to installing the water deflector, wipe glazing pocket with a solvent or cleaning solution recommended by the sealant manufacturer.

*CAUTION:

Carefully follow the recommendations contained in the material safety data sheet provided by the solvent/cleaning solution manufacturer regarding health and fire/explosion risks.

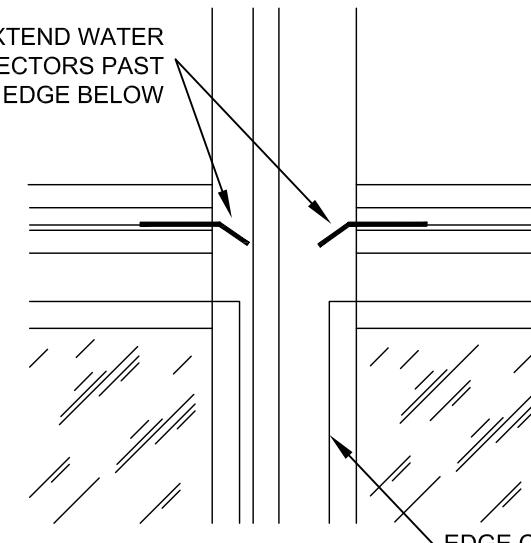


FIGURE 2

After the water deflector is installed, seal the joint between the back leg of the horizontal and the vertical. Make sure to fill the gasket reglets in the area to prevent water from running down the lite below. (Figure 3 and 4)

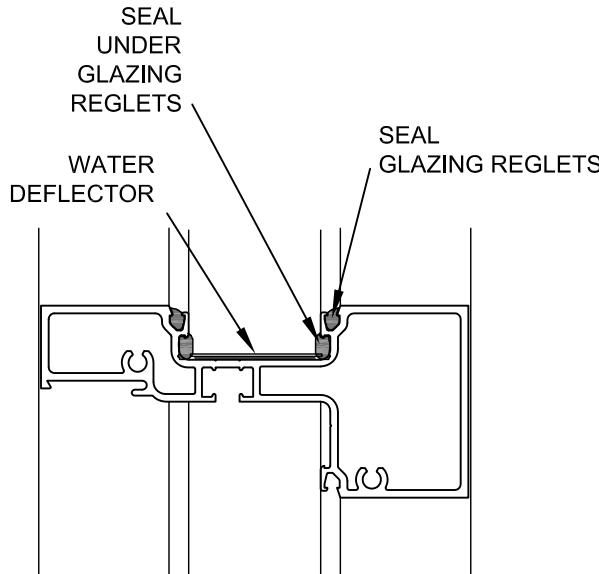


FIGURE 3

NOTE:
FOR THERMAL MEMBERS,
SEAL UNDER DEFLECTOR
FILLING CAVITIES WITH
SEALANT. (FIGURE 4)

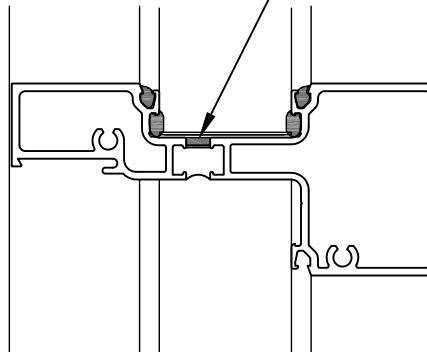


FIGURE 4

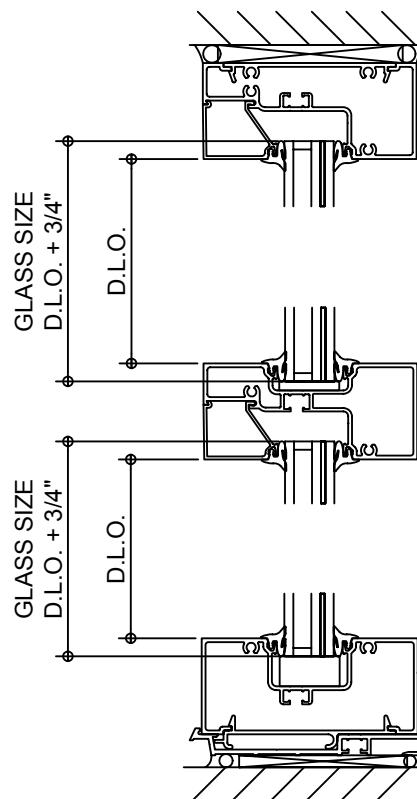
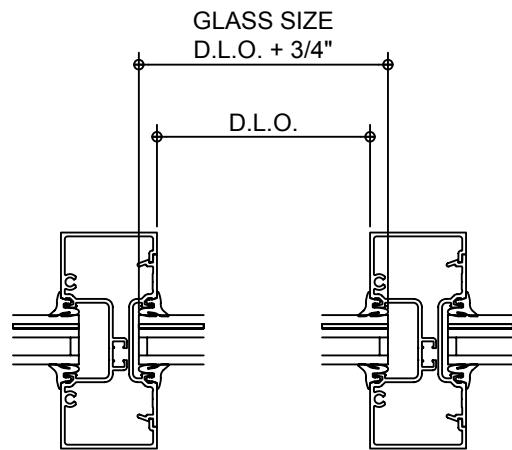
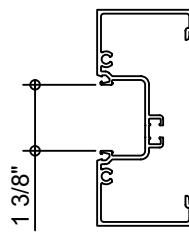
GLAZING

STEP A: All pockets are 1-3/8" in width and will accept 1" to 1-1/32" Laminated glass.

STEP B: Glass size is (Daylight Opening) D.L.O. + 3/4".

NOTE 1: This formula does not allow for undersize or out of square daylite openings.

NOTE 2: The glass manufacturer must indicate the specific glazing requirements for the material being used.



| Infill Thickness | Weathering (Both Sides) |
|------------------|-------------------------|
| 1" | 27-074 (Standard) |
| 1-1/32" | 27-074 (Standard) |

| Glazing Types |
|---|
| 1-1/32" Laminated glass 3/16" HS Outboard / 3/8" Air Space / 3/16" HS Inboard / 0.090 Dupont SG / 3/16" HS Inboard |

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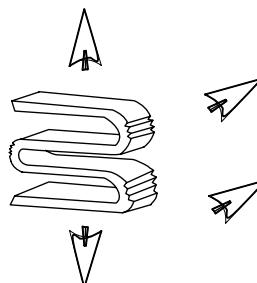
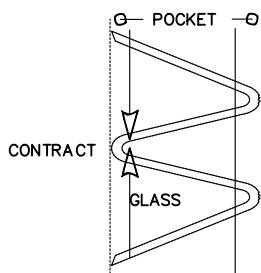
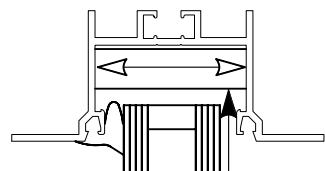
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GLAZING

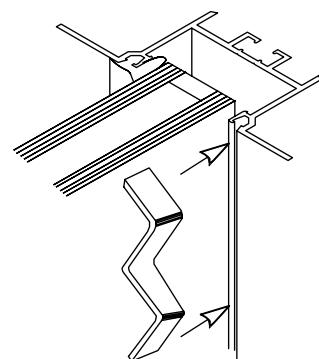
"W" SIDE BLOCKS

One "W" Side Block should be installed in the deep pocket of the mullion of each lite of glass in the opening.

SIDE BLOCK INSTALLATION



FLATTEN BLOCK & SLIDE
BETWEEN REGLET AND
GLASS LITE



INSERT BETWEEN
GLASS AND FRAME

"W" Block will expand and wedge between walls of glazing pocket and prevent glass from shifting into the deep pocket.

NOTE: If deglazing of lite is required after "W" Block is installed, remove both interior and exterior weathering and use hook to pull "W" Block out of pocket.

GASKET AND GLASS STOP INSTALLATION

STEP 1: Cut horizontal and vertical gaskets to an approximate length of D.L.O. + 1/4" per foot of D.L.O..

STEP 2: Install gaskets on the side of frame **opposite** glass stop first. (1)

Insert gaskets into the horizontal members first starting at the ends and work toward the center as shown.

(see Figure 1)

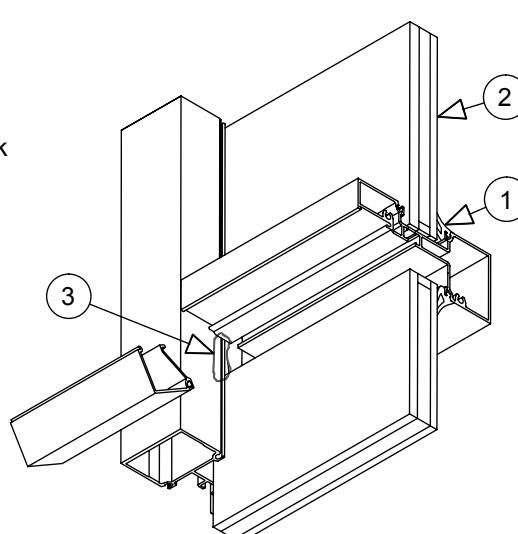
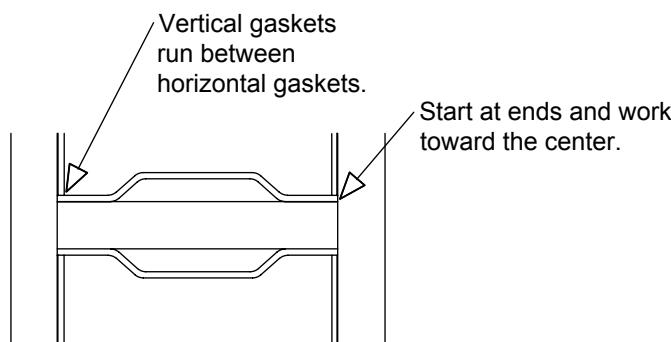
Install vertical gaskets into the same side of frame after horizontal gaskets are in place in the same manner.

STEP 3: Position setting blocks at points under glass as required.

STEP 4: Install glass into frame using standard flush glazing technique. (2)

STEP 5: Run bead of sealant along vertical reglets where glass stop meets, then install glass stop. (3)

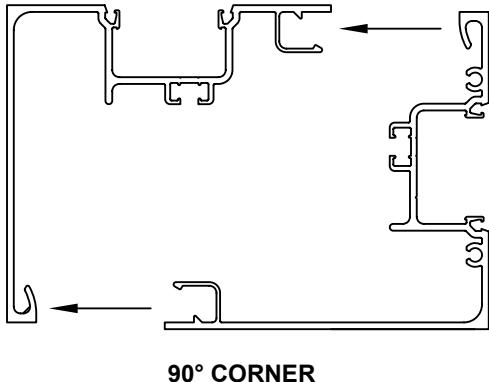
STEP 6: Install horizontal and vertical gasket into **glass stop side** of frame in the same manner as described in Step #2.



SNAP CORNERS

Snap corners together as shown

NOTE: Tight snaps may be waxed to make engagement easier. Corners are not designed to be unsnapped.

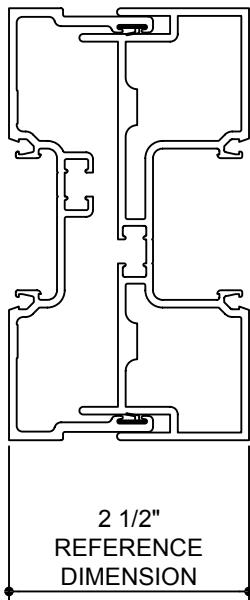


90° CORNER

EXPANSION MULLION

An Expansion Mullion is to be used every 20' in large openings, regardless of the method of construction.

The dimension of the assembly should be adjusted based on the temperature at the time of assembly and expected high and low service temperatures use reference dimension. (For examples, the sight line will be reduced slightly when installed in hot weather and increased slightly when installed in cold weather).



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