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The rapidly changing technology within the architectural aluminum products industry demands that United States 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.

Other metric units shown in this manual are:

m - meter Kg - kilogram
Pa - pascal KPa - kilopascal
MPa - megapascal N - newton
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 and keep records of where various materials are stored.

C. KEEP MATERIAL 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.

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 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. STEEL ANCHORS. Steel anchors that weld to steel structure are normally line set before mullions are hung. Outstanding leg of anchors must be at 90° to offset lines. Mullion space should be held to ±1/32" (0.8). Anchor clips vary per job conditions. Follow approved shop drawings for size and location of clips.

5. 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.

6. 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.

7. 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.

8. 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 material 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.

9. 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.

Revised March 2005
10. 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. United States Aluminum exercises no control over the use or application of its products glazing materials and operating hardware and assumes no responsibility thereof.

11. 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. Gap between expansion members should be based on temperature at time of installation.

12. WATER HOSE TEST. As soon as a representative amount of the wall has been glazed (500 square feet or 46.5 m²) 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 m²) during the glazing operation.

13. 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.).

14. 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.

**STRUCTURAL SILICONE GLAZING NOTES**

1. SEALANTS. All sealants referenced in these instructions must be a one part elastomeric silicone and must be applied according to the silicone manufacturer’s recommendations.

2. APPLICATION. Structural silicone must be applied from the interior and weatherseal from the exterior after the interior structural silicone has fully cured.

3. MAXIMUM ALLOWABLE STRESS ON SILICONE. The maximum allowable size of the glass light 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.

4. 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.

5. 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.**

6. U.S. ALUMINUM. It is the responsibility of United States Aluminum to supply a system to meet the architect’s specifications.
The Series 4500 Curtain Wall Systems are designed for shear block (Stick erected) and screw spline (Panel erected) type assembly methods. The shear block method of assembly is recommended for multi-floor applications where mullions will be spliced. Illustrations used in these instructions depict the 5" back members for 1" glazing. All other back member depths are treated in a similar fashion unless otherwise noted.

1. Cut members to length.

   Vertical mullions, face covers and adapters ..........Frame Height
   Horizontal members and face covers ................Daylight Opening
   Horizontal snap-in fillers ........................Daylight Opening minus $\frac{1}{32}$" (0.8)
   Vertical transition members .....................Daylight Opening plus $\frac{1}{16}$" (1.6)
   Horizontal transition members ................Daylight Opening minus $\frac{1}{16}$" (1.6)
   Butt Glazed horizontal face covers ................Continuous
   Butt Glazed vertical covers .......................Frame Height
   Glass Retainer ........................................3" piece of face cover
   Door Jamb Mullions ..................................Length (+) plus bottom clearance

FOR DOOR SUBFRAME INSTALLATION SEE PAGE 30
2. Fabricate vertical members to receive shear blocks as shown. Mark locations of horizontal members. Use drill guide DJ750.

**SILICONE MULLION**
USE DJ750

27/32" (21.4)

"A" See Chart

**CAPTURED VERTICAL MULLION**
USE DJ750

29/32" (23)

"A" See Chart

<table>
<thead>
<tr>
<th>Dim. &quot;A&quot;</th>
<th>Backmember Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 11/32&quot; (59.5)</td>
<td>4&quot; (101.6)</td>
</tr>
<tr>
<td>3 11/32&quot; (84.9)</td>
<td>5&quot; (127)</td>
</tr>
<tr>
<td>6 11/32&quot; (161.1)</td>
<td>8&quot; (203.2)</td>
</tr>
</tbody>
</table>
3. Fabricate horizontal members to receive horizontal to shear block attachment screws.

4. Fabricate 8" horizontal members to receive horizontal to shear block attachment screws.
5. For last bay installation of 8" back member intermediate horizontals, a "C" notch is required. Fabricate "C" notch as shown.

![Diagram of SHEAR BLOCK (STICK ERECTED) FABRICATION]

6. Fabricate weep holes in bottom of face covers. Drill 5/16" dia. holes at mid-point of daylight opening on bottom side of covers. Butt glazed horizontal covers require 1 hole centered on each light of glass.

![Diagram of Horizontal face cover with 5/16" dia. weep hole at center of each light.]

See page 28 for instructions on how to splice covers.

**DETAIL F**
SHEAR BLOCK (STICK ERECTED) FABRICATION

7. Drill clear holes in top and bottom of "T" anchors for anchor bolts as per approved shop drawings.

NOTE: "T" anchors must be slid into mullions before head and sill shear blocks can be installed.

DETAIL G

<table>
<thead>
<tr>
<th>VERTICAL ANCHORS</th>
<th>JAMB ANCHORS FOR VERTICALS</th>
<th>JAMB ANCHORS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AP514 at TW441 and TW400</td>
<td>AP711 at TW550</td>
<td>AP516 at TW441 and TW400</td>
</tr>
<tr>
<td>AP513 at TW410</td>
<td>AP807 at TW815</td>
<td>AP511 at TW410</td>
</tr>
<tr>
<td>AP526 at TW424</td>
<td>AP811 at TW810</td>
<td>AP534 at TW424</td>
</tr>
<tr>
<td>AP624 at TW524</td>
<td>AP607 at TW841</td>
<td>AP634 at TW524</td>
</tr>
<tr>
<td>AP707 at TW530 and TW541</td>
<td>AP704 at TW530 and TW541</td>
<td></td>
</tr>
</tbody>
</table>
1. Install closure plates on jamb members. Make sure all surfaces are properly prepared according to the sealant manufacturer's recommendations prior to sealing.

![Diagram of Jamb Member with Closure Plates](image)

- **Closure plate for 1" (25.4) glazing** (CP700)
- **Closure plate for 1/4" (6.4) glazing** (CP725)

**DETAIL H**

2. Slide top and bottom "T" anchors into vertical mullions and secure temporarily. Head and sill shear blocks cannot be installed until the anchors are in place.

![Diagram of Wall Jamb with Intermediate Vertical](image)

**NOTE:** Shear blocks can be installed after mullions are set and anchored.

**DETAIL I**
3. Install shear blocks as shown.

TYPICAL SHEAR BLOCK CONFIGURATION

NOTE:
Head and sill shear blocks must be installed after top and bottom "T" anchors are in place.

SHEAR BLOCK AT 8" (203.2)
INTERMEDIATE HORIZONTAL

SHEAR BLOCK AT 8" (203.2)
HEAD AND SILL

DETAIL J
SHEAR BLOCK (STICK ERECTION) INSTALLATION

1. Start with jamb mullion, install plumb, level and true. Shim under mullion as needed. Intermediate mullions must be shimmed under both sides of mullion.

When using 8" back members, intermediate horizontals must be installed at the same time as vertical mullions.

8" BACK MEMBER INSTALLATION

The 8" horizontals require that bays be installed in a progressive manner. Intermediate horizontals are installed at the same time as vertical mullions. Intermediate horizontals in the last bay require a "C" notch to facilitate installation. See page 8 for detailed instructions.
2. Anchor mullions at floor slab as shown or per approved shop drawings.
SHEAR BLOCK (STICK ERECTION) INSTALLATION

3. Install splice joints as shown. For horizontal face cap splice details see page 28.

Splice joint width should be based on sealant movement capability and on the following formula:

- Linear expansion for aluminum, in inches = \( \text{Length (\text{in})} \times \text{F \ difference in temperature} \times 0.0000129 \)
- Linear expansion for aluminum, in millimeters = \( \text{Length (\text{m})} \times \text{C \ difference in temperature} \times 0.02322 \)

A 1/2" (12.7) minimum joint is recommended. Use a 1/2" (12.7) spacer shim to set mullion joint constant during erection. Remove the shim after attaching the verticals to the anchors. Splice joints must occur at spandrel areas.

NOTE: Splice joints are designed to accommodate thermal movement only. They do not compensate for variations in floor levels.

A. Clean splice sleeves and all joint surfaces. Apply bond breaker tape at areas where sleeve will be sealed to avoid three sided adhesion.

B. Slide sleeve into upper member before it is installed and tape to hold it in retracted position.

C. Install ST193 #8 x 3/4" P.H. Phillips stop screw 2 3/4" (69.9) down from top of extrusion at interior of lower member.

D. Install upper member and let extruded sleeve slide down until it sits on top of stop screw.

E. Seal joint over sleeve. Do not install vertical transition adaptors in vertical splice joint area until after splice joint is sealed. Vertical transition adaptors must be spliced at the same location as the vertical splice. The face cover splice must be located 5” (127) min. below the vertical mullion splice joint.

F. Apply bond breaker tape to the face cover splice sleeve where it will be sealed to avoid three sided adhesion. Install face cover splice sleeve in lower cover and bond in place with sealant. After upper face cover has been installed, seal and tool joint between the face covers.
4. Install horizontal members. Apply sealant to front face of shear blocks just prior to installing. Secure horizontal members to shear blocks as shown.

5. Install snap-in fillers.
The Series 4500 Curtain Wall Systems are designed for shear block (Stick erection) and screw spline (Panel erection) type assembly methods. The shear block method of assembly is recommended for multi-floor applications where mullions will be spliced. Illustrations used in these instructions depict the 5" back members for 1" glazing. All other back member depths are treated in a similar fashion unless otherwise noted.

1. Cut members to length.

   - **Vertical mullions, face covers and adapters** ..........Frame Height
   - **Horizontal members and face covers** .......................Daylight Opening
   - **Horizontal snap-in fillers** ...................................Daylight Opening minus 1/32" (0.8)
   - **Vertical transition members** .................................Daylight Opening plus 13/8" (34.9)
   - **Horizontal transition members** ..............................Daylight Opening minus 1/8" (1.6)
   - **Butt Glazed horizontal face covers** .......................Continuous
   - **Butt Glazed vertical covers** .................................Frame Height
   - **Glass Retainer** ..................................................3" piece of face cover
   - **Door Jamb Mullions** .............................................Length (+) plus bottom clearance

DETAIL R

FOR DOOR SUBFRAME INSTALLATION SEE PAGE 30
2. Fabricate vertical mullions for horizontal attachment as shown. Use drill guide DJ751.
3. Fabricate head and sill members for anchor holes. Drill clear holes as shown or per approved shop drawings.
ASSEMBLY FOR SCREW SPLINE (PANEL ERECTED) SYSTEM

1. Assemble panels as shown. Apply silicone sealant to the ends of all horizontal members at vertical joints just prior to assembly.

ST251 (Typical)

#10 x 1" HH Phillips assembly screw

Seal contact surfaces at both ends of horizontals.
INSTALLATION FOR SCREW SPLINE (PANEL ERECTED) SYSTEM

1. Starting at the wall jamb, set first panel in place, plumb, level and true. Attach head and sill 6” from each side of verticals and 24" on center, or as shown on approved shop drawings. Always shim at anchor points.

NOTE: Install jamb anchors first if required. Jamb anchors are required if deflection exceeds 1/2 of caulk joint space. See approved shop drawings for jamb anchor locations.

2. Install remainder of panels. It may be necessary to install the last two bays as a unit.

3. Install head and sill fillers.
1. Apply sealant at three contact surfaces of the plastic water deflectors. Fill the vertical gasket reglet with sealant at the water deflector locations. Seal joints at the face of perimeter water deflectors where it intersects the head and sill members.

2. Snap tabs on the water deflectors into front lip of tongue on vertical and slide down into place. Water deflectors should rest on the horizontal member tongue.

**NOTE:** Water diverter used at head has built in drip that conforms to the contour on flashing of the head member.

**NOTE:** Consult sealant manufacturer for proper cleaning and priming recommendations.
3. After all water deflectors are installed, apply continuous perimeter seal. See DETAIL U.

**PERIMETER CAULKING MUST BE INSTALLED PRIOR TO INSTALLING GLASS OR FACE COVERS.**

![Diagram Illustrating Installation of Water Dams and Perimeter Seals](image-url)
GLASS INSTALLATION (ALL SYSTEMS)

CAPTURED GLASS WIDTH AND HEIGHT = DAYLIGHT OPENING + (PLUS) 1" (25.4)
SILICONE GLAZED GLASS HEIGHT = DAYLIGHT OPENING + (PLUS) 1" (25.4)
GLASS WIDTH = DAYLIGHT OPENING + (PLUS) CALCULATED BITES
GLASS BITES VARY AT CORNER CONDITIONS

These formulae do not take into consideration glass tolerances. Consult glass manufacturer before ordering glass. Glass sizes for special conditions must be calculated according to approved drawings. In temperatures below 40 degrees Fahrenheit gaskets should be warmed and installed before they are allowed to cool again.
GLASS INSTALLATION (ALL SYSTEMS)

NP716 sponge glazing gasket is used on the interior framing members. NP726 EPDM glazing gasket is used on the exterior framing members. SP250 spacer gasket is used at structural silicone glazed verticals for the 4500SG and 4525SG systems.

1. Insert push-in gaskets into all backmembers and face covers. Vertical gaskets on the mullion run past horizontal gaskets by 1/2" (12.7). Horizontal gaskets butt against vertical gaskets. Face cover gaskets run continuous and should be cut 1" (25.4) long on each end to allow for shrinkage.

NOTE: All glazing gaskets should be cut 1/8" (3.2) longer per foot of aluminum member to allow for shrinkage.

Start glazing at bottom and work up.

NOTE: Vertical gaskets do not run through to allow for end dam and water diverter installation. They extend approximately 1/2" (12.7) past edge of horizontal mullion.
2. Locate two setting blocks at quarter points or as shown on approved shop drawings.

![Diagram showing setting blocks](image)

3. Peel off paper backing from anti-walk blocks and locate one on each vertical at mid-points of the glass height.

![Diagram showing side blocks](image)

4. Install glass, centering in opening. Hold glass in place temporarily at corners and center of lights with a 3" long piece of cover at horizontals and captured verticals. For siliconed glazing, hold glass in place with RG700 glass retainers.

**NOTE:** For butt glazed applications, RG700 should remain in place until the silicone has fully cured. See manufacturer's specifications for curing times. Fill hole after removal of retainer.

![Diagram showing RG700 temporary glass retainer](image)
5. Install NC900 face clips as described below. To install clips, twist clockwise.

NC900 Clip Spacing
Horizontal members:
2" from each end
2" from center of each light
6" on center

Vertical members:
2" from each end
2" from center of horizontal member
6" on center

Splice Joints
2" from each side of joint

6. Mark locations of each NC900 clip on the glass. This will assist in knowing where clips are when installing covers.
FACE COVER INSTALLATION (ALL SYSTEMS)

1. Remove temporary retainers. Install all vertical face covers first.

Prior to installing face covers, trim previously installed gaskets to length of cover. On vertical face covers, it may be necessary to crimp each reglet at the bottom of the cover to retain gaskets during installation.

2. Pinning of vertical face covers is required to prevent covers from sliding. Use one screw per cut length nearest the center of the length. Locate the screw so that it rests on the top edge of the bottom wall of the horizontal face cover, concealed from view. Install as shown.
3. Install horizontal face covers. Use same procedure as vertical covers, striking the covers only at clip locations. Always install horizontal face covers with beveled edge on top.

When splicing horizontal face covers, always locate splice at centerline of glass butt joints. Splice should be 1/2" or based on formula for linear expansion for aluminum specification and sealant movement capability. See page 23 for formula.

![Diagram of Face Cover Installation]

4. After frame has been glazed and face covers installed, seal corners of all interior gaskets. Tool excess sealant.
1. Apply sealant into gasket reglets before installing snap-in transition members.

2. Install vertical adapters first. Center in daylight opening.

3. Install horizontal adapters and seal horizontal to vertical joints. Tool sealant into joints.

4. Follow normal glazing procedures.

TRANSITION GLAZING (ALL SYSTEMS)

WITH VERTICAL SPLICE

WITHOUT VERTICAL SPLICE

DETAIL KK
DOOR FRAME INSTALLATION (ALL SYSTEMS)

1. Cut vertical mullions that will accept door subframe to frame height plus bottom clearance. Mullions that will accept door subframes run to the floor. For multiple span installations, cut to typical mullion length plus clearance.

2. Cut horizontal member above door header subframe to standard cut dimension as shown on page 16.

3. Drill holes at the bottom of the door jamb mullion for anchor screws.

4. **STICK TYPE ERECTION:**
   Prior to installing sill horizontal adjacent to door frame, secure and seal vertical mullion door jamb to the floor.

**PANEL TYPE ERECTION:**
Secure mullion to the floor before the next panel is installed.

5. Prior to installing door frame, apply pocket fillers to curtain wall header and jambs. Seal screw heads at pocket filler for Series 4525 applications.

   **NOTE:** Horizontal member above door frame must be installed with screw heads sealed before pocket fillers can be installed.

6. Assemble and install door frame and door in opening per instructions as shown in the Entrance Doors and Frames section of the Installation Manual.

---

**DETAIL LL**

**DETAIL MM**