TRIFAB® VERSAGLAZE® 450/451/451T FRAMING SYSTEM

Installation Instructions - Screw Spline Fabrication

February 2024

451VG970EN

KAWNEER

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INTRODUCTION

These instructions show the general installation sequence and procedure for typical installation. Installation Instructions are a supplement to the approved shop drawings and notations on installation and glazing. Use in conjunction with those drawings.

Consult the KawneerDirect website for the latest updates to these instructions before beginning work on your project.

Contacting Kawneer

For contact information, visit www.Kawneer.com.

Conventions Used in this Document

These symbols identify special types of information that can help you use the document more effectively.

Symbol	Description
NOTE	Denotes general information that provides additional context or guidance
IMPORTANT	Denotes information to which you should pay special attention
TIP	Denotes information that can help you perform a task more efficiently

Metric (SI) Conversion. Metric (SI) conversion figures are included throughout this document for reference. Numbers in parentheses ( ) are millimeters unless otherwise noted. The following metric (SI) units may also appear: m – meter; cm – centimeter; mm – millimeter; s – second; Pa – pascal; MPa – megapascal.

Artwork Typical. Fabrication, installation, and glazing artwork depicts typical 1" front glazed members. All 1/4" infill and 1" front, back, and multi-plane applications are similar unless otherwise noted. Outside glazing is typically shown unless otherwise noted.

Safety Notices

These symbols identify hazards and conditions related to personal safety and equipment.

Symbol	Description
WARNING	Indicates a hazard that **can** result in serious personal injury or death
CAUTION	Indicates a hazard that **can** result in personal injury
NOTICE	Indicates a situation that **can** result in equipment or property damage, but poses no risk of personal injury

General Installation Notes

These practices are recommended for all installations:

- **CHECK SHOP DRAWINGS** and **INSTALLATION 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.
- All materials are to be **INSTALLED PLUMB, LEVEL, AND TRUE**.
- All work should start from benchmarks 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 daylight opening.
- 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.
- 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.
- Check all materials on arrival for quantity and be sure you have everything required to begin installation.
- **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, priming, tooling, adhesion, and so on.
- **FASTENERS**. The term "fastener" refers to any screw or similar component that secures one part to another. These instructions specify only those fasteners used within the system. Do not substitute alternative fasteners for those provided by Kawneer.

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- **ANCHOR FASTENERS.** The term "anchor fastener" refers to any component that secures the system to the perimeter condition. 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. For anchor fastening, refer to the Shop Drawings or consult a structural engineer and the fastener supplier for fastener type, sizing, and location.
- **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.
- **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, specification writer, architect, general contractor, and the installer to make these selections in strict conformance with all applicable codes.
- **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" (2.4) over a 50° F temperature change. Any movement potential should be accounted for at the time of installation.
- **FIELD TESTING.** Field testing should be described in the project specifications. If specifications do not require field testing, we suggest that a Water Hose Test be conducted. Conduct Water Hose Test on the fixed framing portion of the system: 1) in accordance with AAMA 501.2; and, 2) after a sufficient portion of the framing is installed, glazed, and caulked to ensure proper installation. (AAMA 501.2 does not apply to operable products such as doors.)
- **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 on a “FIRST IN - FIRST OUT” basis. If the rubber becomes dry, you may use water ONE TIME to reconstitute the silicone. After that, use a soap-water solution.

Handling, Storage, and Protection of Aluminum

Protect materials against damage. Follow these precautions to assure early acceptance of your products and workmanship:

- **HANDLE CAREFULLY.**

> ⚠ **CAUTION**
> Wear proper hand protection when handling materials. Glass and sharp edges of extrusions can cause cuts and lacerations. Failure to observe this caution may result in personal injury.

  - Do not drop or drag from the truck.
  - Stack with adequate separation so materials will not rub together.
  - Store off the ground. Protect against elements and other construction trades.
- **KEEP MATERIAL AWAY FROM WATER, MUD, AND SPRAY.** Prevent cement, plaster, or other materials from damaging the finish.

- **PROTECT THE MATERIALS AFTER ERECTION.** Wrap with Kraft paper or erect 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.

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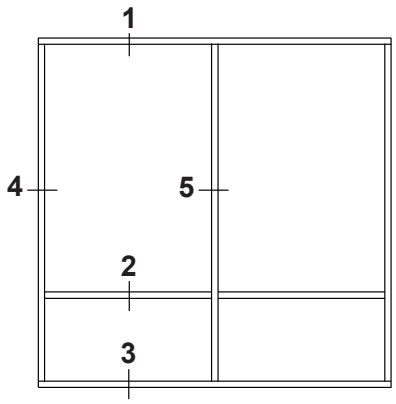
BASIC FRAMING DETAILS

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 installed in the field by snapping the split mullion half of one unit into the split mullion half of the previously installed unit.

Outside Glazed Details



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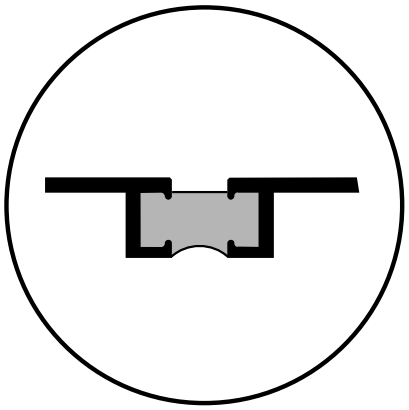

Trifab® VG 451T: Thermally Broken Members

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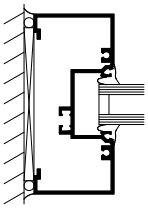	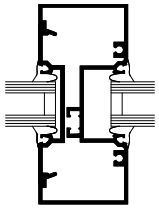	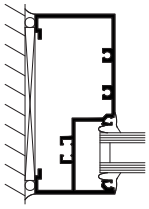	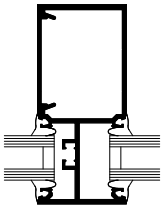	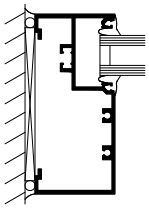	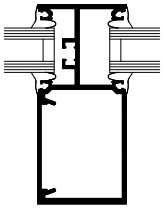
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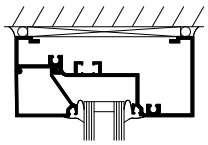		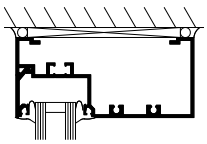		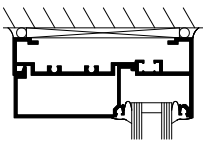	
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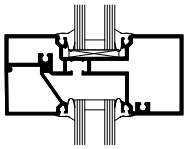		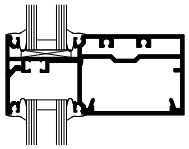		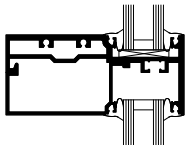	
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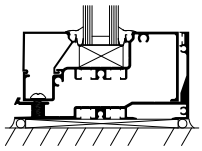	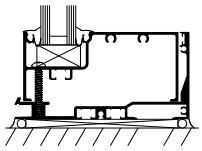	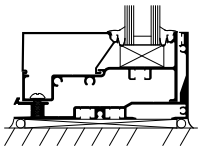
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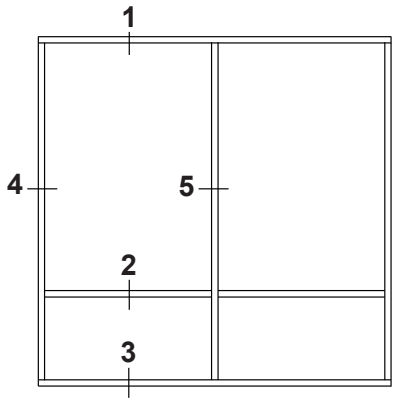

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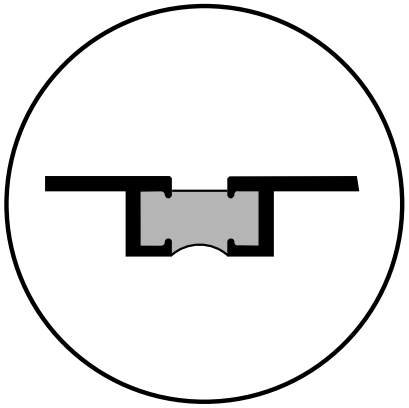

Trifab® VG 451T: Thermally Broken Members

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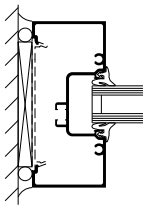
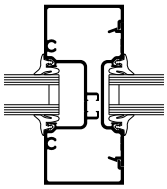
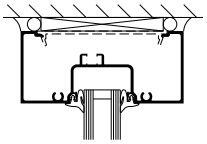
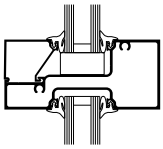
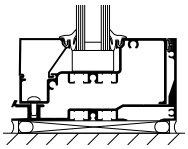
 4 JAMB	 5 VERTICAL
 1 HEAD	
 2 HORIZONTAL	
 3 SILL	

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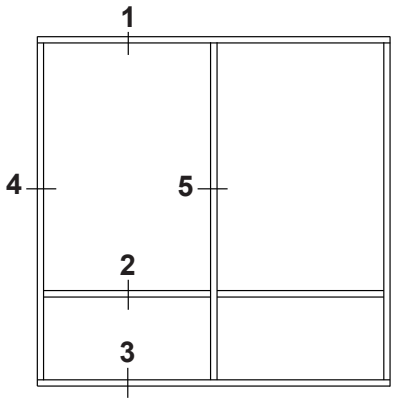

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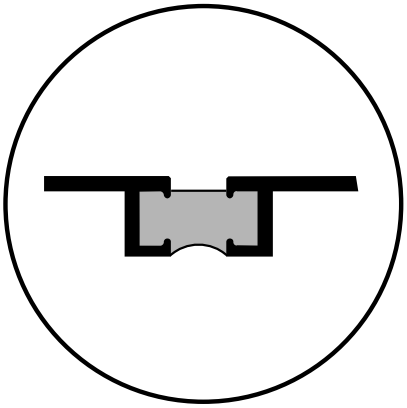

Trifab® VG 451T: Thermally Broken Members

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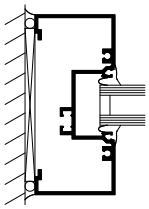	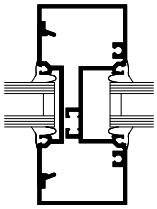	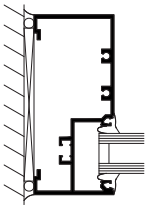	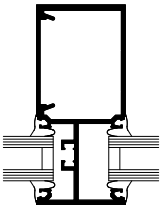	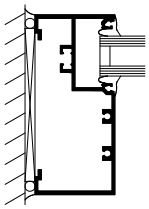	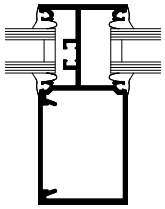
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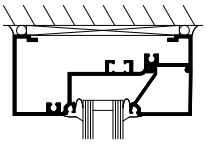		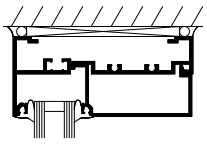		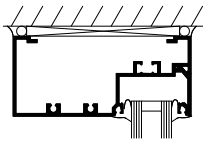	
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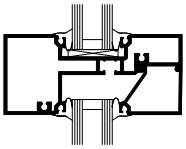		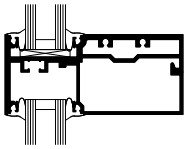		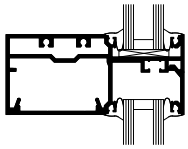	
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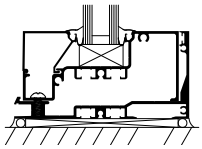		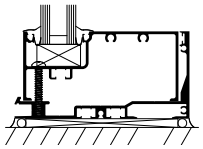		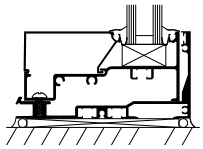	
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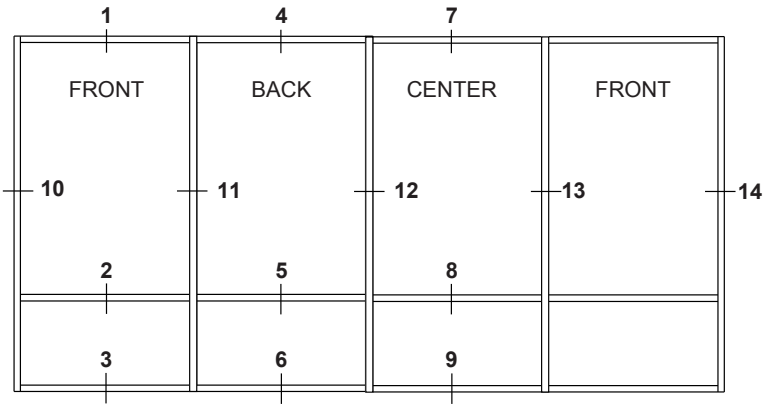
Typical Multi-Plane Details



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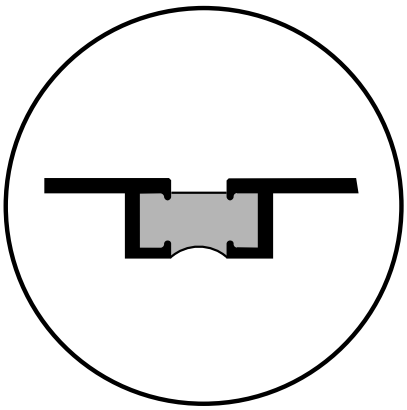
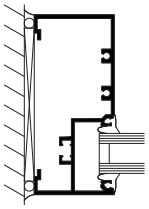
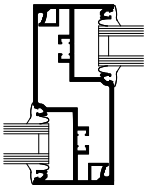
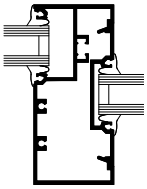
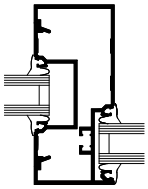
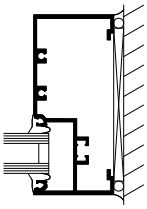
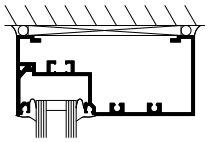
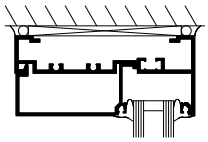
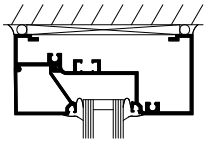
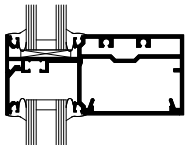
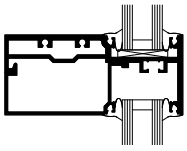
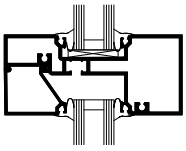
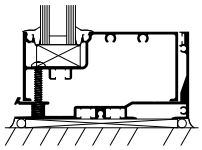
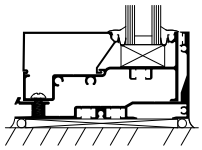
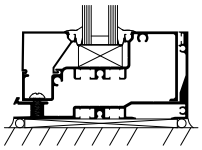


Trifab® VG 451T: Thermally Broken Members

MULTI-PLANE				
 10 JAMB	 11 VERTICAL	 12 JAMB	 13 VERTICAL	 14 JAMB
FRONT	**BACK**	**CENTER**		
 1 HEAD	 4 HEAD	 7 HEAD		
 2 HORIZONTAL	 5 HORIZONTAL	 8 HORIZONTAL		
 3 SILL	 6 SILL	 9 SILL		

TRIFAB® VERSAGLAZE® 450 FRAME FABRICATION AND ASSEMBLY

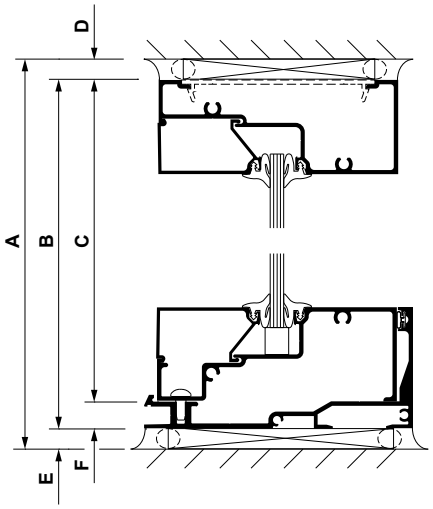
Use the instructions in the following sections to perform:

- Screw Spline Mullion Fabrication for Center Option
- Horizontals Fabrication for Center Option
- Screw Spline Mullion Fabrication for Front or Back Option
- Horizontals Fabrication for Front or Back Option
- Screw Spline Assembly
- Shear Block Joinery for Entrances

Screw Spline Fabrication for Center Plane Option (TF VG 450)

Fabricate Vertical Mullions

1. Measure minimum height of opening to determine Opening Dimension (**OD**).
2. Cut vertical members to Mullion Height (MH).



A	Opening Dimension (OD)
B	Frame Height (FH)
C	Mullion Height (MH)
D	Shim Space (Sealant Joint) at Head (SSH)
E	Shim Space (Sealant Joint) at Sill (SSS)
F	Sill Flashing Height (SFH)

MH = OD - (SSH + SSS + SFH)
FH = OD - (SSH + SSS)
MH = FH - SFH
EXAMPLE:

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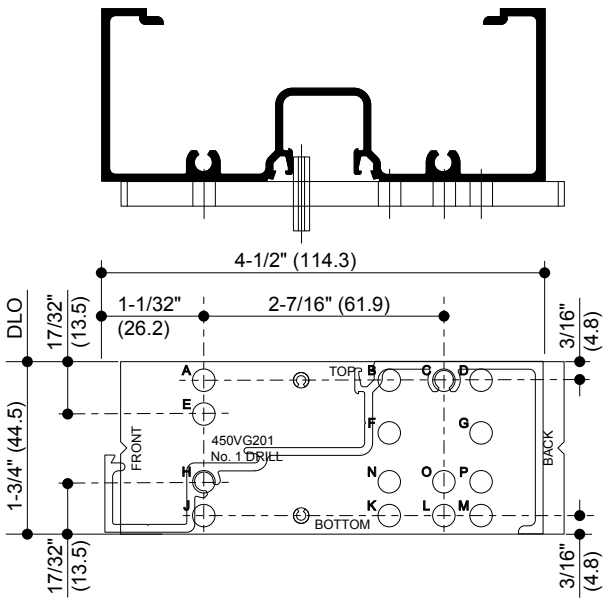
SFH = 1/2" (12.7)
SHIM SPACE (SSH or SSS) = 3/8" (9.5) minimum (Note: Typically specified by sealant manufacturer)
$MH_{Imperial}$ = OD = (3/8" + 3/8" + 1/2")
$MH_{Imperial}$ = OD - (1-1/4")
MH_{Metric} = OD - (9.5 + 9.5 + 12.7)
MH_{Metric} = OD - (31.8)

NOTICE

- Approved shop drawings always take precedence over the formula shown.
- 3/8" (9.5) minimum perimeter shim space is required. For uncertain job conditions or irregular masonry openings, add extra clearance for construction tolerance.
- Formula shown includes 1/2" (12.7) Sill Flashing Height (SFH) for HP Sill Flashing [451VG037, 451TVG037], 3/8" (9.5) minimum Shim Space at Head (SSH) and 3/8" (9.5) minimum Shim Space at Sill (SSS). Optional Sill Flashing Heights (SFH): 7/16" (11.1) [451HP037, 451THP037], and 1/8" (3.2) [450037].
- When using a head receptor, or head/jamb receptor combination, the Frame Height (FH) and Frame Width (FW) vary from these diagrams; refer to approved shop drawings.
- When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.

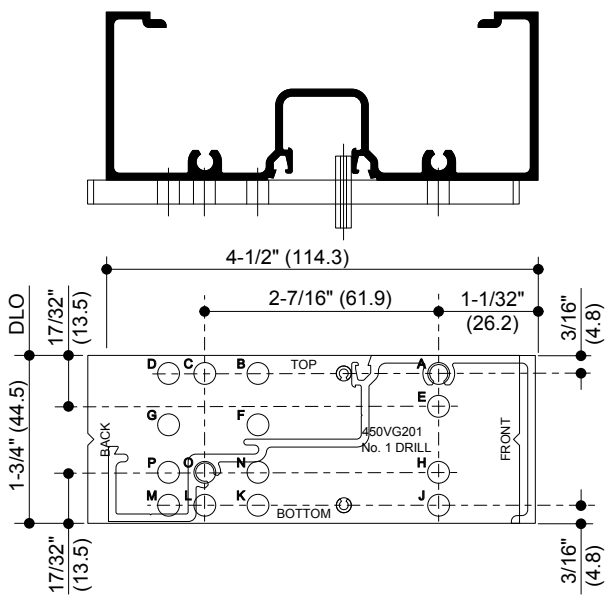
3. At desired horizontal locations, drill spline screw holes in vertical members.
   a. Place drill jig onto mullion as shown below.
   b. Drill 0.228" diameter holes (#1 drill) according to the key below..

Trifab® VersaGlaze® 450 (CENTER OPTION)



OUTSIDE GLAZED (STOPS DOWN)

	Head Prep Holes	E, L
	Horizontal Prep Holes	E, L



INSIDE GLAZED

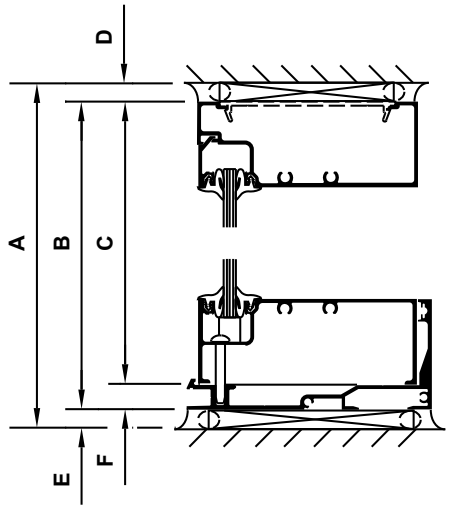
	Head Prep Holes	E, L
	Horizontal Prep Holes	E, L

Trifab® VersaGlaze® 450 (CENTER OPTION)					
	Sill Prep Holes	C, H		Sill Prep Holes	(A, O)
OUTSIDE GLAZED (STOPS UP)					
	Head Prep Holes	E, L			
	Horizontal Prep Holes	C, H			
	Sill Prep Holes	C, H			

Screw Spline Fabrication for Front or Back Plane Option (TF VG 450)

Fabricate Vertical Mullions

1. Measure minimum height of opening to determine Opening Dimension (**OD**).
2. Cut vertical members to Mullion Height (MH).



A	Opening Dimension (OD)
B	Frame Height (FH)
C	Mullion Height (MH)
D	Shim Space (Sealant Joint) at Head (SSH)
E	Shim Space (Sealant Joint) at Sill (SSS)
F	Sill Flashing Height (SFH)

MH = OD - (SSH +SSS + SFH)
FH = OD - (SSH + SSS)
MH = FH - SFH
EXAMPLE:
SFH = 1/2" (12.7)
SHIM SPACE (SSH or SSS) = 3/8" (9.5) minimum (Note: Typically specified by sealant manufacturer)
$MH_{Imperial}$ = OD - (3/8" + 3/8" + 1/2")
$MH_{Imperial}$ = OD - (1-1/4")
MH_{Metric} = OD - (9.5 + 9.5 + 12.7)

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MH_{Metric} = OD - (31.8)

NOTICE

- Approved shop drawings always take precedence over the formula shown.
- 3/8" (9.5) minimum perimeter shim space is required. For uncertain job conditions or irregular masonry openings, add extra clearance for construction tolerance.
- Formula shown includes 1/2" (12.7) Sill Flashing Height (SFH) for HP Sill Flashing [451VG037, 451TVG037], 3/8" (9.5) minimum Shim Space at Head (SSH) and 3/8" (9.5) minimum Shim Space at Sill (SSS). Optional Sill Flashing Heights (SFH): 7/16" (11.1) [451HP037, 451THP037], and 1/8" (3.2) [450037].
- When using a head receptor, or head/jamb receptor combination, the Frame Height (FH) and Frame Width (FW) vary from these diagrams; refer to approved shop drawings.
- When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.

3. At desired horizontal locations, drill spline screw holes in vertical members.

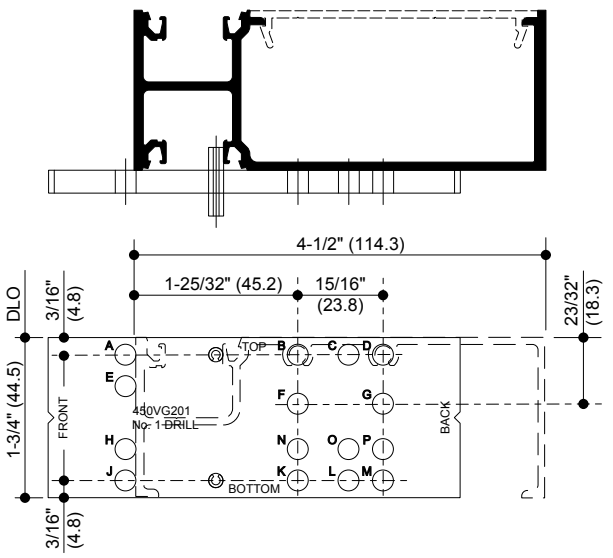
TIP

Screw spline preps for mullion fillers may be completed by using a 2" (50.8) piece of mullion to support drill jig or by locating the horizontal at the vertical dimensions shown above, and drilling at the "V" groves in the extrusions.

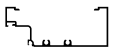
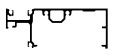
a. Place drill jig onto mullion as shown below.

b. Drill 0.228" diameter holes (#1 drill) according to the key below..

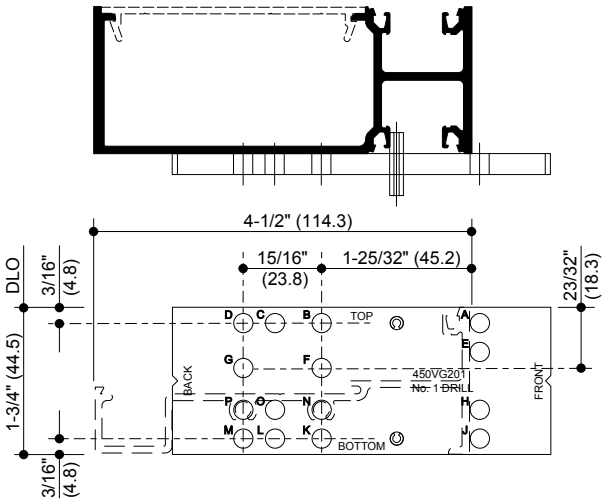
Trifab® VersaGlaze® 450 (FRONT OPTION)



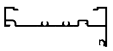
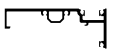
OUTSIDE GLAZED

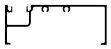
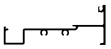
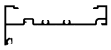
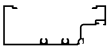
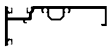
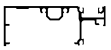
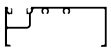
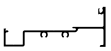
	Head Prep Holes	K, M
	Horizontal Prep Holes	B, D

Trifab® VersaGlaze® 450 (BACK OPTION)



OUTSIDE GLAZED

	Head Prep Holes	F, G
	Horizontal Prep Holes	B, D

Trifab® VersaGlaze® 450 (FRONT OPTION)			Trifab® VersaGlaze® 450 (BACK OPTION)		
	Sill Prep Holes	B, D		Sill Prep Holes	N, P
INSIDE GLAZED			**INSIDE GLAZED**		
	Head Prep Holes	F, G		Head Prep Holes	K, M
	Horizontal Prep Holes	B, D		Horizontal Prep Holes	B, D
	Sill Prep Holes	B, D		Sill Prep Holes	N, P

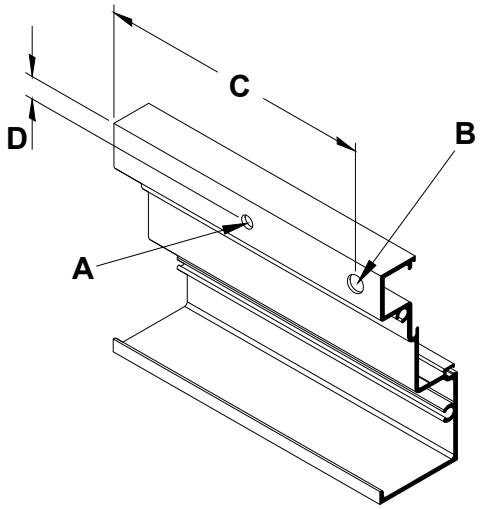
Horizontals Fabrication for Center Option (TF VG 450)

1. Cut horizontals to length, $\mathbf{L_{HORIZ} = DLO_H}$.
2. Cut glass stops to length, $\mathbf{L_{GLASS\ STOP} = DLO_H - 1/16"\ (1.6)}$.
3. Drill sill holes.
   a. Drill 0.201" (#7 drill) clear holes in sill for anchoring to sill flashing.

> **NOTE**
> See Sill to Sill Flashing Fastener Schedule for hole spacing dimensions.

   b. Drill 5/16" weep holes at 1/4 points of sill to align with 5/16" holes in sill flashing.

> **NOTE**
> Sill weep holes are not required for front option assemblies.



A	0.201" (#7 drill) clear anchor hole
B	5/16" weep hole
C	1/4 point
D	0.442" (11.2) or interior V-groove

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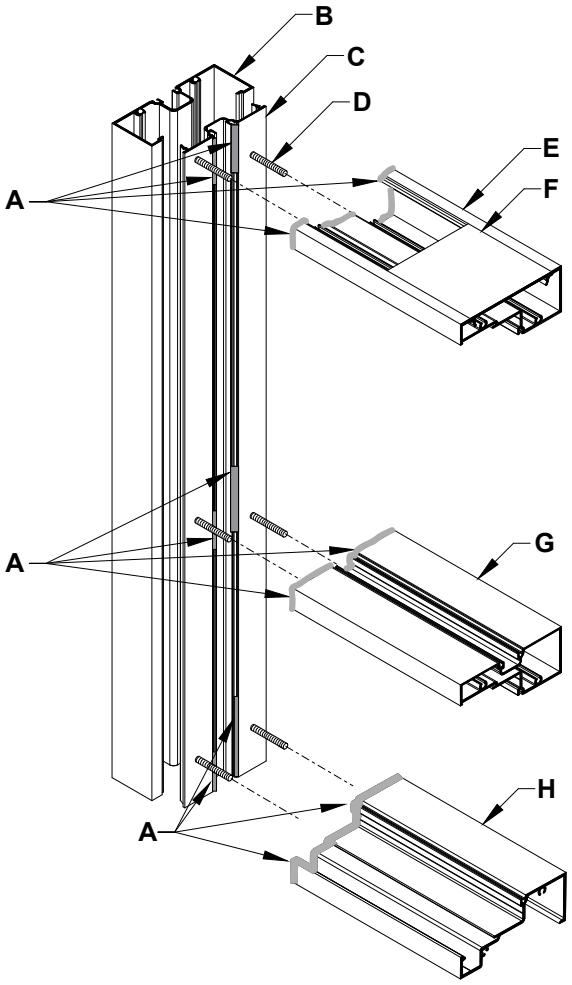
Screw Spline Assembly (TF VG 450)

NOTICE
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. See Shear Block Fabrication and Assembly.

1. Apply sealant to ends of all horizontal members and glazing reglets to ensure a good seal to vertical members.
2. Assemble each unit to include:
   - at least one deep vertical pocket; and
   - both a male and a female mullion half.
3. Secure units using two (2) screws 028856 at each joint as shown.



A	Sealant (by others)
B	Screw Spline Mullion
C	Snap-in Mullion Filler
D	#12 x 1-1/8" Spline Screw
E	Head
F	3" (76.2) long Shim Filler
G	Intermediate Horizontal
H	Sill

Shear Block Preps for Center Option at Door Jambs (TF VG 450)

1. At desired horizontal locations drill holes in the door jambs as shown.

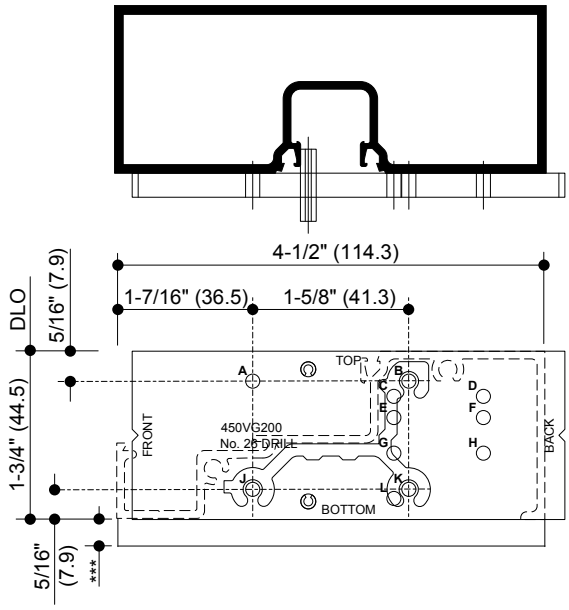
> **IMPORTANT**
> Door jambs run through to perimeter at sill. Locate sill to accommodate sill flashing and shim space at sill.

   a. Place drill jig onto mullion as shown below.

   b. Drill 0.147" diameter holes (#26 drill) according to key below.

2. Attach shear blocks to door jambs using #028400 (#10 X 1-19/32" P.H.) screws as needed.

Trifab® VersaGlaze® 450 (CENTER OPTION)



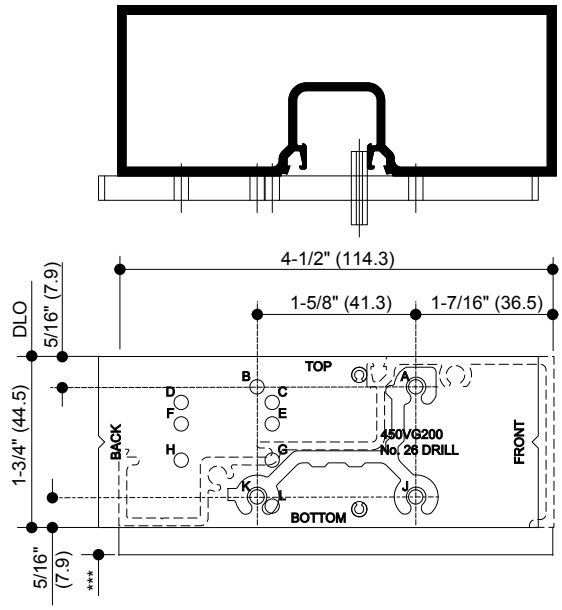
*** Shim Space

OUTSIDE GLAZED (STOPS DOWN)

	Head Prep Holes	A, B, K
	Horizontal Prep Holes	A, B, K
	Sill Prep Holes	B, J, K

INSIDE GLAZED

	Head Prep Holes	B, J, K
	Horizontal Prep Holes	B, J, K
	Sill Prep Holes	B, J, K



*** Shim Space

INSIDE GLAZED

	Head Prep Holes	A, B, K
	Horizontal Prep Holes	A, B, K
	Sill Prep Holes	A, J, K

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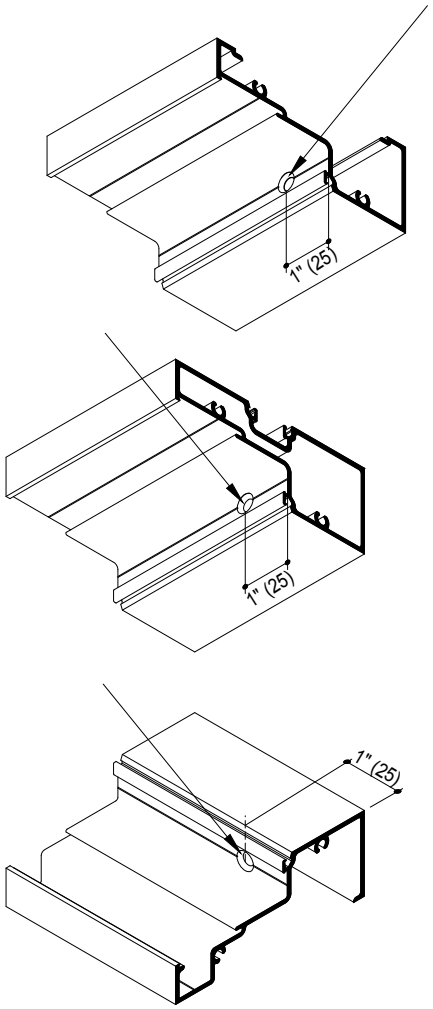
Horizontals Fabrication for Shear Block Center Option at Door Jambs (TF VG 450)

1. Cut horizontals to length, $\mathbf{L_{HORIZ} = DLO_H}$.
2. Cut glass stops to length, $\mathbf{L_{GLASS\ STOP} = DLO_H - 1/16"\ (1.6)}$.
3. Drill head, sill, and intermediate horizontals.
   a. Drill 0.201" (#7 drill) holes as shown.
   b. Countersink drilled holes to 0.390" x 82°.

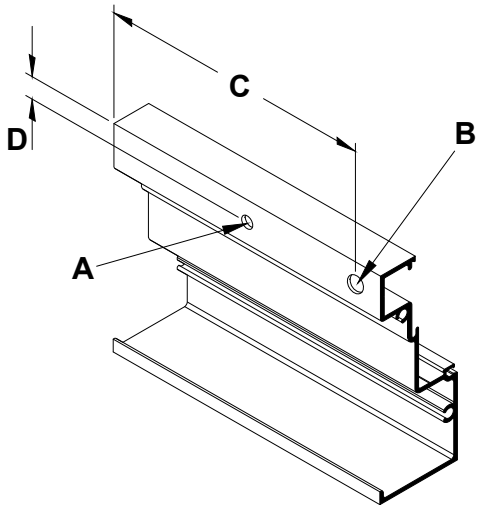


4. Drill sill holes.
   a. Drill 0.201" (#7 drill) clear holes in sill for anchoring to sill flashing.

> **NOTE**
> See Sill to Sill Flashing Fastener Schedule for hole spacing dimensions.

b. Drill 5/16" weep holes at 1/4 points of sill to align with 5/16" holes in sill flashing.

> **NOTE**
> Sill weep holes are not required for front option assemblies.



A	0.201" (#7 drill) clear anchor hole
B	5/16" weep hole
C	1/4 point
D	0.442" (11.2) or interior V-groove

Shear Block Preps for Front or Back Option at Door Jambs (TF VG 450)

1. At desired horizontal locations drill holes in the door jambs as shown.

> **IMPORTANT**
> Door jambs run through to perimeter at sill. Locate sill to accommodate sill flashing and shim space at sill.

   a. Place drill jig onto mullion as shown below.

   b. Drill 0.147" diameter holes (#26 drill) according to key below.

2. Attach shear blocks to door jambs using #028400 (#10 X 1-19/32" P.H.) screws as needed.

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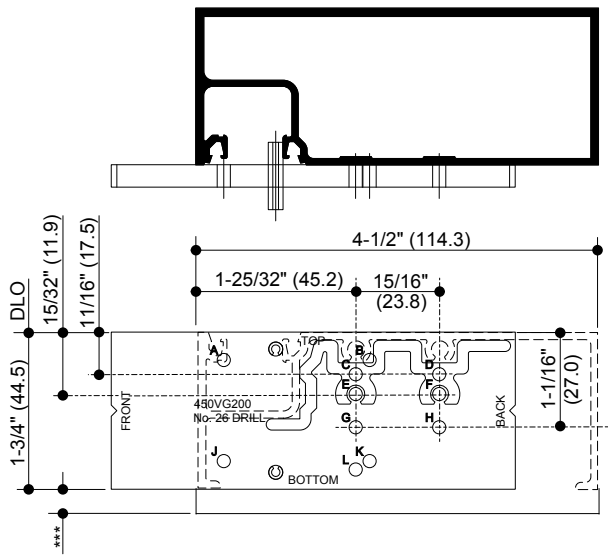
Trifab® VersaGlaze® 450 (FRONT OPTION)



*** Shim Space

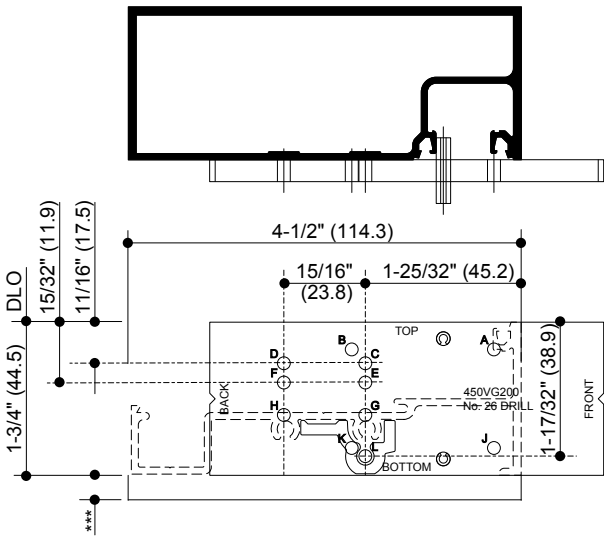
OUTSIDE GLAZED

	Head Prep Holes	G, H
	Horizontal Prep Holes	E, F
	Sill Prep Holes	E, F

INSIDE GLAZED

	Head Prep Holes	C, D
	Horizontal Prep Holes	E, F
	Sill Prep Holes	E, F

Trifab® VersaGlaze® 450 (BACK OPTION)



*** Shim Space

OUTSIDE GLAZED

	Head Prep Holes	C, D
	Horizontal Prep Holes	E, F
	Sill Prep Holes	L

INSIDE GLAZED

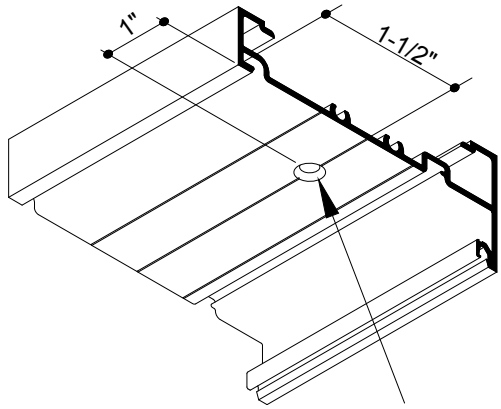
	Head Prep Holes	G, H
	Horizontal Prep Holes	E, F
	Sill Prep Holes	L

Horizontals Fabrication for Shear Block Front or Back Option at Door Jambs (TF VG 450)

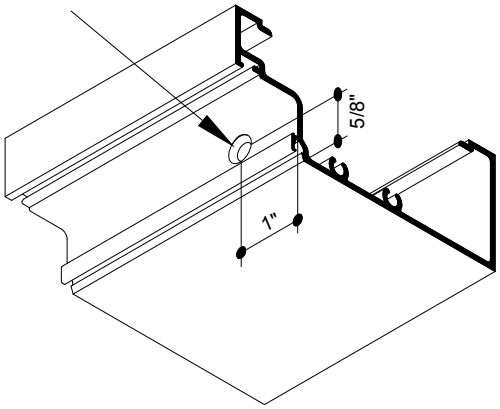
1. Cut horizontals to length, $\mathbf{L_{HORIZ} = DLO_H}$.
2. Cut glass stops to length, $\mathbf{L_{GLASS\ STOP} = DLO_H - 1/16"\ (1.6)}$.
3. Drill head and sill for #10 FH screws.
   a. Drill 0.201" (#7 drill) holes as shown.
   b. Countersink drilled holes to 0.390" x 82°.

HEAD

FRONT - INSIDE GLAZED or BACK - OUTSIDE GLAZED

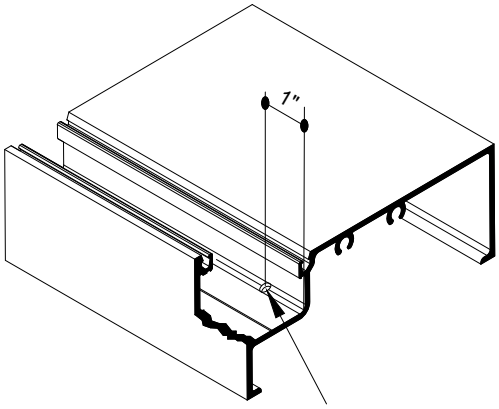


FRONT - OUTSIDE GLAZED or BACK - INSIDE GLAZED

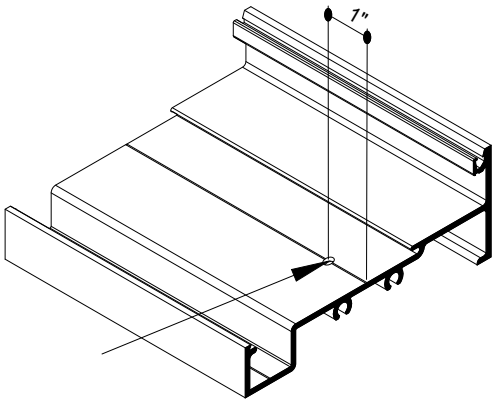


SILL

FRONT INSIDE or OUTSIDE GLAZED



BACK INSIDE or OUTSIDE GLAZED

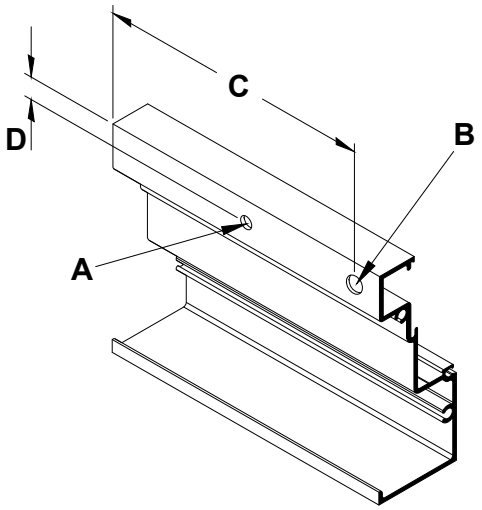


4. Drill sill holes.
   a. Drill 0.201" (#7 drill) clear holes in sill for anchoring to sill flashing.

> **NOTE**
> See Sill to Sill Flashing Fastener Schedule for hole spacing dimensions.

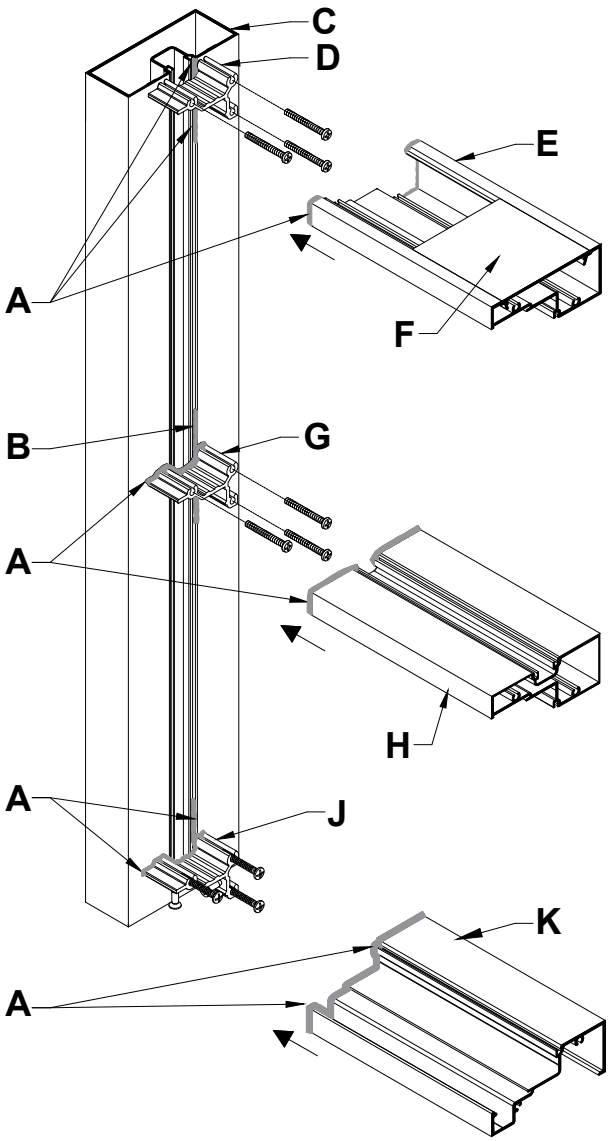
   b. Drill 5/16" weep holes at 1/4 points of sill to align with 5/16" holes in sill flashing.

> **NOTE**
> Sill weep holes are not required for front option assemblies.



A	0.201" (#7 drill) clear anchor hole
B	5/16" weep hole
C	1/4 point
D	0.442" (11.2) or interior V-groove

Shear Block Door Jamb and Sidelite Assembly (TF VG 450)



A	Sealant
B	Sealant Into Reglet
C	Door Jamb
D	Head Shear Block Package
E	Head
F	3" (76.2) long Shim Filler
G	Intermediate Horizontal Shear Block Package
H	Intermediate Horizontal
J	Sill Shear Block Package
K	Sill

1. Apply sealant to contact ends of shear blocks and to glazing reglets to ensure a good seal to vertical members.

NOTICE
Failure to properly seal horizontal components to vertical mullions will reduce system performance.

2. Attach shear blocks to vertical mullions.
3. Hold fabricated horizontal member over shear block and tight against vertical member.
4. Match drill 0.147" diameter holes (#26 drill) into shear block.
   - For center option, offset slightly to vertical mullion side of countersunk hole in horizontal.
   - For front or back option, offset slightly to DLO side of countersunk hole in horizontal.
5. Apply sealant to ends of all horizontal members and to glazing reglets to ensure a good seal to vertical members.

> **NOTICE**
> Failure to properly seal horizontal components to vertical mullions will reduce system performance.

6. Attach all horizontal members to shear blocks with fasteners provided in shear block packages.
7. Install flat fillers.
   a. Identify perimeter anchor locations.
      - 6" (152) on each side of vertical mullions
      - 24" (610) on center between vertical mullions
   b. Insert flat fillers into head and jambs at perimeter anchor locations.
   c. Crimp filler material to prevent plate from sliding.

TRIFAB® VERSAGLAZE® 451/451T FRAME FABRICATION AND ASSEMBLY

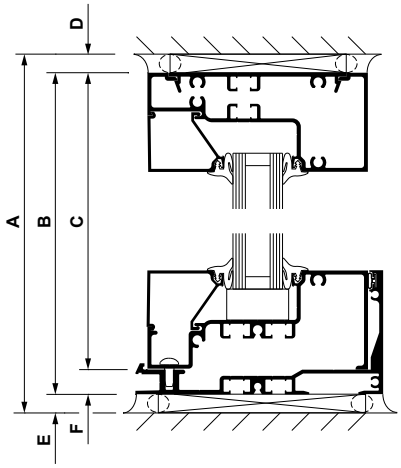
Use the instructions in the following sections to perform:

- Screw Spline Mullion Fabrication for Center Option
- Horizontals Fabrication for Center Option
- Screw Spline Mullion Fabrication for Front or Back Option
- Horizontals Fabrication for Front or Back Option
- Screw Spline Assembly
- Shear Block Joinery for Entrances

Screw Spline Fabrication for Center Plane Option (TF VG 451/451T)

Fabricate Vertical Mullions

1. Measure minimum height of opening to determine Opening Dimension (**OD**).
2. Cut vertical members to Mullion Height (MH),



A	Opening Dimension (OD)
B	Frame Height (FH)
C	Mullion Height (MH)
D	Shim Space (Sealant Joint) at Head (SSH)
E	Shim Space (Sealant Joint) at Sill (SSS)
F	Sill Flashing Height (SFH)

MH = OD - (SSH + SSS + SFH)
FH = OD - (SSH + SSS)
MH = FH - SFH
EXAMPLE:

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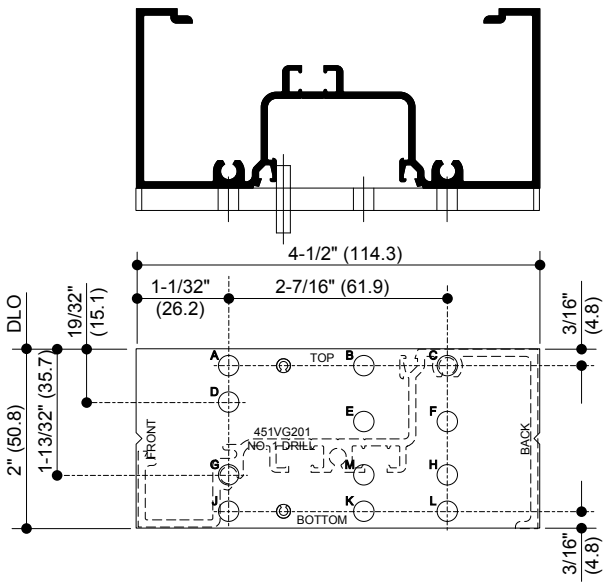
SFH = 1/2" (12.7)
SHIM SPACE (SSH or SSS) = 3/8" (9.5) minimum (Note: Typically specified by sealant manufacturer)
$MH_{Imperial}$ = OD - (3/8" + 3/8" +1/2")
$MH_{Imperial}$ = OD - (1-1/4")
MH_{Metric} = OD - (9.5 + 9.5 + 12.7)
MH_{Metric} = OD - (31.8)

NOTICE

- Approved shop drawings always take precedence over the formula shown.
- 3/8" (9.5) minimum perimeter shim space is required. For uncertain job conditions or irregular masonry openings, add extra clearance for construction tolerance.
- Formula shown includes 1/2" (12.7) Sill Flashing Height (SFH) for HP Sill Flashing [451VG037, 451TVG037], 3/8" (9.5) minimum Shim Space at Head (SSH) and 3/8" (9.5) minimum Shim Space at Sill (SSS). Optional Sill Flashing Heights (SFH): 7/16" (11.1) [451HP037, 451THP037], and 1/8" (3.2) [450037].
- When using a head receptor, or head/jamb receptor combination, the Frame Height (FH) and Frame Width (FW) vary from these diagrams; refer to approved shop drawings.
- When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.

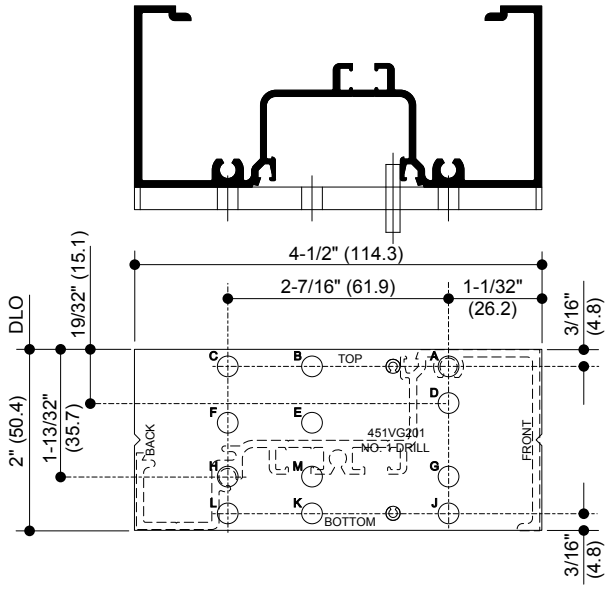
3. At desired horizontal locations, drill spline screw holes in vertical members.
   a. Place drill jig onto mullion as shown below.
   b. Drill 0.228" diameter holes (#1 drill) according to the key below..

Trifab® VersaGlaze® 451 (CENTER OPTION)



OUTSIDE GLAZED (STOPS DOWN)

	Head Prep Holes	D, L
	Horizontal Prep Holes	D, L



INSIDE GLAZED

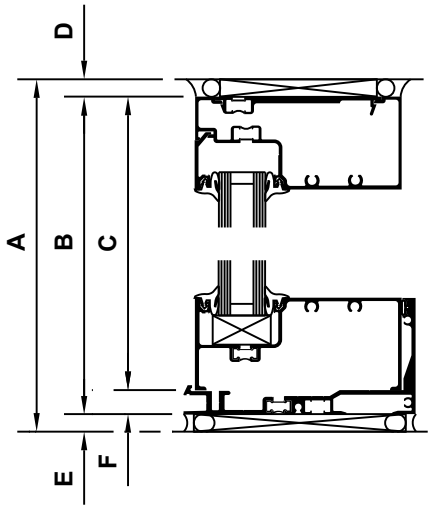
	Head Prep Holes	D, L
	Horizontal Prep Holes	D, L

Trifab® VersaGlaze® 451 (CENTER OPTION)					
	Sill Prep Holes	C, G		Sill Prep Holes	A, H
OUTSIDE GLAZED (STOPS UP)					
	Head Prep Holes	J, L			
	Horizontal Prep Holes	C, G			
	Sill Prep Holes	C, G			

Screw Spline Fabrication for Front or Back Plane Option (TF VG 451/451T)

Fabricate Vertical Mullions

1. Measure minimum height of opening to determine Opening Dimension (**OD**).
2. Cut vertical members to Mullion Height (MH).



A	Opening Dimension (OD)
B	Frame Height (FH)
C	Mullion Height (MH)
D	Shim Space (Sealant Joint) at Head (SSH)
E	Shim Space (Sealant Joint) at Sill (SSS)
F	Sill Flashing Height (SFH)

MH = OD - (SSH + SSS + SFH)
FH = OD - (SSH + SSS)
MH = FH - SFH
EXAMPLE:
SFH = 1/2" (12.7)
SHIM SPACE (SSH or SSS) = 3/8" (9.5) minimum (Note: Typically specified by sealant manufacturer)
$MH_{Imperial}$ = OD - (3/8" + 3/8" + 1/2")
$MH_{Imperial}$ = OD - (1-1/4")
MH_{Metric} = OD - (9.5 + 9.5 + 12.7)

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MH_{Metric} = OD - (31.8)

NOTICE

- Approved shop drawings always take precedence over the formula shown.
- 3/8" (9.5) minimum perimeter shim space is required. For uncertain job conditions or irregular masonry openings, add extra clearance for construction tolerance.
- Formula shown includes 1/2" (12.7) Sill Flashing Height (SFH) for HP Sill Flashing [451VG037, 451TVG037], 3/8" (9.5) minimum Shim Space at Head (SSH) and 3/8" (9.5) minimum Shim Space at Sill (SSS). Optional Sill Flashing Heights (SFH): 7/16" (11.1) [451HP037, 451THP037], and 1/8" (3.2) [450037].
- When using a head receptor, or head/jamb receptor combination, the Frame Height (FH) and Frame Width (FW) vary from these diagrams; refer to approved shop drawings.
- When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.

3. At desired horizontal locations, drill spline screw holes in vertical members.

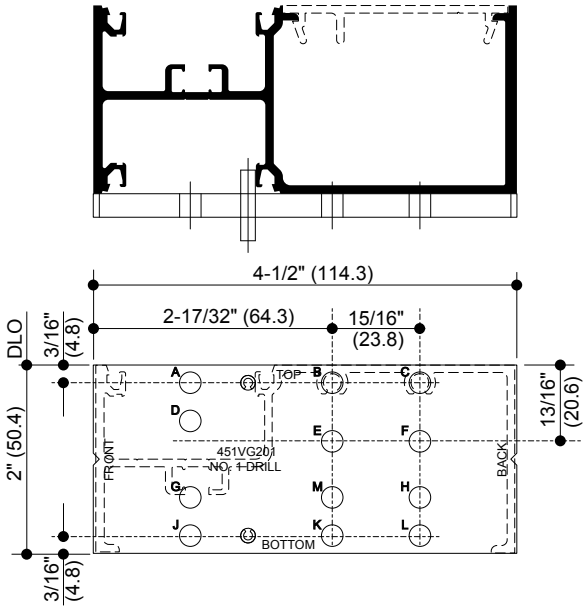
TIP

Screw spline preps for mullion fillers may be completed by using a 2" (50.8) piece of mullion to support drill jig or by locating the horizontal at the vertical dimensions shown above, and drilling at the "V" groves in the extrusions.

a. Place drill jig onto mullion as shown below.

b. Drill 0.228" diameter holes (#1 drill) according to the key below..

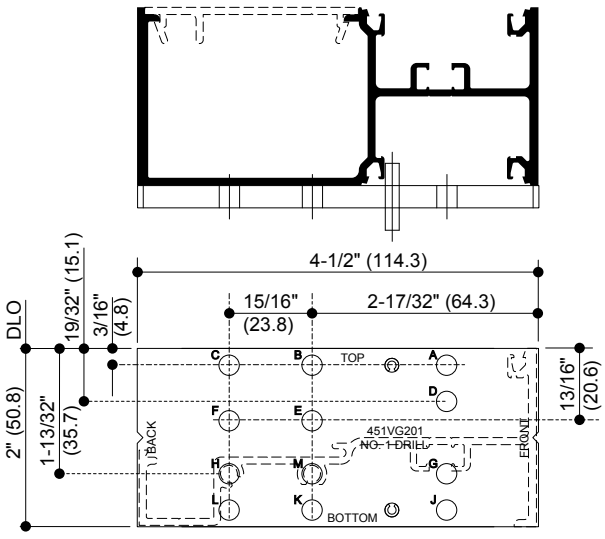
Trifab® VersaGlaze® 451 (FRONT OPTION)



OUTSIDE GLAZED

	Head Prep Holes	K, L
	Horizontal Prep Holes	B, C

Trifab® VersaGlaze® 451 (BACK OPTION)



OUTSIDE GLAZED

	Head Prep Holes	E, F
	Horizontal Prep Holes	B, C

Trifab® VersaGlaze® 451 (FRONT OPTION)			Trifab® VersaGlaze® 451 (BACK OPTION)		
	Sill Prep Holes	B, C		Sill Prep Holes	H, M
INSIDE GLAZED			**INSIDE GLAZED**		
	Head Prep Holes	E, F		Head Prep Holes	K, L
	Horizontal Prep Holes	B, C		Horizontal Prep Holes	B, C
	Sill Prep Holes	B, C		Sill Prep Holes	H, M

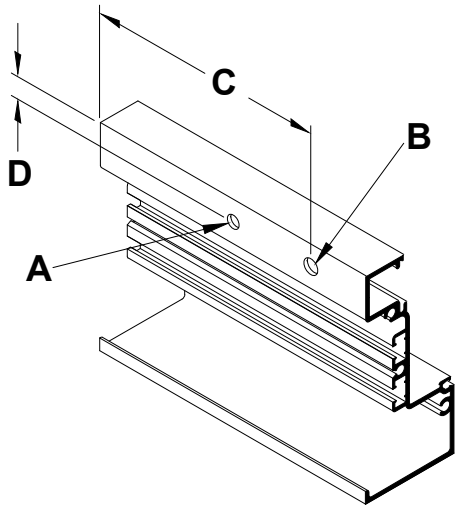
Horizontals Fabrication (TF VG 451/451T)

1. Cut horizontals to length, $\mathbf{L_{HORIZ} = DLO_H}$.
2. Cut glass stops to length, $\mathbf{L_{GLASS\ STOP} = DLO_H - 1/16"\ (1.6)}$.
3. Drill sill holes.
   a. Drill 0.201" (#7 drill) clear holes in sill for anchoring to sill flashing.

> **NOTE**
> See Sill to Sill Flashing Fastener Schedule for hole spacing dimensions.

   b. Drill 5/16" weep holes at 1/4 points of sill to align with 5/16" holes in sill flashing.

> **NOTE**
> Sill weep holes are not required for front option assemblies.



A	0.201" (#7 drill) clear anchor hole
B	5/16" weep hole
C	1/4 point
D	0.442" (11.2) or interior V-groove

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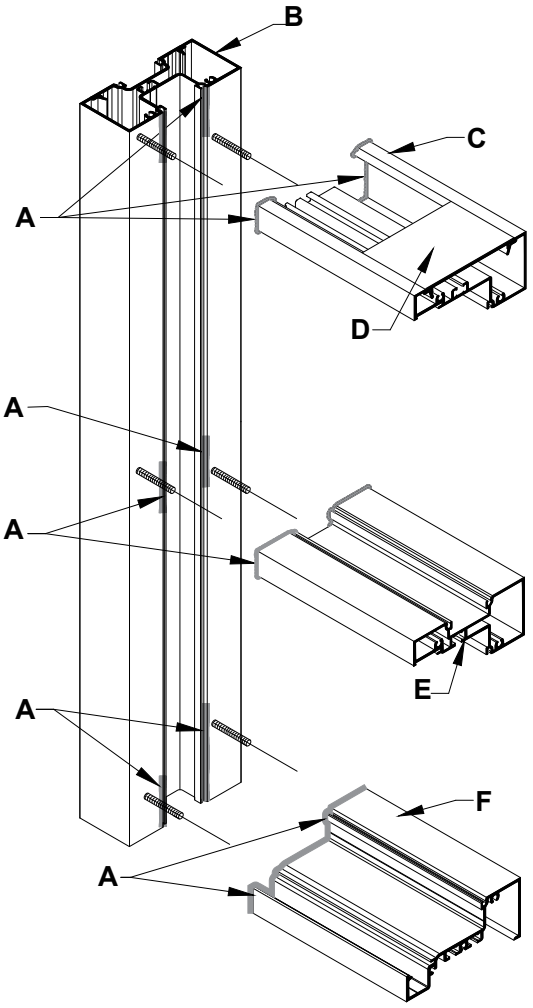
Assemble Screw Spline Frame

NOTICE
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. See Shear Block Fabrication and Assembly.

1. Apply sealant to ends of all horizontal members and glazing reglets to ensure a good seal to vertical members.
2. Assemble each unit to include:
   - at least one deep vertical pocket; and
   - both a male and a female mullion half.
3. Secure units using two (2) screws 028856 at each joint as shown.



A	Sealant
B	Door Jamb
C	Head
D	3" (76.2) long Shim Filler
E	Intermediate Horizontal
F	Sill

Shear Block Preps for Center Option at Door Jambs (TF VG 451/451T)

1. At desired horizontal locations drill holes in the door jambs as shown.

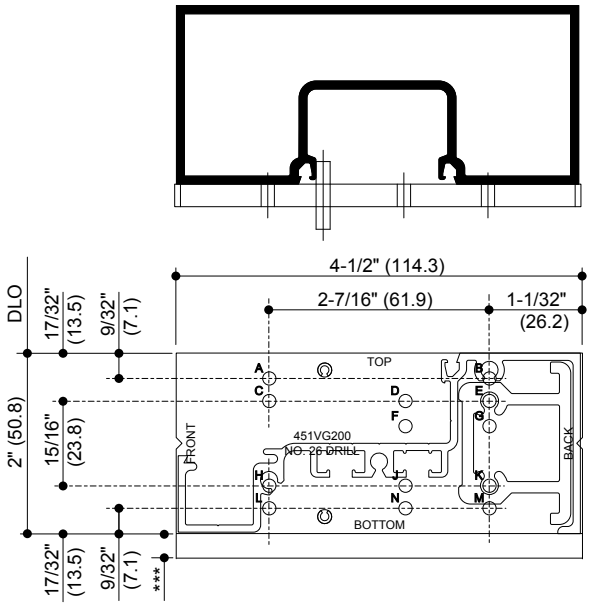
> **IMPORTANT**
> Door jambs run through to perimeter at sill. Locate sill to accommodate sill flashing and shim space at sill.

   a. Place drill jig onto mullion as shown below.

   b. Drill 0.147" diameter holes (#26 drill) according to key below.

2. Attach shear blocks to door jambs using #028400 (#10 X 1-19/32" P.H.) screws as needed.

Trifab® VersaGlaze® 451/451T (CENTER OPTION, OUTSIDE GLAZED)



*** Shim Space

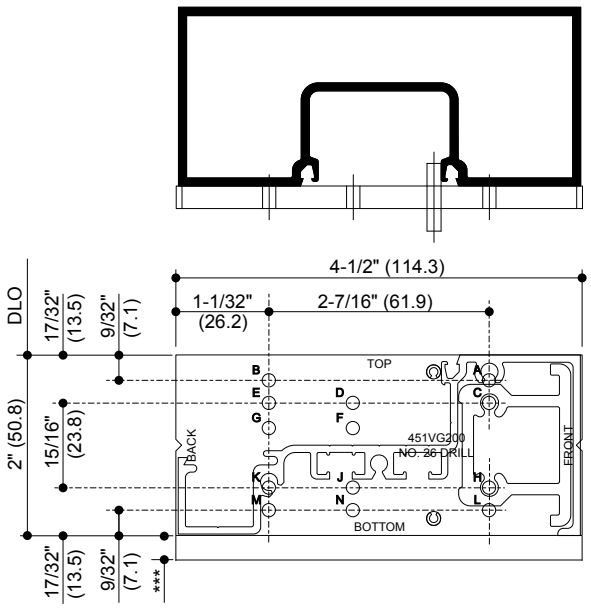
STOPS DOWN		
	Head Prep Holes	E, K
	Horizontal Prep Holes	E, K
	Sill Prep Holes	E, K

STOPS UP		
	Head Prep Holes	C, H, K
	Horizontal Prep Holes	E, K
	Sill Prep Holes	E, K

STOPS DOWN WITH OPTIONAL HORIZONTAL		
	Head Prep Holes	E, K
	Horizontal Prep Holes	A, B, K
	Sill Prep Holes	E, K

STOPS UP WITH OPTIONAL HORIZONTAL		
	Head Prep Holes	C, H, K
	Horizontal Prep Holes	E, L, M
	Sill Prep Holes	E, K

Trifab® VersaGlaze® 451/451T (CENTER OPTION, INSIDE GLAZED)

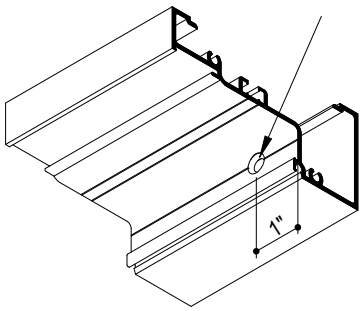


*** Shim Space

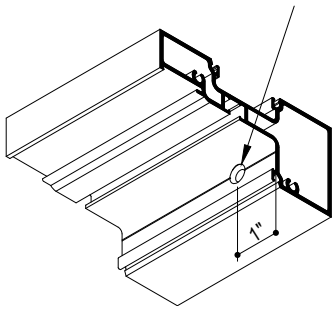
INSIDE GLAZED			INSIDE GLAZED WITH OPTIONAL HORIZONTAL		
	Head Prep Holes	E, K		Head Prep Holes	C, K
	Horizontal Prep Holes	E, K		Horizontal Prep Holes	A, B, K
	Sill Prep Holes	C, H		Sill Prep Holes	C, H

Horizontals Fabrication for Shear Block Center Option at Door Jambs (TF VG 451/451T)

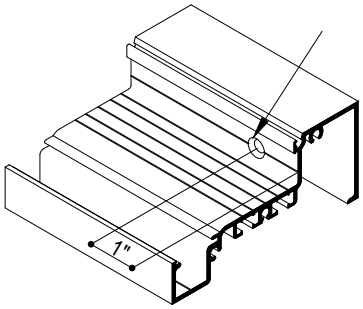
1. Cut horizontals to length, $\mathbf{L_{HORIZ} = DLO_H}$.
2. Cut glass stops to length, $\mathbf{L_{GLASS\ STOP} = DLO_H - 1/16"\ (1.6)}$.
3. Drill head, sill, and intermediate horizontals.
   a. Drill 0.201" (#7 drill) holes as shown.
   b. Countersink drilled holes to 0.390" x 82°.



HEAD



HORIZONTAL



SILL

4. Drill sill holes.
   a. Drill 0.201" (#7 drill) clear holes in sill for anchoring to sill flashing.

> **NOTE**
> See Sill to Sill Flashing Fastener Schedule for hole spacing dimensions.

   b. Drill 5/16" weep holes at 1/4 points of sill to align with 5/16" holes in sill flashing.

> **NOTE**
> Sill weep holes are not required for front option assemblies.

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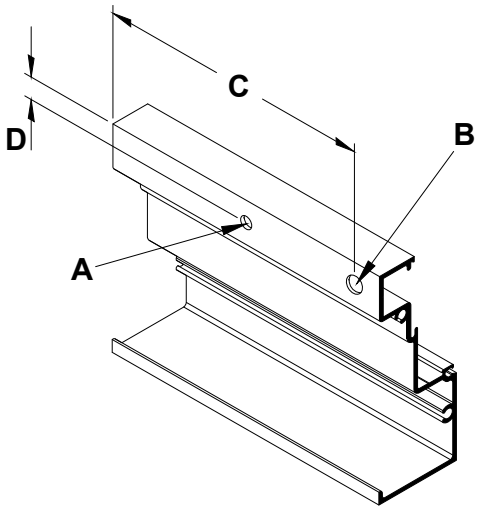


A	0.201" (#7 drill) clear anchor hole
B	5/16" weep hole
C	1/4 point
D	0.442" (11.2) or interior V-groove

Shear Block Preps for Front or Back Option at Door Jambs (TF VG 451/451T)

1. At desired horizontal locations drill holes in the door jambs as shown.

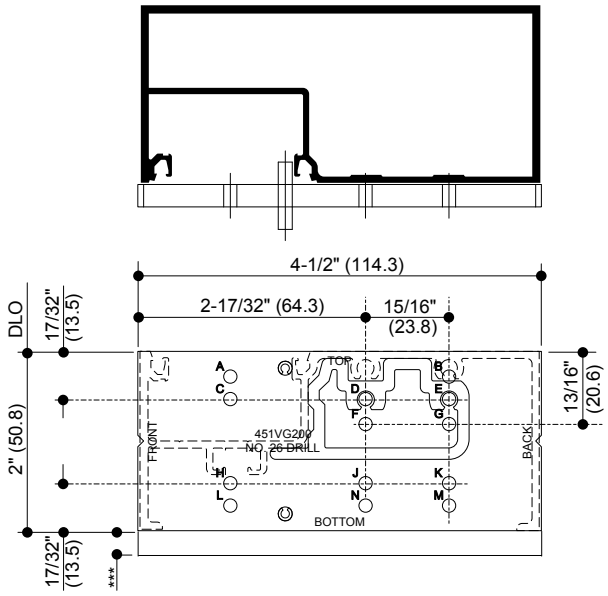
> **IMPORTANT**
> Door jambs run through to perimeter at sill. Locate sill to accommodate sill flashing and shim space at sill.

   a. Place drill jig onto mullion as shown below.

   b. Drill 0.147" diameter holes (#26 drill) according to key below.

2. Attach shear blocks to door jambs using #028400 (#10 X 1-19/32" P.H.) screws as needed.

Trifab® VersaGlaze® 451 (FRONT OPTION)



*** Shim Space

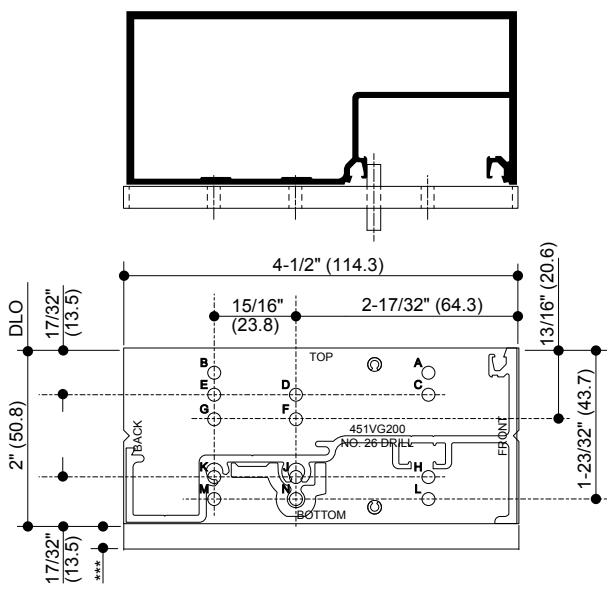
OUTSIDE GLAZED

	Head Prep Holes	J, K
	Horizontal Prep Holes	F, G
	Sill Prep Holes	D, E

INSIDE GLAZED

	Head Prep Holes	D, E
	Horizontal Prep Holes	F, G
	Sill Prep Holes	D, E

Trifab® VersaGlaze® 451 (BACK OPTION)



*** Shim Space

OUTSIDE GLAZED

	Head Prep Holes	D, E
	Horizontal Prep Holes	F, G
	Sill Prep Holes	N

INSIDE GLAZED

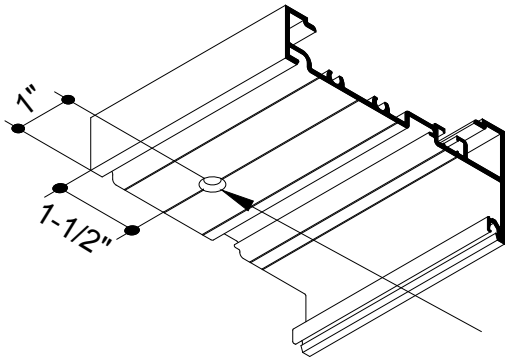
	Head Prep Holes	J, K
	Horizontal Prep Holes	F, G
	Sill Prep Holes	N

Horizontals Fabrication for Shear Block Front or Back Option at Door Jambs (TF VG 451/451T)

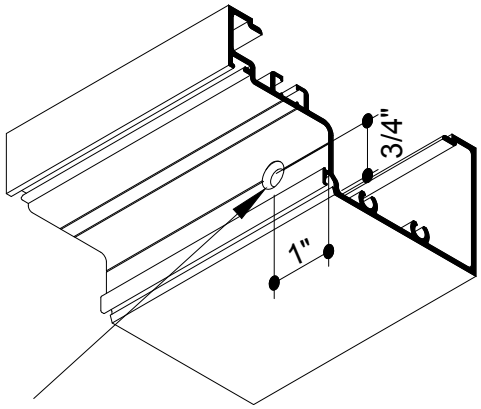
1. Cut horizontals to length, $\mathbf{L_{HORIZ} = DLO_H}$.
2. Cut glass stops to length, $\mathbf{L_{GLASS\ STOP} = DLO_H - 1/16"\ (1.6)}$.
3. Drill head and sill for #10 FH screws.
   a. Drill 0.201" (#7 drill) holes as shown.
   b. Countersink drilled holes to 0.390" x 82°.

HEAD

FRONT - INSIDE GLAZED or BACK - OUTSIDE GLAZED

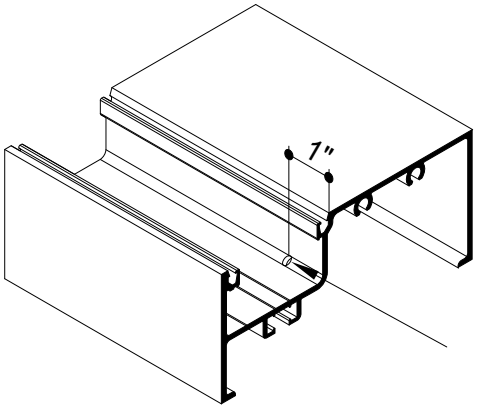


FRONT - OUTSIDE GLAZED or BACK - INSIDE GLAZED

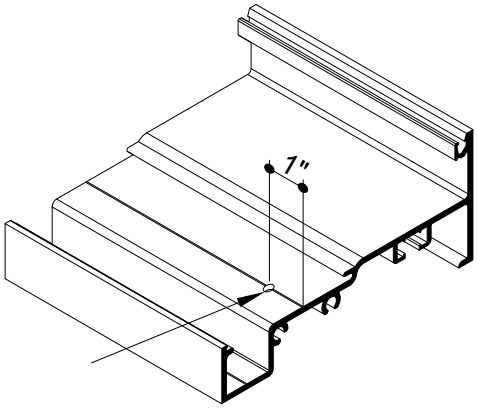


SILL

FRONT INSIDE or OUTSIDE GLAZED



BACK INSIDE or OUTSIDE GLAZED

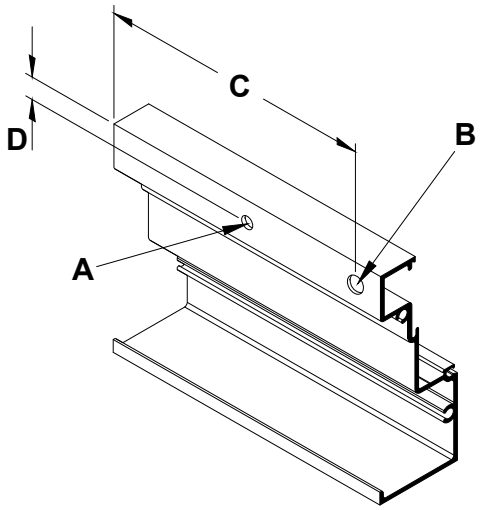


4. Drill sill holes.
   a. Drill 0.201" (#7 drill) clear holes in sill for anchoring to sill flashing.

> **NOTE**
> See Sill to Sill Flashing Fastener Schedule for hole spacing dimensions.

   b. Drill 5/16" weep holes at 1/4 points of sill to align with 5/16" holes in sill flashing.

> **NOTE**
> Sill weep holes are not required for front option assemblies.



A	0.201" (#7 drill) clear anchor hole
B	5/16" weep hole
C	1/4 point
D	0.442" (11.2) or interior V-groove

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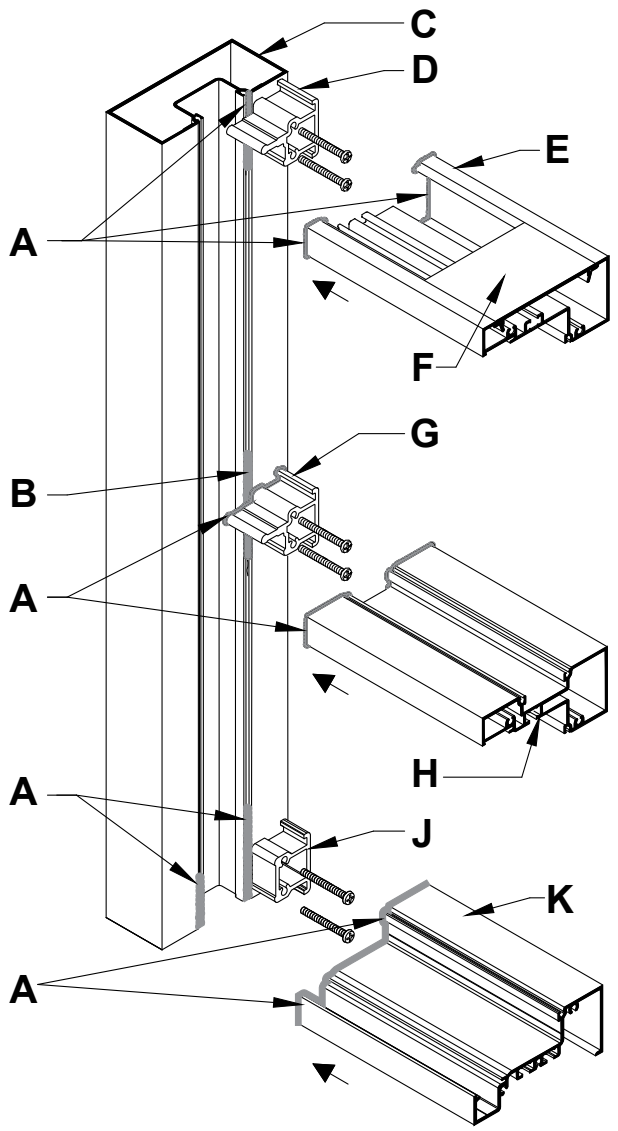
Shear Block Door Jamb and Sidelite Assembly (TF VG 451/451T)



A	Sealant
B	Sealant Into Reglet
C	Door Jamb
D	Head Shear Block Package
E	Head
F	3" (76.2) long Shim Filler
G	Intermediate Horizontal Shear Block Package
H	Intermediate Horizontal
J	Sill Shear Block Package
K	Sill

1. Apply sealant to contact ends of shear blocks and to glazing reglets to ensure a good seal to vertical members.

> **NOTICE**
> Failure to properly seal horizontal components to vertical mullions will reduce system performance.

2. Attach shear blocks to vertical mullions.
3. Hold fabricated horizontal member over shear block and tight against vertical member.
4. Match drill 0.147" diameter holes (#26 drill) into shear block.

- For center option, offset slightly to vertical mullion side of countersunk hole in horizontal.
- For front or back option, offset slightly to DLO side of countersunk hole in horizontal.

5. Apply sealant to ends of all horizontal members and to glazing reglets to ensure a good seal to vertical members.

> **NOTICE**
> Failure to properly seal horizontal components to vertical mullions will reduce system performance.

6. Attach all horizontal members to shear blocks with fasteners provided in shear block packages.
7. Install flat fillers.
   a. Identify perimeter anchor locations.
      - 6" (152) on each side of vertical mullions
      - 24" (610) on center between vertical mullions
   b. Insert flat fillers into head and jambs at perimeter anchor locations.
   c. Crimp filler material to prevent plate from sliding.

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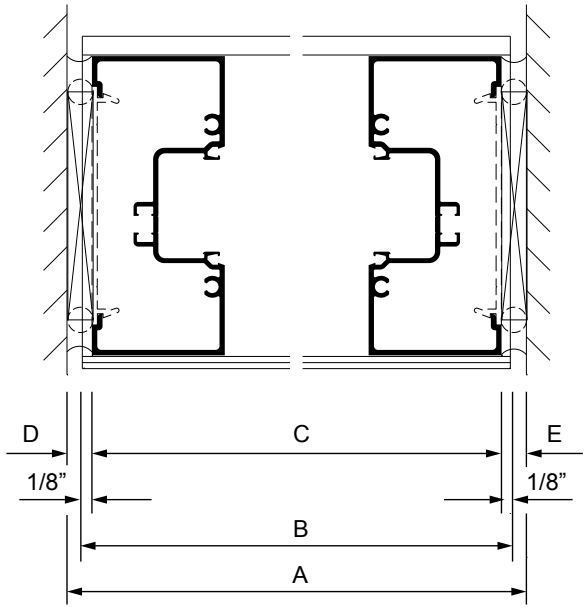
SILL FLASHING

Sill Flashing Fabrication

1. Measure minimum width of opening to determine Opening Dimension (OD).
2. Cut Sill Flashing to Length (SFL),

NOTICE

- Approved shop drawings always take precedence over the formula shown.
- 3/8" (9.5) minimum perimeter shim space is required. For uncertain job conditions or irregular masonry openings, add extra clearance for construction tolerance.
- Formula shown includes 1/4" (6.4) space for installation and required minimum sealant joints of 3/8" (9.5).
- When using a head receptor, or head/jamb receptor combination, the Frame Height (FH) and Frame Width (FW) vary from these diagrams; refer to approved shop drawings.



A	Opening Dimension (OD)
B	Sill Flashing Length (SFL)
C	Frame Width (FW)
D	Shim Space at Left jamb (SSL)
E	Shim Space at Right jamb (SSR)

For openings less than 24' (7.32 m) wide, length.
SFL = OD - (SSL + SSR) + 1/4" (6.4)
FW = OD - (SSL + SSR)
SFL = FW + 1/4" (6.4)
EXAMPLE:

SHIM SPACE = (SSR or SSL) = 3/8" (9.5) minimum (Note: Typically specified by sealant manufacturer)
$SFL_{IMPERIAL}$ = OD - (3/8" + 3/8") + 1/4"
$SFL_{IMPERIAL}$ = OD - 1/2"
SFL_{METRIC} = OD - (9.5 + 9.5) + 6.4
SFL_{METRIC} = OD - 12.7
For openings greater than 24' (7.32 m) wide, refer to approved shop drawings.

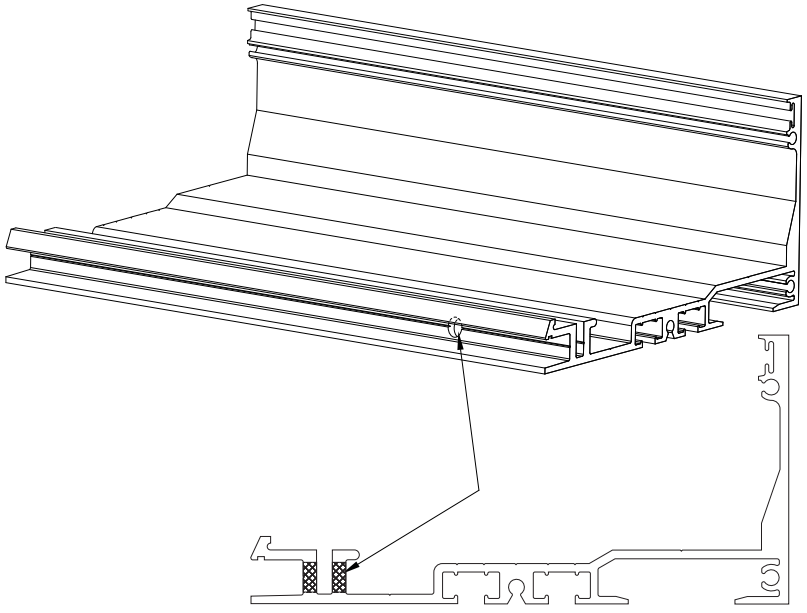
IMPORTANT
For openings greater than 24' (7.32 m) wide, splicing is required every 12' (3.66 m) and splices must be located at the center of DLO. See Splice Joint Installation.

3. Drill perimeter anchor holes through the sill flashing.

NOTICE
- Do not drill through thermal breaks. Damage to thermal breaks will reduce thermal performance.
- Refer to shop drawings or consult Engineering for perimeter fastener size and locations.

Locate anchor holes as determined by structural calculations.

4. Drill weep holes in sill flashing.



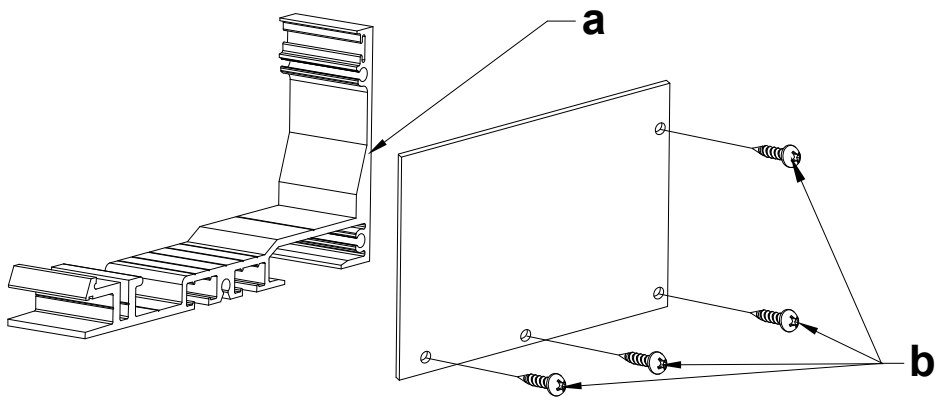
a. Locate weep holes at 1/4 points of each DLO.

b. Drill each 5/16" hole through both exterior face and adjacent interior wall.

5. Apply sealant or weathering.

NOTE
Either apply sealant to upturned interior leg at frame installation or install 127043 weathering before attaching end dams.

6. Attach end dams.



a. Apply sealant to entire end of sill flashing.

b. Secure end dams to flashing with four 028808 (#8 x 1/2" PHTF) supplied screws.

c. Seal over fastener heads.

d. Tool sealant between sill flashing and end dam inside and out.

Sill Flashing Splice

NOTICE

- Before beginning splice, clean and prime joint following silicone supplier recommendations.
- Silicone must be tested and approved for compatibility and adhesion by the sealant manufacturer.
- Install splices every 12' (3.66 m) when receptor or flashing is over 24' (7.32 m).
- Locate splice sleeves at the center of a Daylight Opening (**DLO**).
- Do NOT locate splice sleeves at mullions.
- If there is an entrance, install entrance frame and attached sidelite(s) first, being careful to locate them accurately in the opening. Fasten entrance frame to perimeter condition as needed using the required perimeter fasteners.
- If sill flashing is installed on a knee wall adjacent to an entrance, and the sill runs more than two lites wide, splice the sill flashing at the center of the first lite and use an expansion mullion adjacent to the door on each side.

1. Clean splice area with solvent.

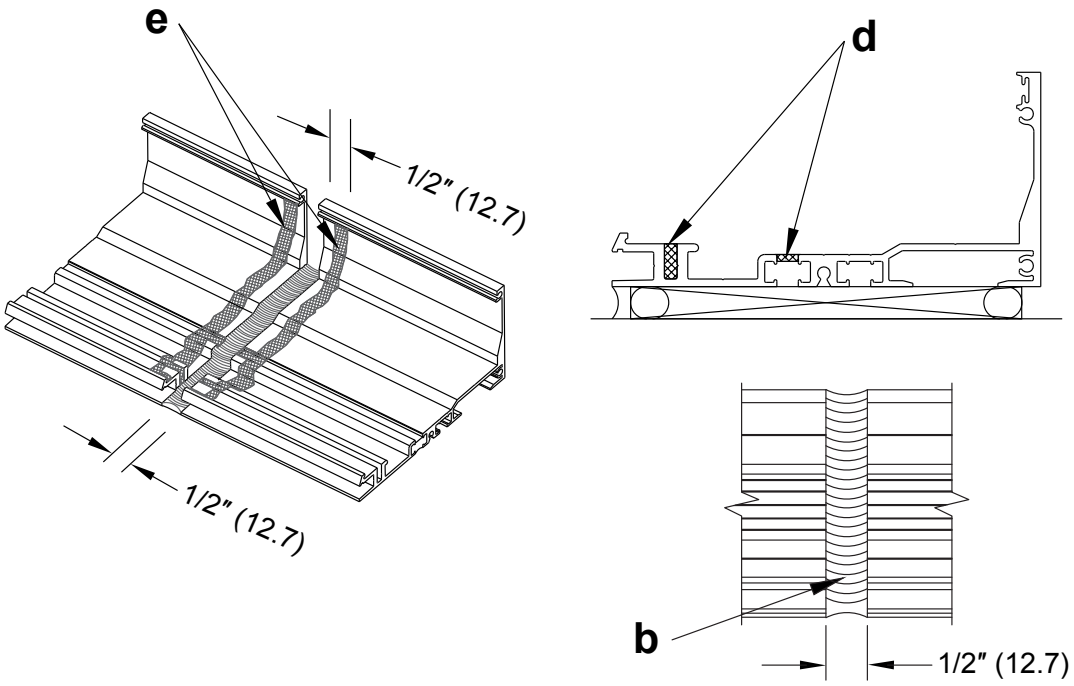
NOTICE: COLD WEATHER INSTALLATION

For temperatures below 40°, prepare aluminum surfaces just prior to installing. Wipe with a solvent or cleaning solution recommended by the sealant manufacturer to remove any condensation or frost.

REFER TO SAFETY DATA SHEET (SDS)

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

2. Apply sealant to flashing and within joint.



a. Place backer rod between splice in the shim space. Position backer rod to allow the perimeter backer rod and sealant to run through.

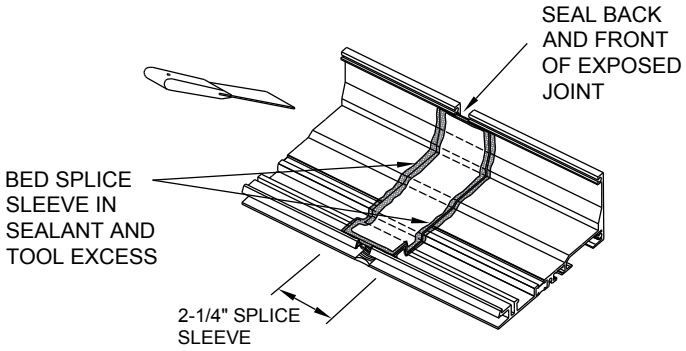
b. Apply bead of silicone sealant over backer rod in 1/2" (12.7) joint between flashing.

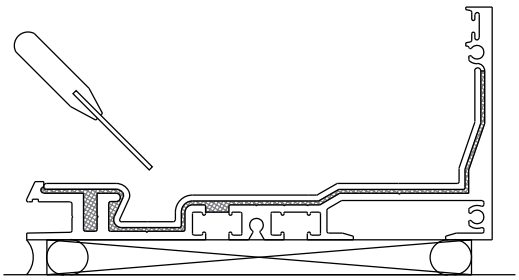
c. Tool sealant into joint.

d. Fill front screw chase and thermal break area, if required, completely with silicone a minimum of 1" (25.4) from cut end of flashing.

e. Apply bead of silicone within 1/2" (12.7) of the edge of sill members on each side of 1/2" (12.7) joint and thermal break areas if required.

3. Attach splice sleeve.





   a. Remove protective liner from needed length of splice sleeve.
   b. Center splice sleeve over joint and bed splice sleeve into sealant starting below reglet on back upturned leg.
   c. Use a putty knife to form splice sleeve along flashing profile. Silicone will squeeze out from under the splice sleeve.

> **NOTICE**
> Do NOT press splice sleeve into thermal break areas or into screw chase groove at front of flashing.

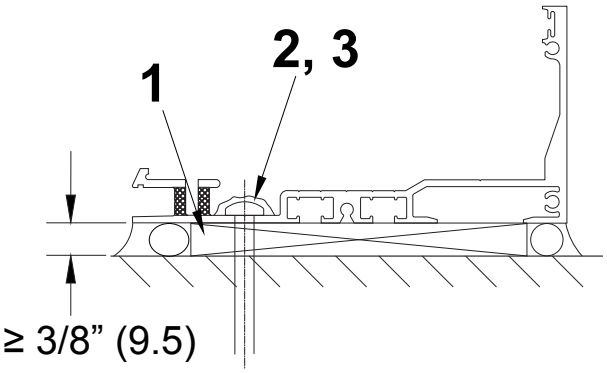
   d. Cut ends of splice sleeve to fit flush where shown.

4. Tool excess silicone over edges of splice sleeve.

> **NOTICE**
> Tool to prevent or remove buildup of sealant at the front and back of splice. Excess sealant may prevent horizontal from sitting correctly over the splice.

5. Seal joint.
   a. Seal back and front of exposed joints.
   b. Force sealant under front of splice sleeve.

Sill Flashing Installation



1. Shim sill flashing as needed.
   a. Shim sill flashing a minimum of 3/8" (9.5) as needed at each fastener and under each mullion location.
   b. Confirm sill flashing is level and true in the opening.
2. Secure sill flashing in opening.
3. Seal over the heads of all sill flashing anchor fasteners.

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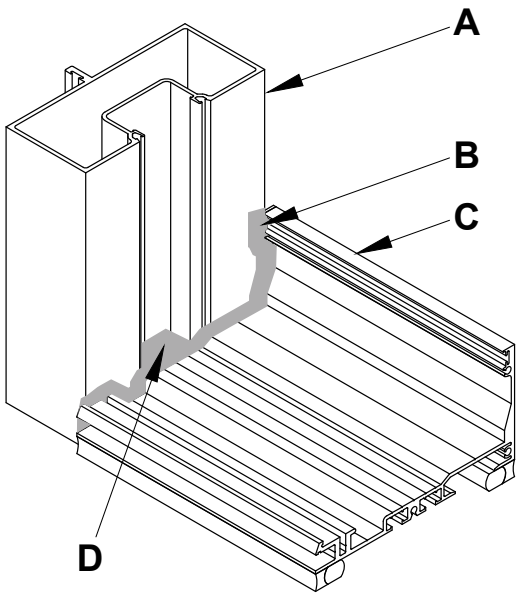
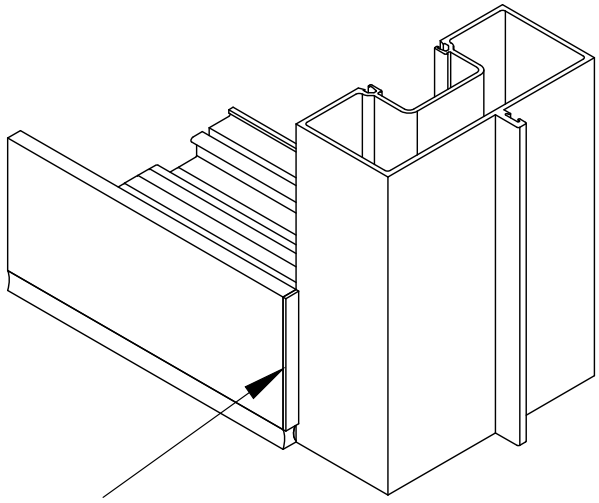
Sill Flashing at Door Jamb

Exterior



A	Door Jamb
B	Seal sill flashing to door jamb including vertical leg.
C	Sill Flashing
D	Fill glass pocket completely with sealant. Tool sealant to slope into sill flashing.

Interior

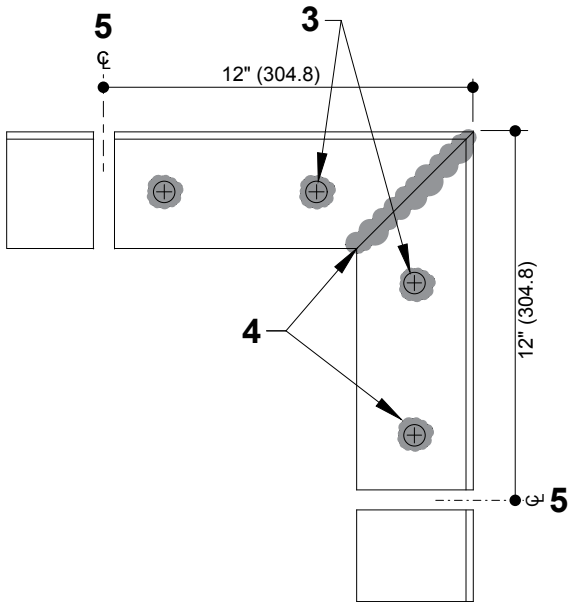


Sill Flashing End Cap

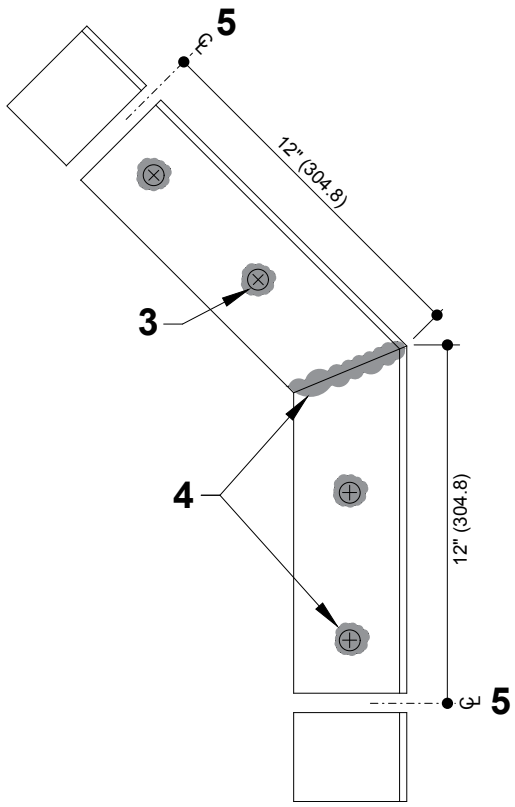
NOTICE
Sill flashing end cap is not designed to be water tight, but to provide a backing surface for sealant applied between the sill flashing leg and the door jamb.

Install Sill Flashing at Corners

Typical 90° Corner Joint



Typical 135° Corner Joint



1. Miter two 12" (304.8) sections of sill flashing to correct angle.
2. Set the mitered sections in a bed of sealant.
3. Create a tight joint and secure with appropriate anchors.
4. Completely seal *non-moving* mitered joint and anchors.
5. Install splice sleeves with centerlines 12" (304.8) from corner.

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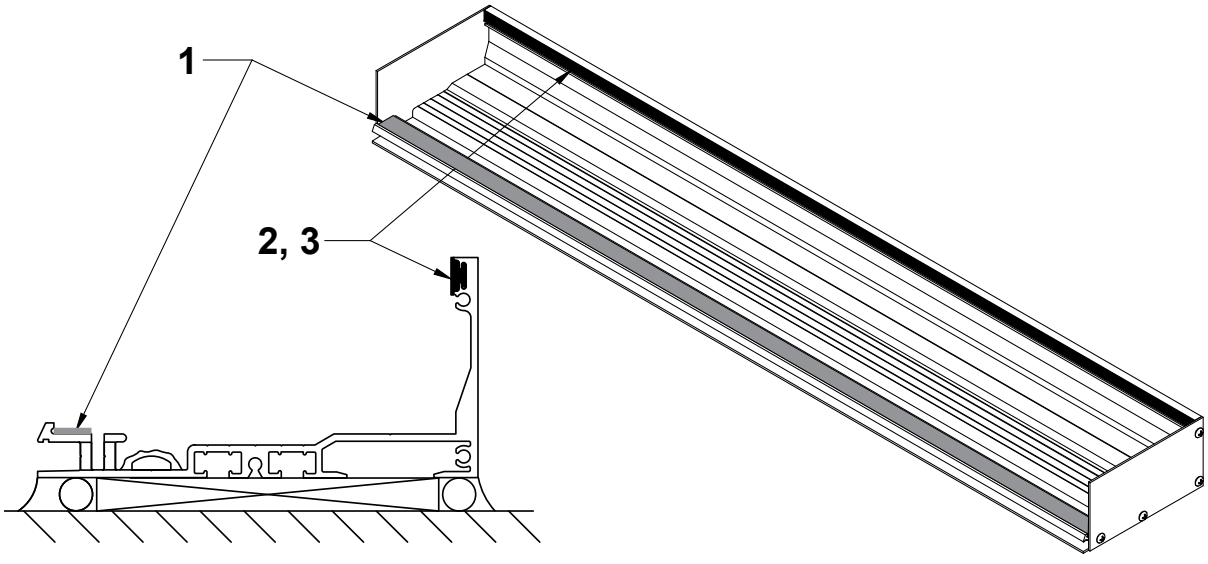
FRAME INSTALLATION



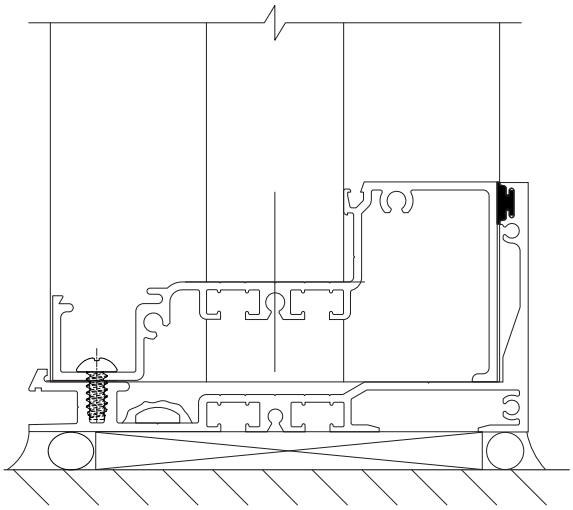
1. Apply a continuous bead of sealant to front ledge of flashing.
2. Check for 127043 weathering in top reglet of sill flashing back leg.
3. If weathering was not installed, then fill reglet with sealant.

> **NOTICE**
> When each frame is installed there must be good sealant contact between sill and sill flashing.

   a. Apply a continuous bead of sealant to fill reglet.
   b. Make sealant bead large enough to sit proud of reglet.
4. Align assembled frame with installed sill flashing.

5. Anchor sill to sill flashing.

> **NOTE**
> Refer to Sill to Sill Flashing Anchor Schedule.



6. Insert shims and anchor as needed at head and jambs.

> **NOTICE**
> If heavy mullion or steel reinforcing is used, extra perimeter fasteners may be required to handle larger loads. Consult Area Application Engineering Department.

7. Confirm unit is level and plumb.
8. After installing each frame, tool and clean up sealant.
    1. Tool sealant along seam between sill and sill flashing.
    2. Remove excess sealant from visible surfaces.

Sill to Sill Flashing Fastener Schedule

Mullion End Reaction	Fastener Locations
≤ 400 lb	One (1) fastener on each side of vertical mullion, located 3” (76.2) from end of the sill member
> 400 lb and ≤ 800 lb	Two (2) fasteners on each side of vertical mullion, starting 3” (76.2) from the end of the sill member and spaced 2” (50.8) on centers going away from the end
> 800 lb	Three (3) fasteners on each side of vertical mullion, starting 3” (76.2) from the end of the sill member and spaced 2” (50.8) on centers going away from the end

> **NOTICE**
> Also locate a minimum of one (1) fastener at the centerline of the DLO with a maximum spacing of 36” (914.4) from adjacent anchors and a maximum 200 lb reaction per fastener.

Glazing Application	Sill to Sill Flashing Fastener
Center and Back Set glazing	128407: #10-16 x 7/16” CRPHTFS-B / 300 Series SS

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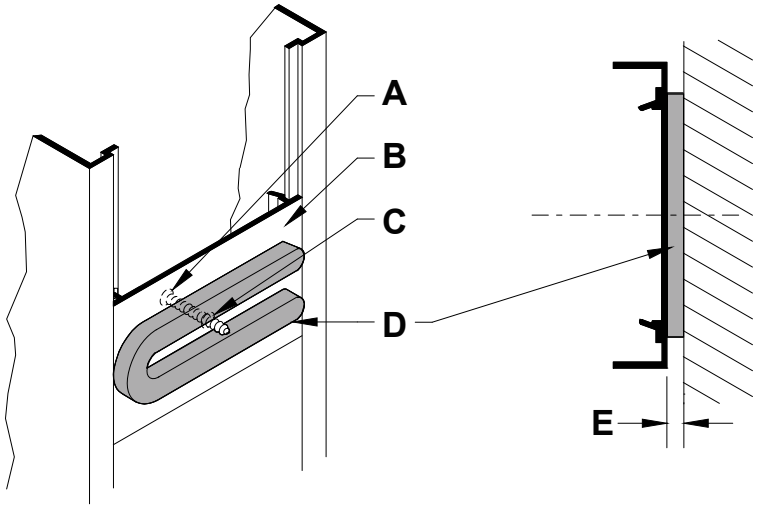
Glazing Application	Sill to Sill Flashing Fastener
Front Set glazing in Trifab® VG 450	128582: #10-16 x 1-1/4” CRPHTFS-B / 300 Series SS
Front Set glazing in Trifab® VG 451/451T	128583: #10-16 x 1-3/8” CRPHTFS-B / 300 Series SS

Shim Installation

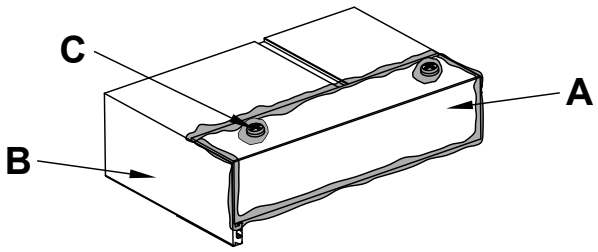


A	Flat head perimeter fastener (not by Kawneer)
B	3" (76.2) long shim filler or pocket filler
C	Clear hole in flat filler lines up with countersunk hole in pocket of perimeter member.
D	Standard horseshoe shim as required (not by Kawneer)
E	Shim 3/8" (9.5) typical

1. Install support shims at head, sill, and jamb.
2. Place between pocket filler and perimeter condition at perimeter anchor locations.
3. Caulk both interior and exterior shim spaces with a high-quality sealant.
   - head
   - jambs
   - under sill flashing

HEAD AND JAMB RECEPTORS

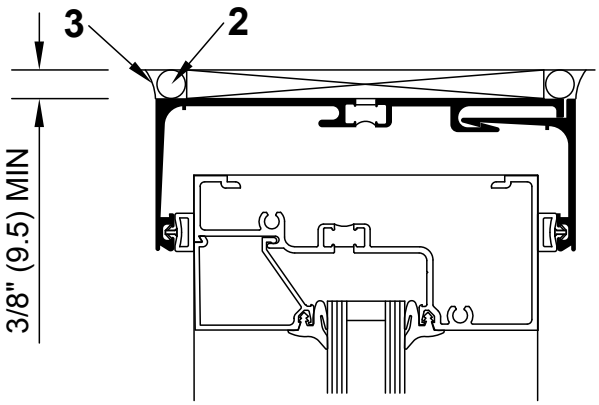
Install Head Receptor End Dam



A	Modified 601CG317: Receptor Corner End Dam
B	Head Receptor
C	028808 fasteners

1. Modify 601CG317 to 5-1/2" length.
2. Liberally apply silicone sealant where end dam will be placed.
3. Push end dam firmly onto sealed surfaces, evenly spreading the sealant.
4. Install two (2) fasteners 028808 and seal over the heads.
5. Tool silicone around all edges to seal well.

Head Receptor Installation



1. Install head receptor with a 3/8" (9.5) minimum space at the head.
2. Place a backer rod on the exterior side as shown.
3. Fill the gap with silicone sealant.

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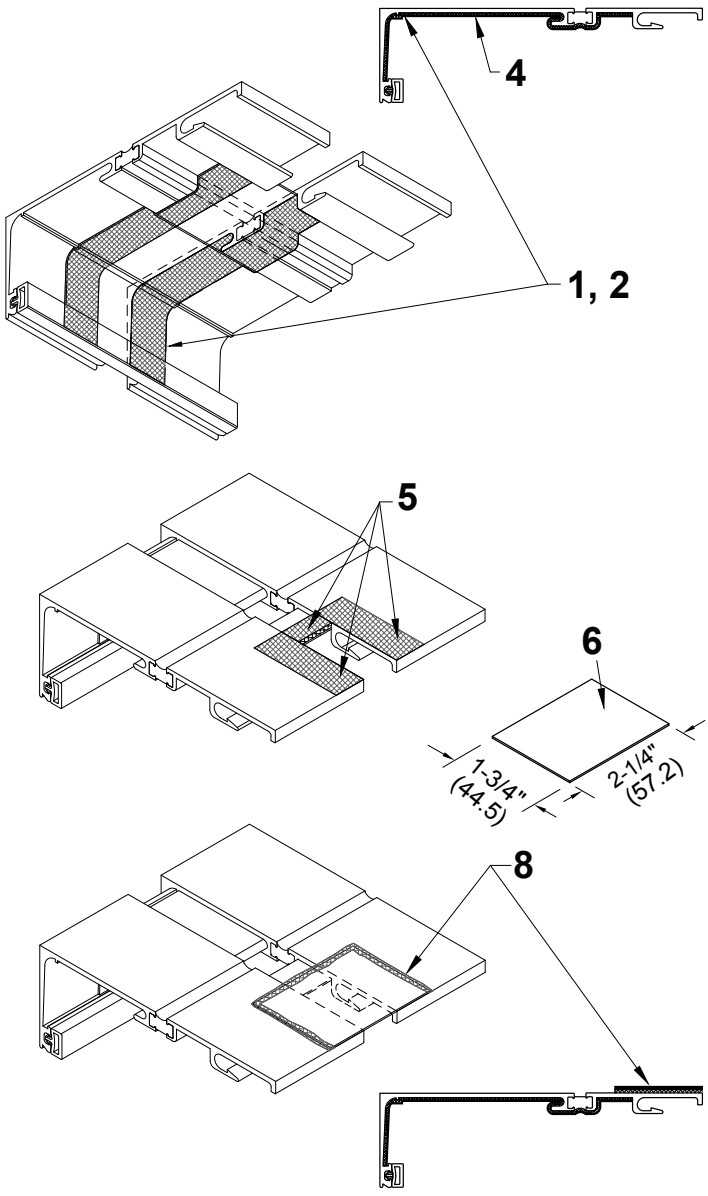
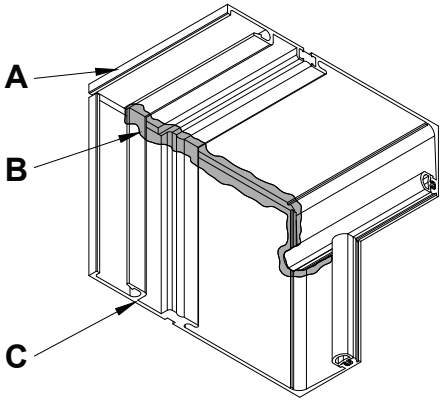
Splice Head Compensating Receptor

1. Cut silicone splice sleeve 127178 length to fit the area shown.
2. Apply silicone sealant to lower surface of head receptor. Apply within 3/4" (19.1) of each cut end.
3. Remove the protective liner from splice sleeve.
4. Apply silicone splice sleeve to lower surface of head receptor.
   a. Center sleeve over the splice joint.
   b. Bed splice sleeve in the sealant.
   c. Use a putty knife to form sleeve to the profile.
5. Apply silicone sealant to top surface of head receptor. Apply within 3/4" (19.1) of each cut end and along top of the splice sleeve, as shown.
6. Cut silicone splice sleeve 127178 length to 2-1/4" (57.2) x 1-3/4" (44.5).
7. Remove the protective liner from splice sleeve.
8. Apply silicone splice sleeve to top surface of head receptor.
   a. Center sleeve over the splice joint.
   b. Bed splice sleeve in the sealant.
   c. Use a putty knife to tool sleeve smooth.



Install Jamb Receptors

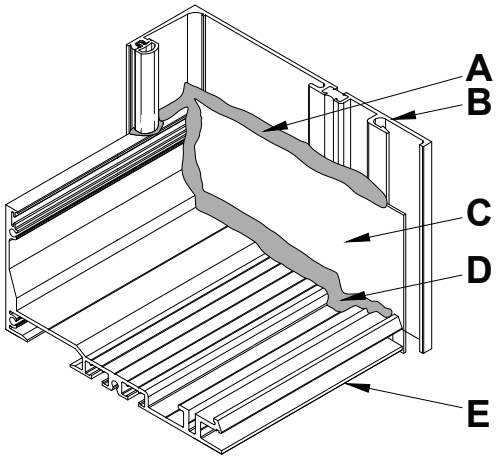


A	Head Receptor
B	Inside corner seal
C	Jamb Compensating Receptor

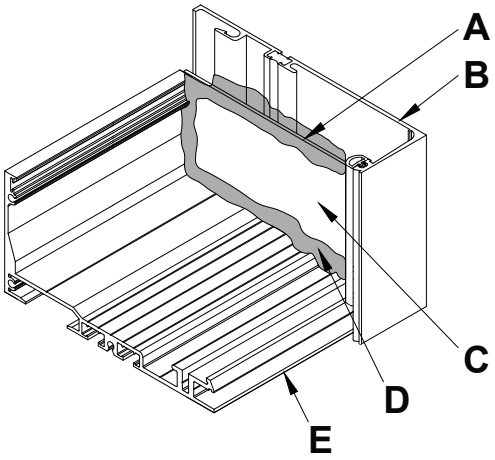
1. Liberally apply silicone sealant along the inside corner.
2. Confirm that any gaps in the extrusion joint are filled.
3. Tool silicone to seal well.

Jamb Receptor and Sill Flashing Joints

With Receptor Face On Exterior



With Removable Face On Interior



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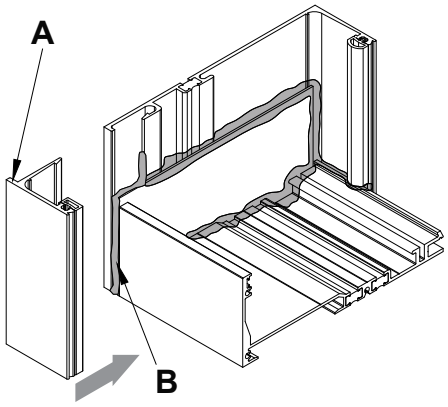
A	Backer Rod Installed Between End Dam and Jamb Receptor
B	Jamb Compensating Receptor
C	End Dam
D	Inside corner seal
E	Sill Flashing

1. Install backer rod in opening between end dam and jamb receptor.
2. Liberally apply silicone sealant along the inside corner.
3. Confirm that any gaps in the extrusion joint are filled.
4. Tool silicone to seal well.
5. Apply silicone in the receptor face snap in pocket before final assembly.

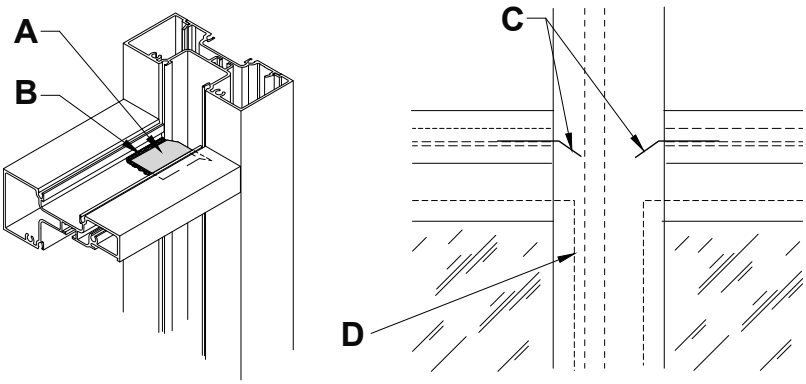


A	Receptor Face
B	Silicone in receptor face snap in pocket

WATER DEFLECTOR INSTALLATION

NOTICE: COLD WEATHER INSTALLATION
For temperatures below 40°, prepare aluminum surfaces just prior to installing. Wipe with a solvent or cleaning solution recommended by the sealant manufacturer to remove any condensation or frost.

REFER TO SAFETY DATA SHEET (SDS)
Carefully follow recommendations contained in the safety data sheet (SDS) provided by the solvent/cleaning solution manufacturer regarding health and fire/explosion risks.



A	Water Deflector
B	Sealant
C	Extend water deflectors past glass edge.
D	Edge of Glass

1. Remove paper backing from water deflector.
2. *For thermal horizontal members*, fill cavity under deflector with sealant.
3. Locate water deflector centered in glazing pocket and extending past glass edge.
4. Fix deflector to clean, dry surface of horizontal.
5. Apply sealant around edges of deflector.
6. Seal joint between back leg of horizontal and the vertical.

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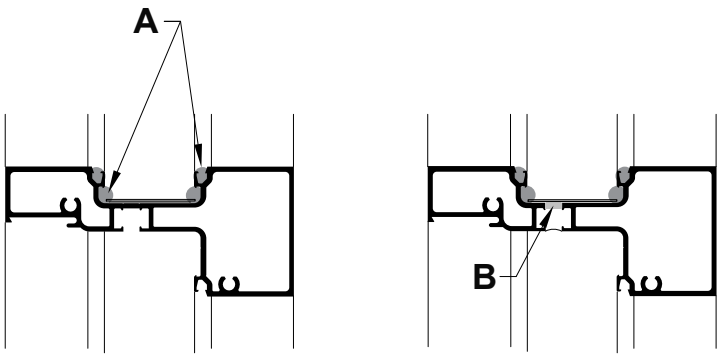


Non-thermal Horizontal Thermal Horizontal

A	Sealant
B	For thermal members, seal cavity under deflector.

NOTICE

Confirm that glazing reglets in the area of this joint are filled. Failure to fill these reglets will allow water to reach the lite below.

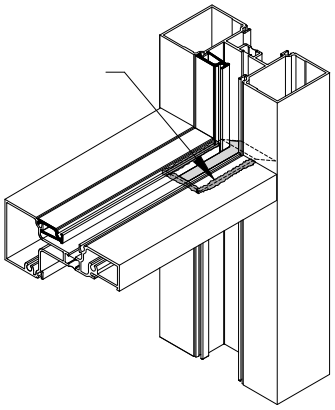
GLAZING

Glazing Adapter Installation

Installation Prior to Frame Assembly

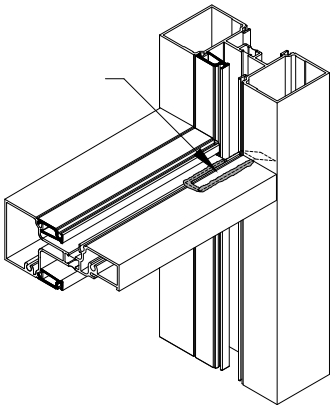
Vertical glazing adapters may be installed for either partial or full-length applications at the time frames are assembled.

1/4" over 1"



1" Water Deflector for Partial Length Application

1/4" over 1/4"



1/4" Water Deflector for Full Length Application

NOTICE

When using pre-installed vertical glazing adapters, seal the vertical glazing reglets where they meet the intermediate horizontals at the time of frame assembly. Use 1/4" water deflector on all full-length applications and install as instructed. Use 1" water deflectors on partial adapter applications as long as the adapter does not impede water evacuation of the intermediate horizontal. The water deflector must allow water to drain into the vertical pocket beyond the edge of the glass below.

1. Cut glazing adapters.

	Partial Length Application	Full Length Application
Vertical Adapters	DLO + 1/2" (12.7)	Vertical Member Length
Horizontal Adapters	DLO	

2. Install vertical adapters.

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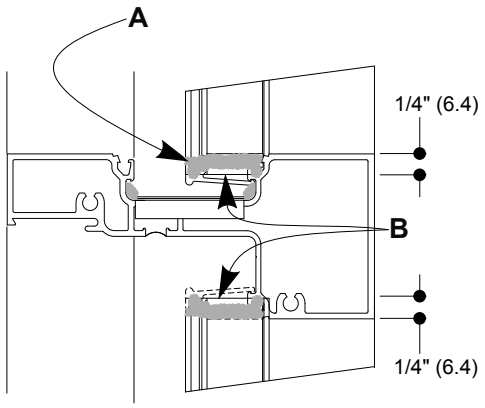
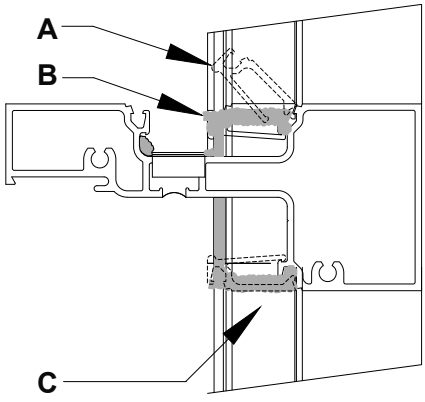


A	Sealant at End of Horizontal Adapter
B	Line of Horizontal Adapter

a. Snap vertical adapters into glazing reglets of frame.
b. Assemble frame as instructed.
c. Position vertical adapter
   - such to allow sealing of horizontal adapter to vertical,
   - with approximately 1/4" (6.4) projection into horizontal pocket,
d. If needed, lightly crimp vertical adapter in place to prevent sliding.

3. Seal the vertical glazing reglets where they meet the intermediate horizontals.
4. Apply sealant to vertical adapter at final position of snapped-in horizontal adapter.
5. Install horizontal adapters.



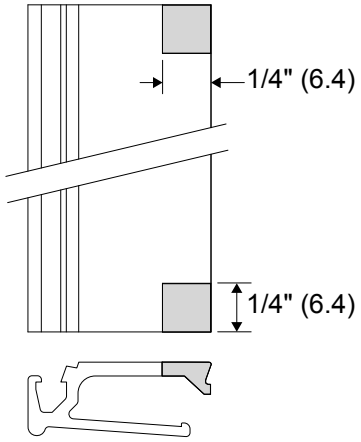
A	Rotate Adapter
B	Sealant at End
C	Adapter Runs Length of Vertical

a. Snap horizontal glazing adapter into the glazing reglet.

b. Ensure adapter rotates into pocket and contacts sealant at vertical adapter.

Installation After Frame Assembly and For Field Retrofit Applications

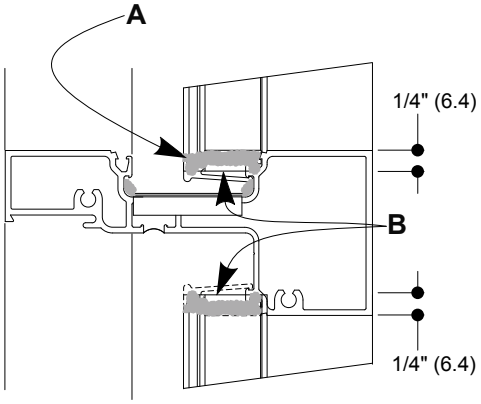
1. Cut vertical glazing adapters to DLO + 1/2" (12.7).
2. Notch at each end of the vertical glazing adapter.



- Cut notch on face side of adapter nearest the gasket reglet.
- Cut notch to 1/4" (6.4) x 1/4" (6.4).

3. Cut horizontal glazing adapters to DLO.
4. Install vertical adapters.

NOTICE
Ensure that the glazing adapter does not impede water evacuation of the intermediate horizontal. The previously installed 1" water deflector must allow water to drain into the vertical pocket beyond the edge of the glass below.



A	Sealant at End of Horizontal Adapter
B	Line of Horizontal Adapter

a. Position vertical adapter

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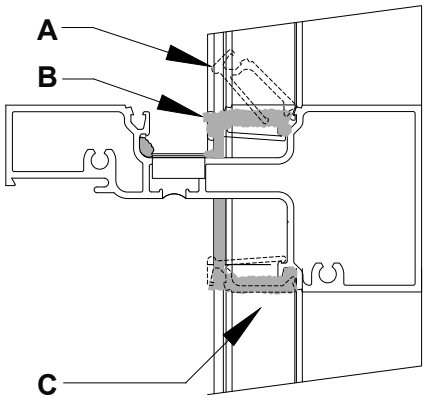
- such to allow sealing of horizontal adapter to vertical,
- with approximately 1/4" (6.4) projection into horizontal pocket,

b. Snap vertical adapters into glazing reglets of frame.

5. Apply sealant to vertical adapter at final position of snapped-in horizontal adapter.
6. Install horizontal adapters.



A	Rotate Adapter
B	Sealant at End
C	Adapter Runs Length of Vertical

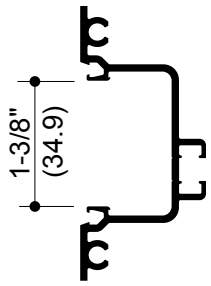
a. Snap horizontal glazing adapter into the glazing reglet.

b. Ensure adapter rotates into pocket and contacts sealant at vertical adapter.

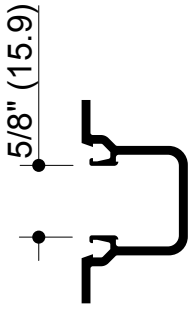
Glazing Charts

IMPORTANT

1. Pocket sizes:

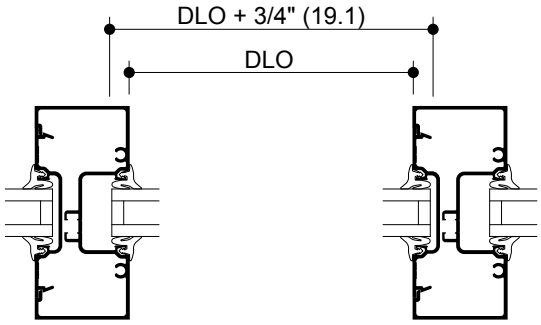


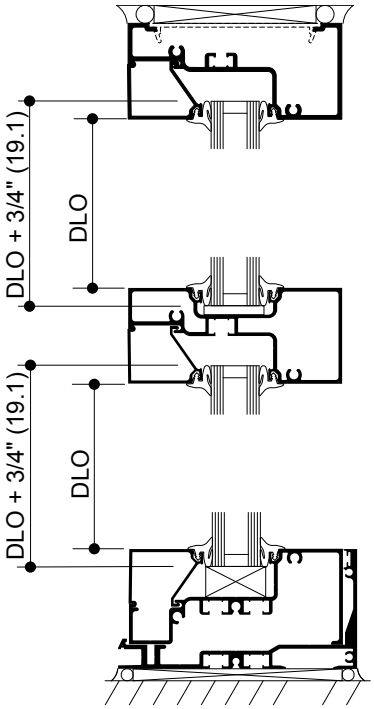
Pockets for 1" infill are 1-3/8" (34.9) wide and accept up to 1-1/8" glass dry glazed.



Pockets for 1/4" infill are 5/8" (15.9) wide, and accept up to 3/8" glass dry glazed.

2. Glass size = Daylight Opening (DLO) + 3/4" (19.1). *This formula does not allow for undersize or out of square daylight openings.*





3. See Dart Corner sections for dart corner glass sizes.
4. The glass manufacturer must indicate the specific glazing requirements for the material being used.

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Glazing Chart for 1/4" System

Infill Thickness	*Weathering (Both Sides)
1/8"	027077 (Heavy)
1/4"	027074 (Standard)
3/8"	027076 (Light)

Glazing Chart for 1" System

Infill Thickness	**Adapter	*Weathering (Both Sides)
1/8"	451VG029	027077 (Heavy)
1/4"	451VG029	027074 (Standard)
3/8"	451VG029	027076 (Light)
1/2"	451VG030	027077 (Heavy)
5/8"	451VG030	027074 (Standard)
3/4"	451VG030	027076 (Light)
7/8"	----------	027077 (Heavy)
1"	----------	027074 (Standard)
1-1/8"	----------	027076 (Light)

GLAZING CHART NOTES

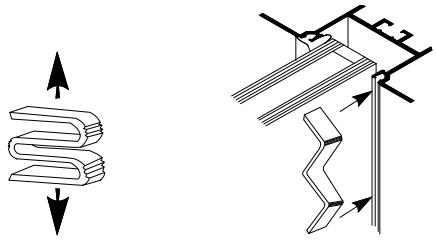
* For infill thickness in 1/16" increments or oversize and undersize glass, use a combination of the standard with either the light or heavy gaskets.

Heavy, 3 ID Marks | Standard, No ID Mark | Light, 1 ID Mark

** Snap-in glazing adapters 451VG029 and 451VG030 are provided for application requiring infills less than 1" thickness at adapter. Reference Section VIII, Glazing Adapters for adapter cut lengths and seal information.

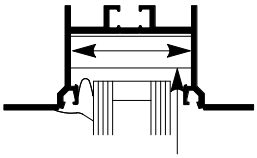
"W" Side Block Installation

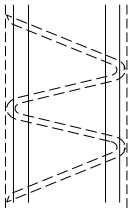
"W" side blocks prevent glass from shifting into the deep pocket. Install one "W" side block in the mullion deep pocket of each lite of glass in an opening.



1 2

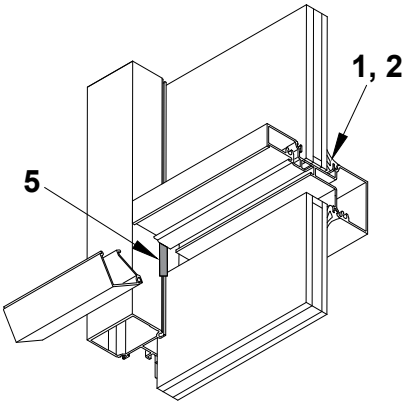
1. Stretch and flatten block.
2. Slide "W" block between reglet and glass lite. Block will return to original shape and wedge between walls of glazing pocket



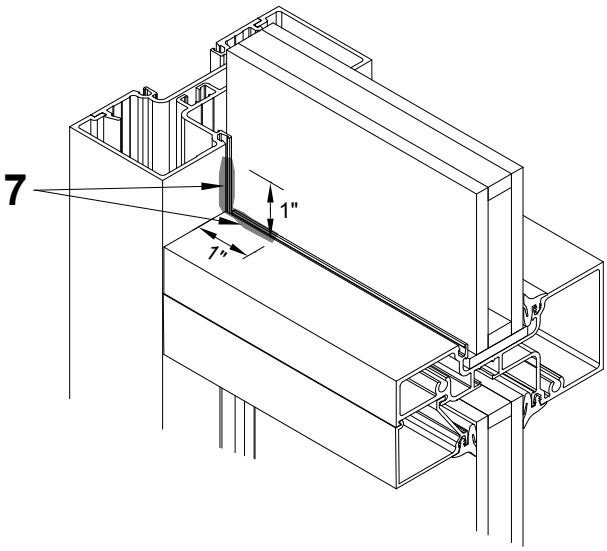


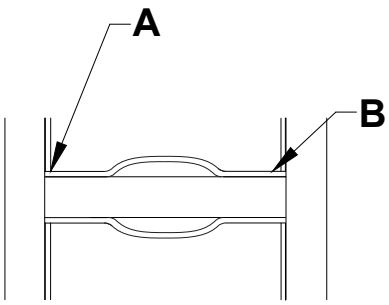
TIP
If deglazing of lite is required after "W" block is installed, remove both interior and exterior weathering and use hook to pull "W" block out of pocket.

Install Glass Stops and Gaskets



1. Square cut horizontal and vertical gaskets to approximate length, $L_{gasket} = DLO + (DLO/48)$.
2. Install gaskets on frame side opposite glass stops.
3. Position setting blocks under glass at required points
4. Install glass into frame using standard flush glazing technique.
5. Run bead of sealant along vertical reglets where glass stop meets.
6. Install glass stop.
7. Run beads of sealant along external vertical and horizontal gasket reglets, 1" from corners at all horizontal members.
8. Install horizontal and vertical gaskets into glass stop side of frame, the same as in step 2.





A	Vertical gaskets run between horizontal gaskets
B	Start at ends and work toward the center

a. Insert gasket into horizontal members first.

b. Start at ends and work toward the center.

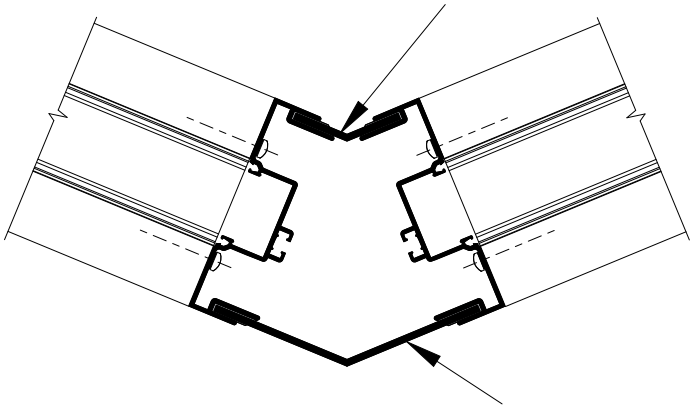
c. Insert vertical gasket on same side, in same manner.

OPTIONAL CORNERS

Adjustable Corners

Use the same preps as required for the standard vertical.

Aluminum Brake Metal Set in Sealant

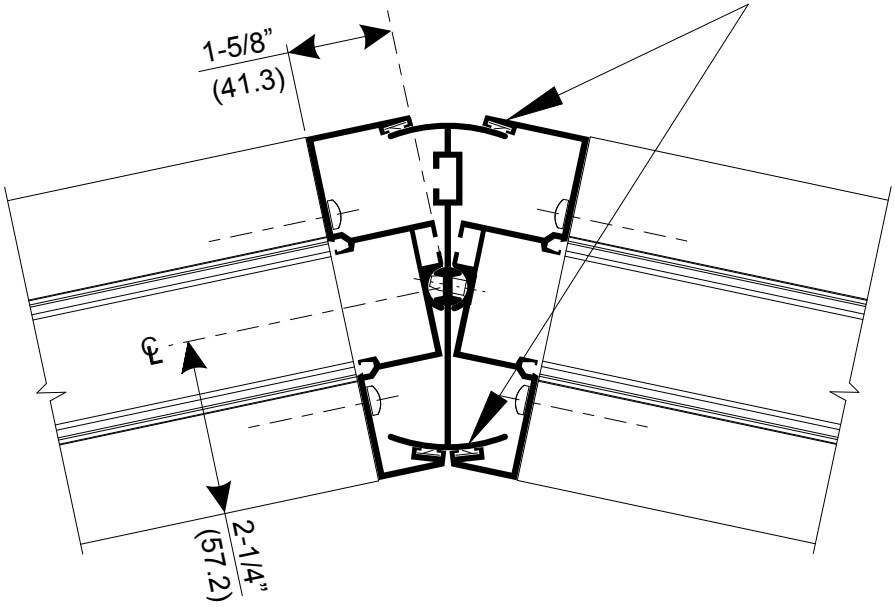


Pivoted Inside and Outside 155° to 180° Corners

Use the same fabrication methods as required for the standard vertical.

NOTE

Layout and cut sizes can be determined using pivot center lines. Corner parts and fabrication are the same when flipped for outside corners.



Continuous weathering installed into both corner halves before assembly (4) places.

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1. Locate screw holes 6" (152.4) from each end and 24" (609.6) on center.
2. Drill 0.147" diameter holes (#26 drill) and countersink for assembly screws (#10 x 9/16").
3. Fasten with supplied screws.

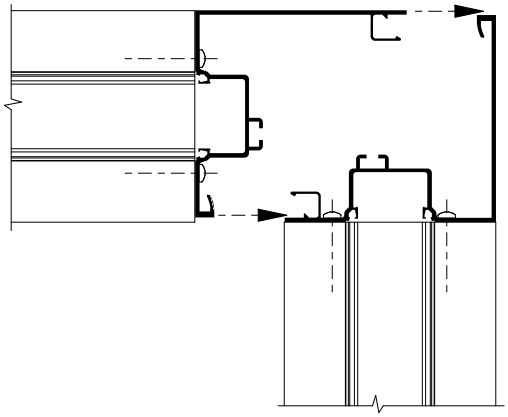
Snap Corners

NOTICE
Corners are not designed to be unsnapped.

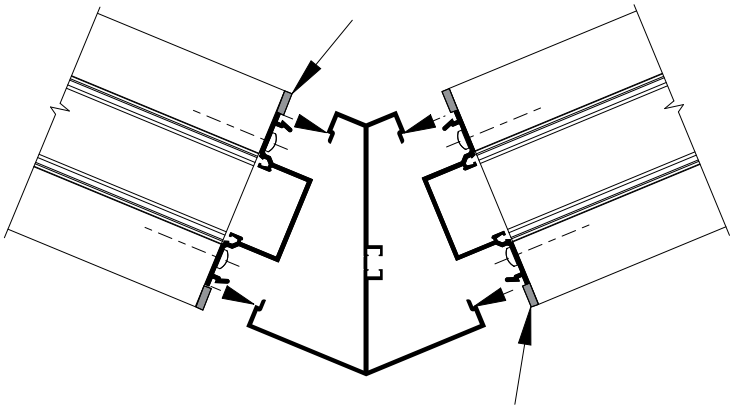
TIP
Wax tight snaps to make engagement easier.

Snap corners together as shown.

90° Corner



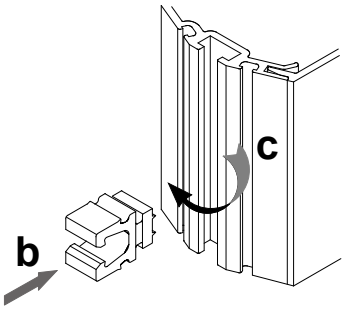
135° Corner



Sealant Locations

90° Dart Corners

1. Cut mullion halves and cover to required length (Frame Height).
2. Cut horizontals to length, $\mathbf{L_{Horizontal} = DLO_V + 1"}$ (25.4).
   Miter as shown in following illustrations.
3. Cut glass stops to length = DLO - 1/16" (1.6).
   Miter as shown in following illustrations.
4. Drill mullion halves for shear blocks as shown in following illustrations, using the fabricated clip as a template.
5. Attach shear blocks using two #10 x 1-19/32" pan head screws 028400.
6. Fabricate horizontals for one (1) #128345 (#10 x 9/16") flat head screw as shown in following illustrations.
7. Before installing cover, install 250299 glazing clips into verticals.

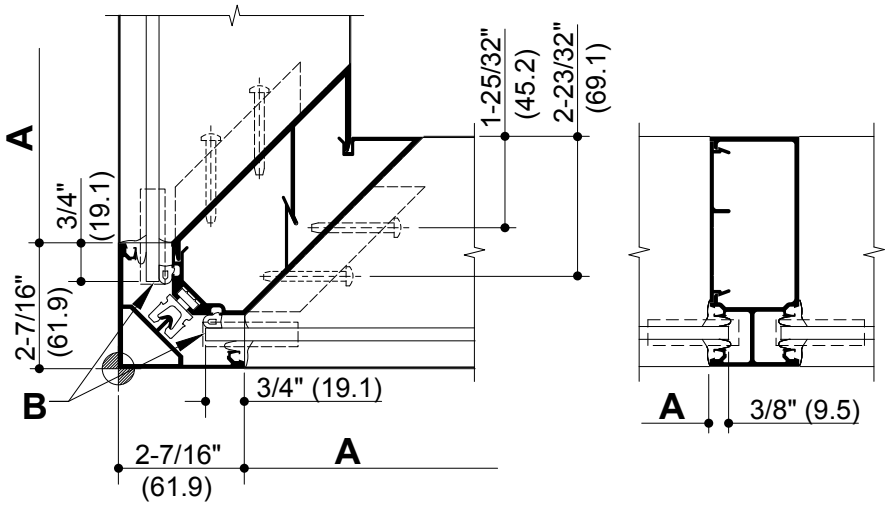


a. Locate clips no more than 9" (228.6) O.C. and no more than 3" (76.2) from the ends of mullions.

b. Push clip (250299) into mullion reglet.

c. Twist clip 1/4 turn clockwise to lock in place.

Trifab® VersaGlaze® 450



A	DLO
B	Extend water deflector past glass edge below.
Glass Formula: DLO + 1.125" (28.6)	

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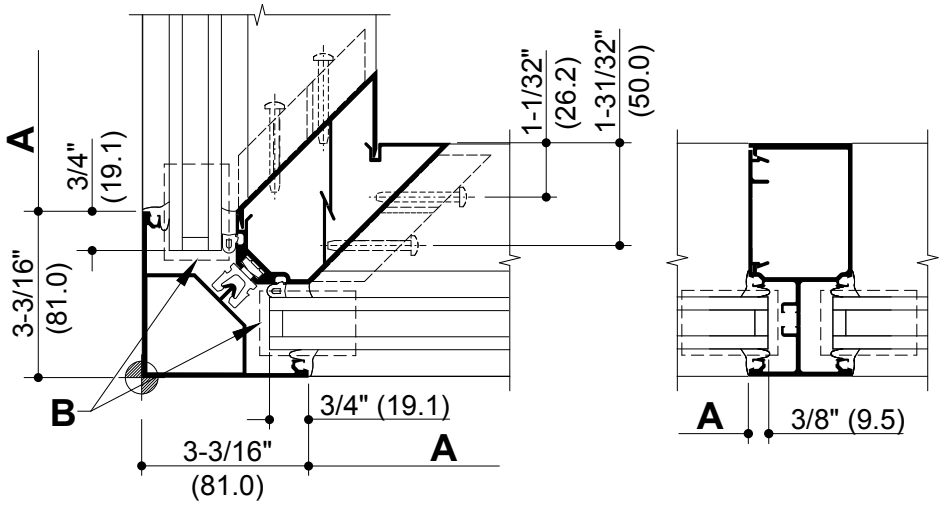
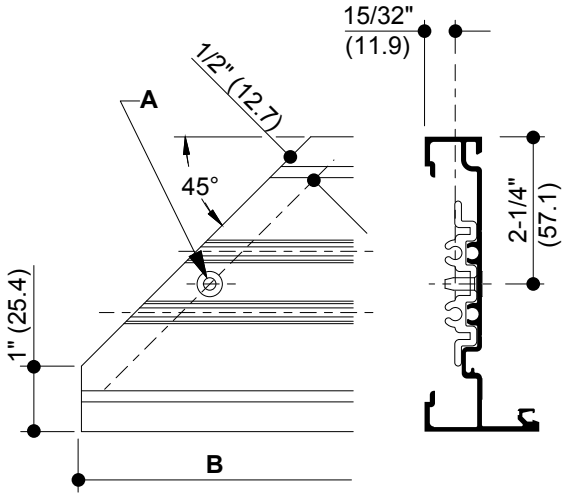
Trifab® VersaGlaze® 451/451T



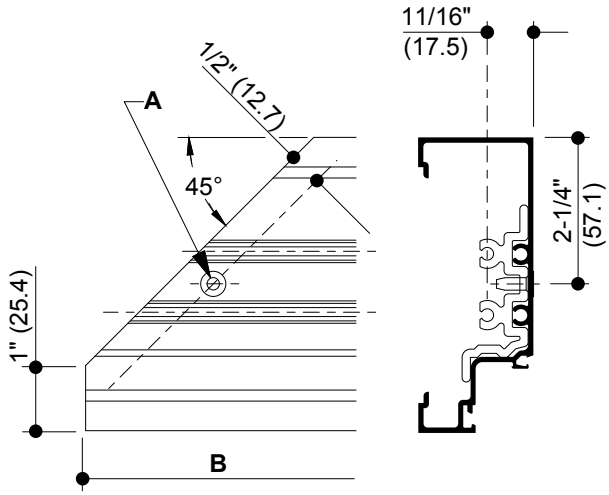
A	DLO
B	Extend water deflector past glass edge below.
Glass Formula: DLO + 1.125" (28.6)	

90° Dart Corners for Trifab® VersaGlaze® 450

Inside Glazed Head

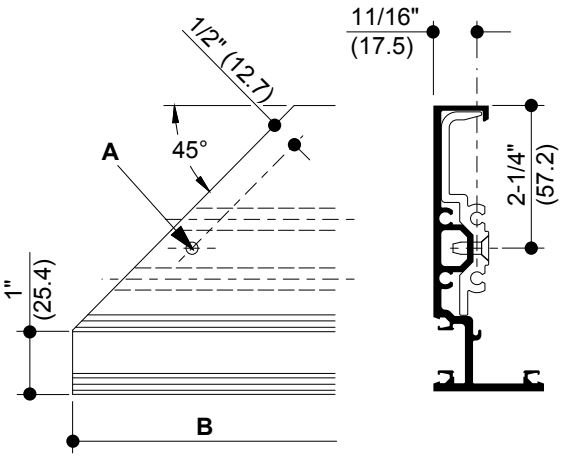


Outside Glazed Head

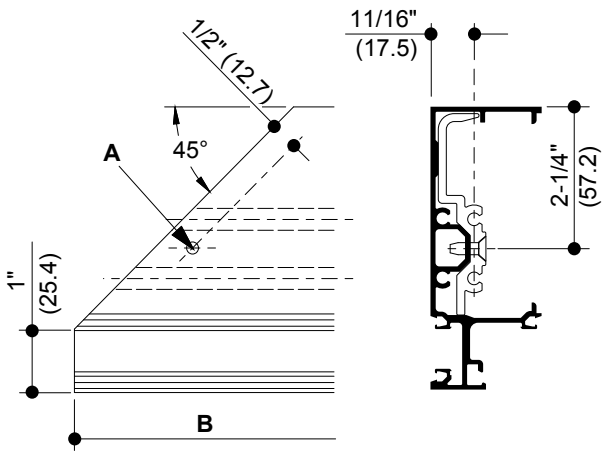


A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

Inside Glazed Horizontal

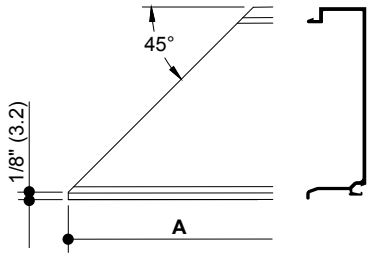


Outside Glazed Horizontal



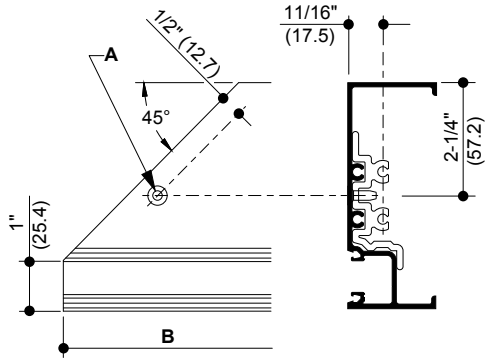
A	0.147" dia. hole (#26 drill)
B	DLO
Cut Length = DLO	

Inside Glazed Glass Stop



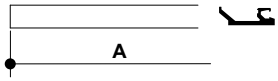
A	DLO
Cut Length = DLO - 1/16" (1.6)	

Inside or Outside Glazed Sill



A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

Outside Glazed Glass Stop



A	DLO
Cut Length = DLO - 1/16" (1.6)	

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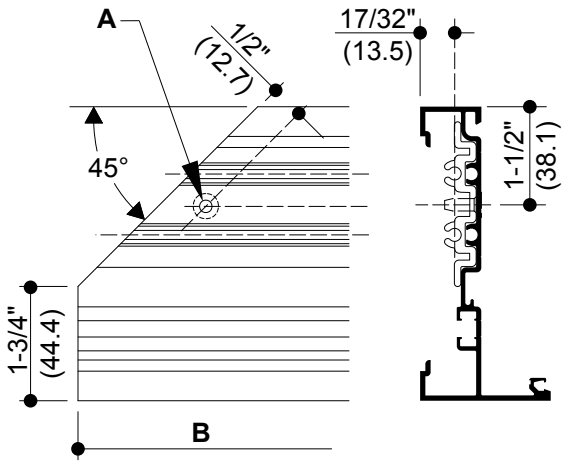
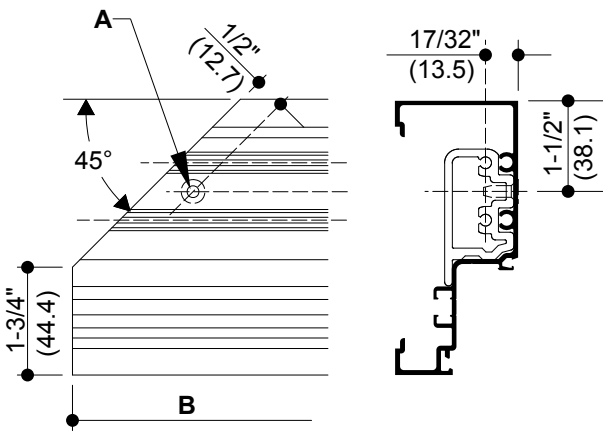
90° Dart Corners for Trifab® VersaGlaze® 451/451T

Inside Glazed Head

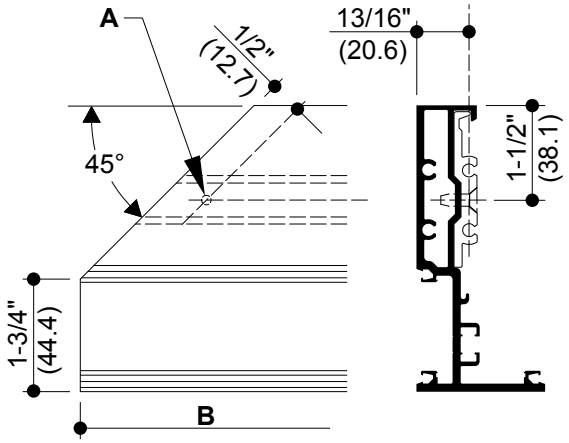


Outside Glazed Head

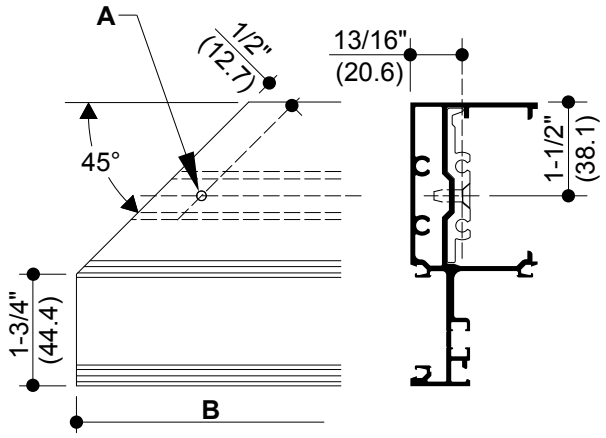


A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

Inside Glazed Horizontal

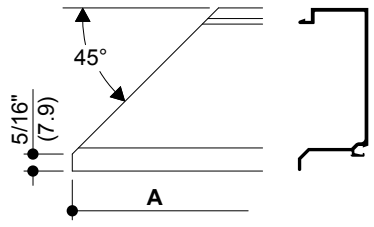


Outside Glazed Horizontal



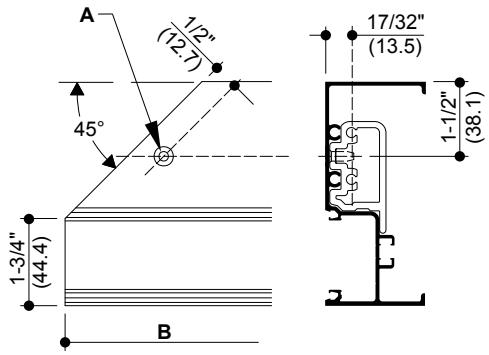
A	0.147" dia. hole (#26 drill)
B	DLO
Cut Length = DLO	

Inside Glazed Glass Stop



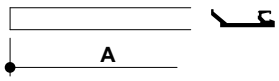
A	DLO
Cut Length = DLO - 1/16" (1.6)	

Inside or Outside Glazed Sill



A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

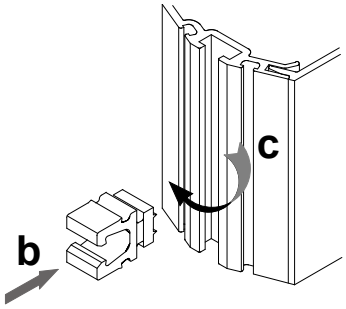
Outside Glazed Glass Stop



A	DLO
Cut Length = DLO - 1/16" (1.6)	

135° Dart Corners

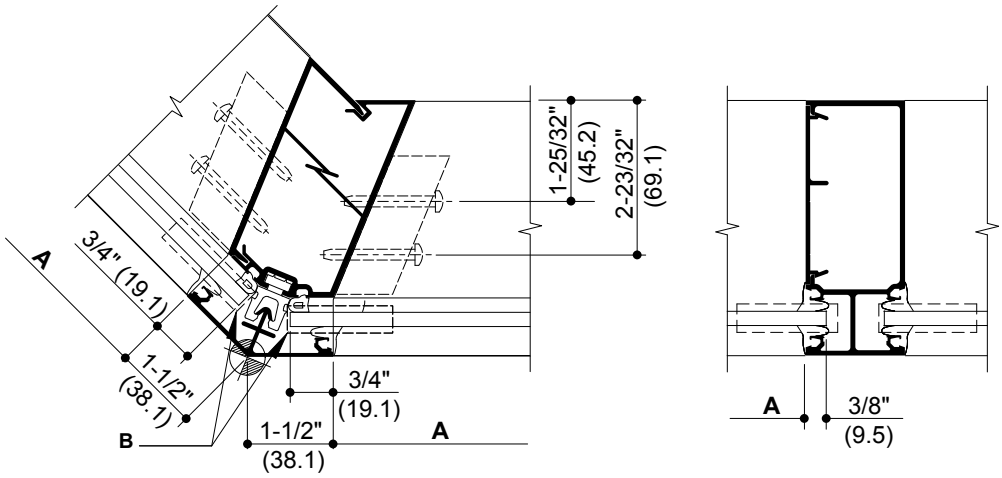
1. Cut mullion halves and cover to required length (Frame Height).
2. Cut horizontals to length, $L_{Horizontal} = DLO_V + 1"$ (25.4).
   Miter as shown in following illustrations.
3. Cut glass stops to length = DLO - 1/16" (1.6).
   Miter as shown in following illustrations.
4. Drill mullion halves for shear blocks as shown in following illustrations, using the fabricated clip as a template.
5. Attach shear blocks using two #10 x 1-19/32" pan head screws 028400.
6. Fabricate horizontals for one (1) #128345 (#10 x 9/16") flat head screw as shown in following illustrations.
7. Before installing cover, install 250299 glazing clips into verticals.



   a. Locate clips no more than 9" (228.6) O.C. and no more than 3" (76.2) from the ends of mullions.
   b. Push clip (250299) into mullion reglet.

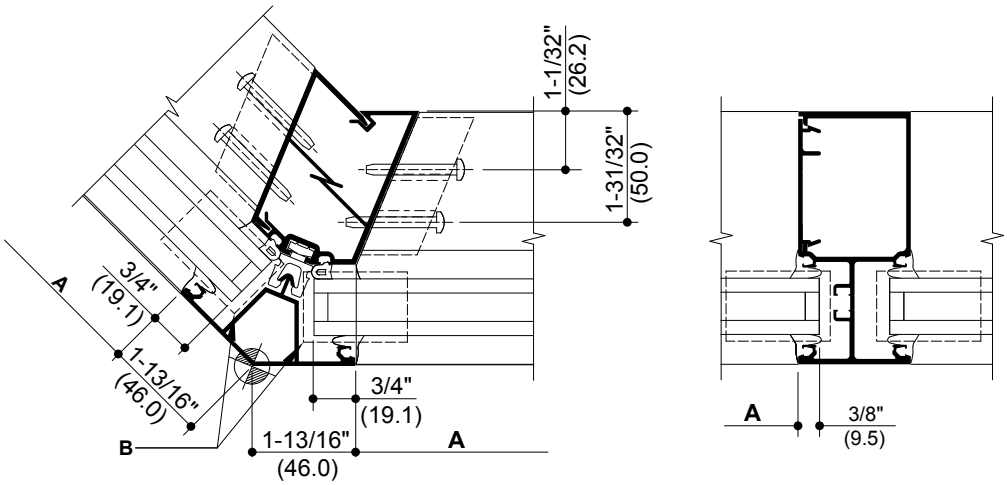
c. Twist clip 1/4 turn clockwise to lock in place.

Trifab® VersaGlaze® 450



A	DLO
B	Extend water deflector past glass edge below.
Glass Formula: DLO + 1.125" (28.6)	

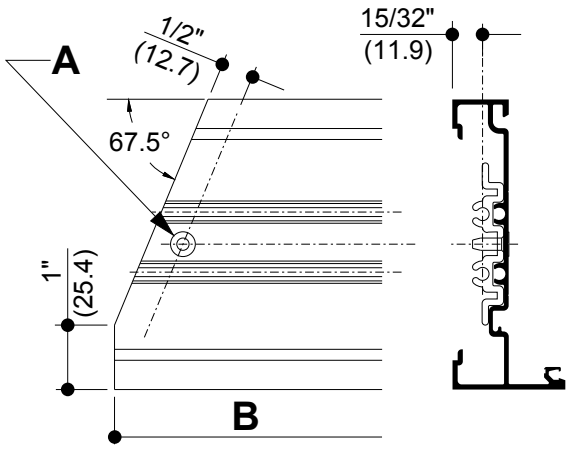
Trifab® VersaGlaze® 451/451T



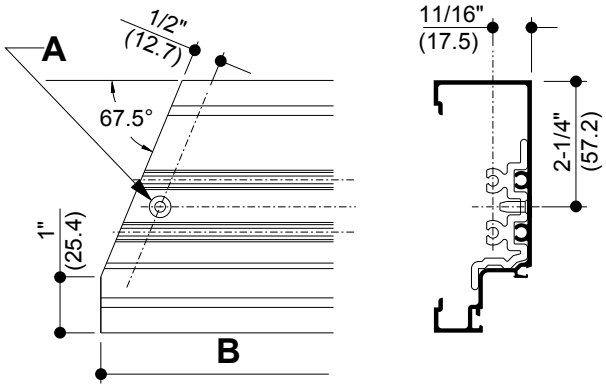
A	DLO
B	Extend water deflector past glass edge below.
Glass Formula: DLO + 1.125" (28.6)	

135° Dart Corners for Trifab® VersaGlaze® 450

Inside Glazed Head

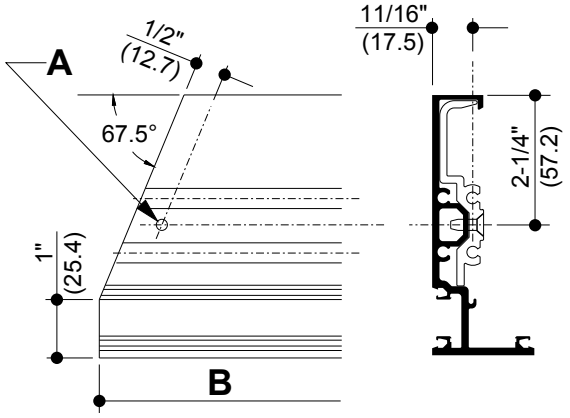


Outside Glazed Head

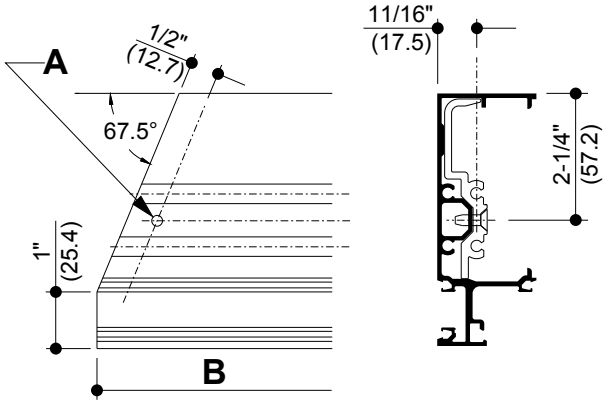


A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

Inside Glazed Horizontal



Outside Glazed Horizontal



A	0.147" dia. hole (#26 drill)
B	DLO
Cut Length = DLO	

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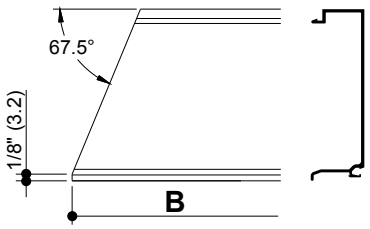
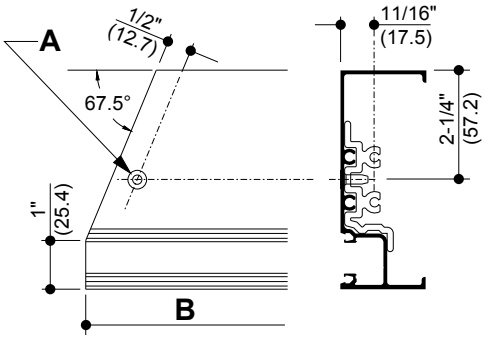
Inside Glazed Glass Stop



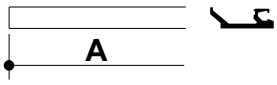
A	DLO
Cut Length = DLO - 1/16" (1.6)	

Inside or Outside Glazed Sill



A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

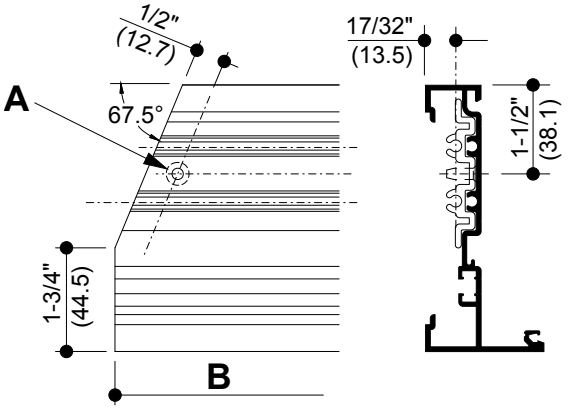
Outside Glazed Glass Stop



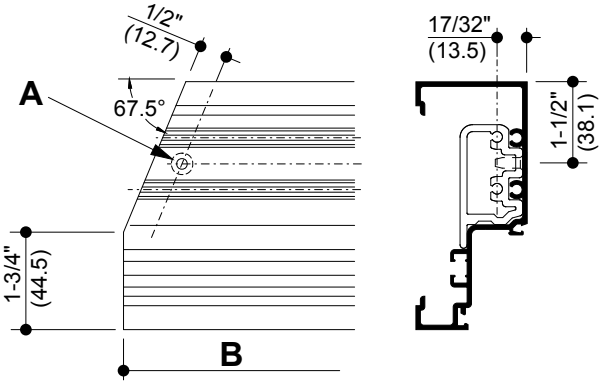
A	DLO
Cut Length = DLO - 1/16" (1.6)	

135° Dart Corners for Trifab® VersaGlaze® 451/451T

Inside Glazed Head

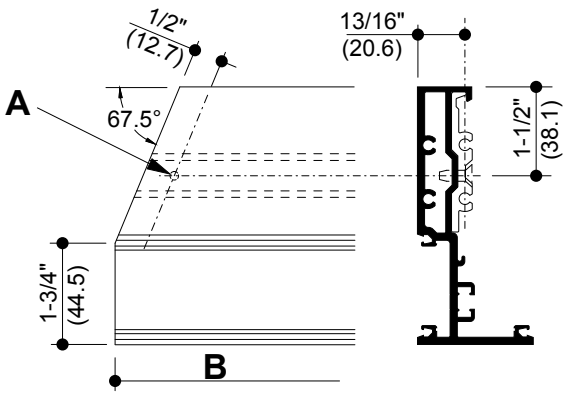


Outside Glazed Head

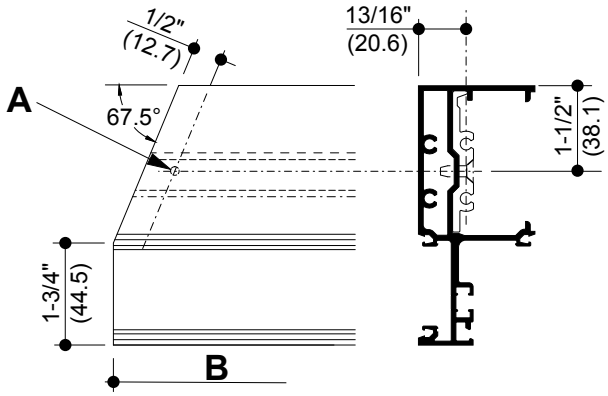


A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

Inside Glazed Horizontal

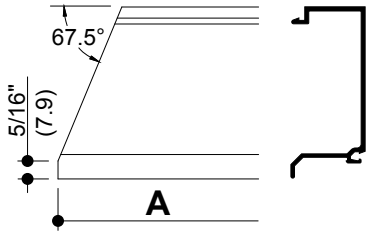


Outside Glazed Horizontal



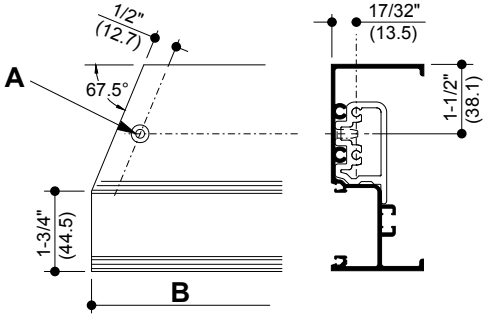
A	0.147" dia. hole (#26 drill)
B	DLO
Cut Length = DLO	

Inside Glazed Glass Stop



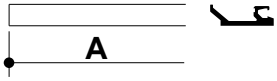
A	DLO
Cut Length = DLO - 1/16" (1.6)	

Inside or Outside Glazed Sill



A	0.201" dia. hole (#7 drill); 0.390" dia. x 82° countersink
B	DLO
Cut Length = DLO	

Outside Glazed Glass Stop



A	DLO
Cut Length = DLO - 1/16" (1.6)	

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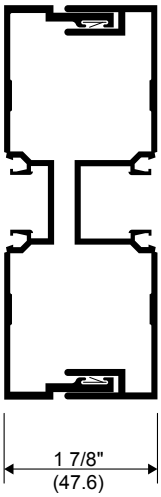
Install Expansion Mullions

Use an expansion mullion every 20' (6.10 m) in large openings, regardless of construction method.

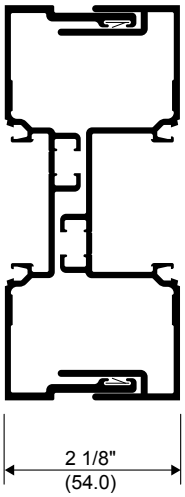
Adjust the standard width of the assembly based on temperature at the time of assembly and expected high and low service temperatures. (For example, reduce the sightline slightly when installed in hot weather and increase the sightline slightly when installed in cold weather).

Reference Dimensions



Trifab VG 450

1 3/4" (44.5) minimum HOT WEATHER to 2" (50.8) maximum COLD WEATHER



Trifab VG 451/451T

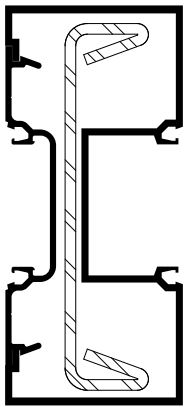
2" (50.8) minimum HOT WEATHER to 2 1/4" (57.2) maximum COLD WEATHER

Install Steel Reinforcing

1. Coat cut ends of steel reinforcing with a corrosion-inhibiting primer before installing.

NOTICE
For Trifab® VersaGlaze® 451 center plane applications where steel reinforcing is required, you must use the non-thermal split mullion without thermal pockets.

Split Mullion with 450110 Steel Reinforcing



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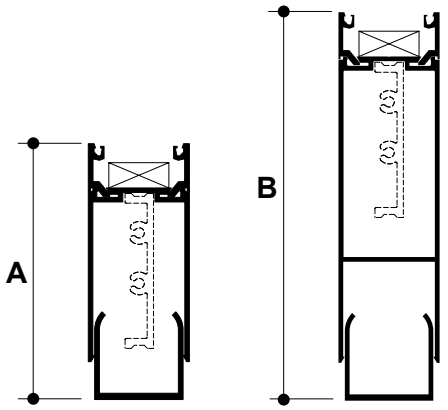
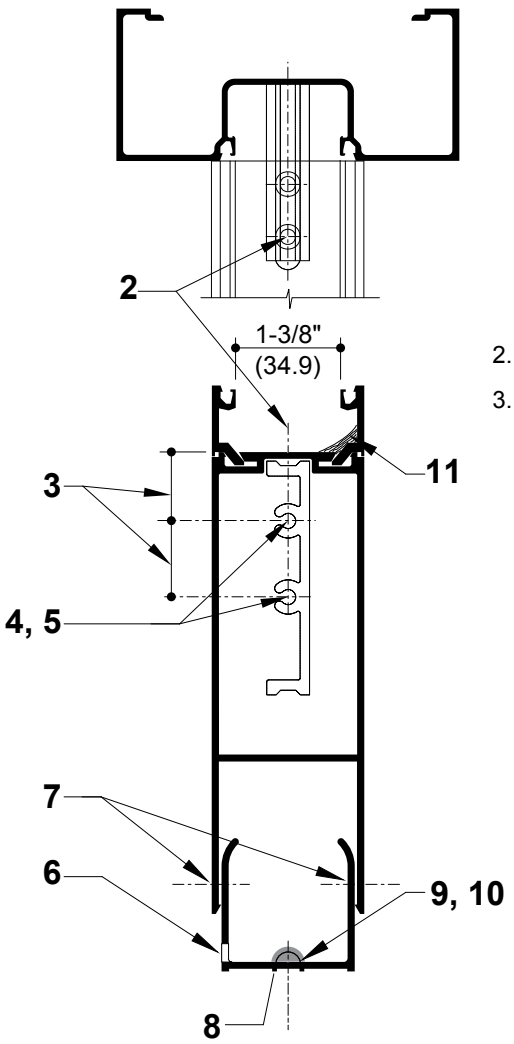
ADJUSTABLE NARROW SIDELITE BASE

For Center Glazed Option Using Non-Thermal, 2-Piece Vertical Only

NOTICE
Project wind loads may produce end load reactions at vertical mullions that may require additional anchors. Consult Application Engineering for review of narrow sidelite base applications.



A	5-3/4" (146.1) max. to 4-1/4" (108.0) min.
B	8-3/8" (212.7) max. to 7-1/8"(181.0) min.

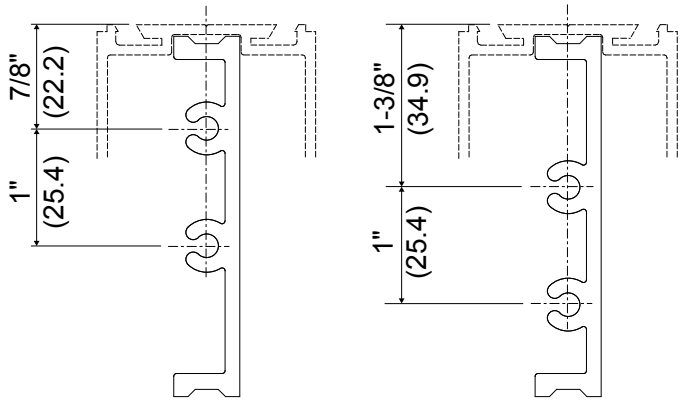


1. Determine required sidelite base height.

Standard Base Door	Bottom Rail Height
190 Door with Threshold	5-1/16"
190 Door without Threshold	4-9/16"

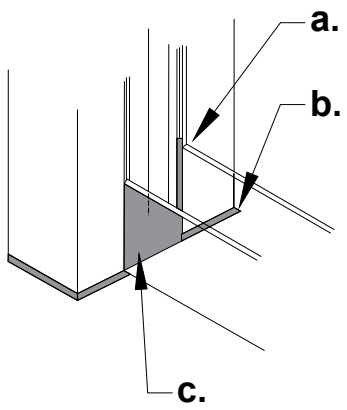
Tall Base Door	Bottom Rail Height
350/500 Door with Threshold	5-1/16"
350/500 Door without Threshold	4-9/16"

2. Drill top of rail with #26 drill and countersink.
3. Orient clip as needed and center in pocket.



*** Top of Sidelite Base

NOTICE
When using the sidelite base on both sides of the mullion, a clip is required in each pocket of the vertical. One of the clips must be reversed as shown to avoid interference of the screws.



4. Drill through splines of clip with #26 drill into pocket of vertical.
5. Secure clip to vertical with two (2) #10 x 2-5/8" PH screws, 128354.
6. Drill 1/4" weep holes at 1/4 points of channel.
7. Use 129345 screws at setting block points.
8. Set base in bed of sealant.
9. Anchor base to masonry.
10. Seal over heads of perimeter fasteners.
11. Seal interior glass stop continuously across opening and to vertical at ends.
12. Seal channel to mullion.
13. Seal mullion to finished floor.
14. Completely seal bottom of mullion pocket to floor and to channel.

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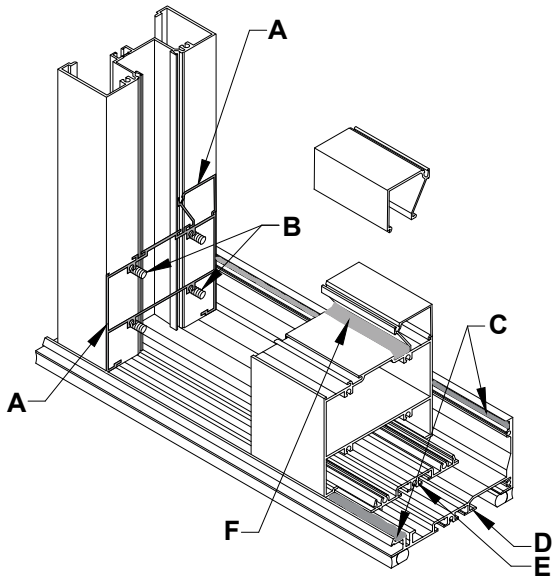
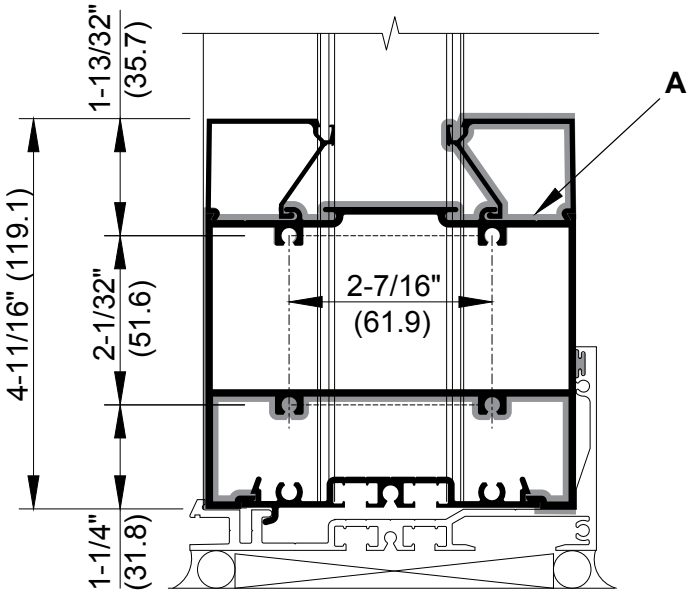
WIDE SIDELITE BASE FOR CENTER GLAZED OPTION



A	Seal end of sidelite base and interior glass stop at verticals.
B	Spline Screws
C	1. Apply sealant to front ledge of flashing. 2. Check for 127043 weathering in top reglet of sill flashing back leg. 3. If weathering was not installed, then fill reglet with sealant. **NOTICE** When each frame is installed there must be good sealant contact between sill and sill flashing. a. Apply a continuous bead of sealant to fill reglet. b. Make sealant bead large enough to sit proud of reglet. 4. Remove excess sealant from visible surfaces.
D	Sill Flashing
E	Tall Sill Filler Clips 451TCG365 located: 1. One on each side of vertical mullions with centerline of clips 3” (76.2) from end of sill members 2. Minimum of one sill clip at centerline of DLO with a maximum spacing of 36” (914.4) from adjacent clips 3. Clips must not interfere with anchor fasteners in sill flashing **NOTE** • Sill clip can be used with all open back sill members. • Sill clip not required at last bay. • When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.
F	Seal interior glass stop continuous across opening and to verticals at ends.



A	Apply sealant to end of sidelite base and interior glass stop

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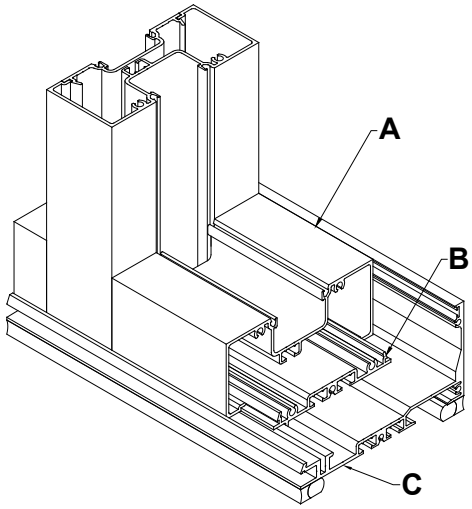
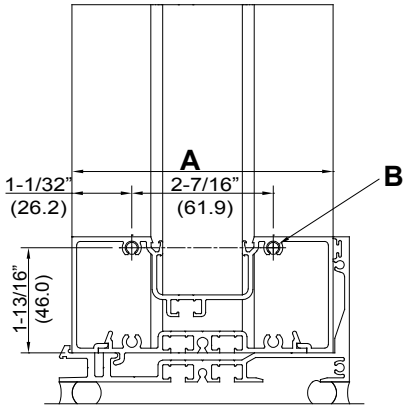
451CG001 SILL FOR CENTER GLAZED OPTION



A	451CG001, 451TCG001 or 451VG001, 451TVG001 Sill
B	451CG365 or 451TCG365 Tall Sill Filler Clip
C	Sill Flashing

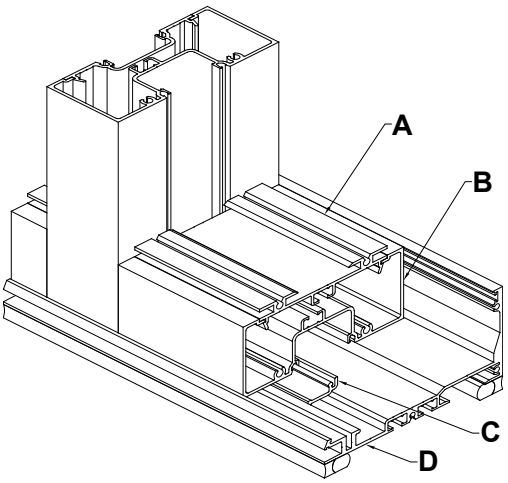
NOTE

- Follow sealing instructions and clip spacing from Wide Sidelite Base For Center Glazed Option.
- Sill clip not required at last bay.
- When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.



A	4.5 Ref
B	∅0.228 THRU, TYP 2X

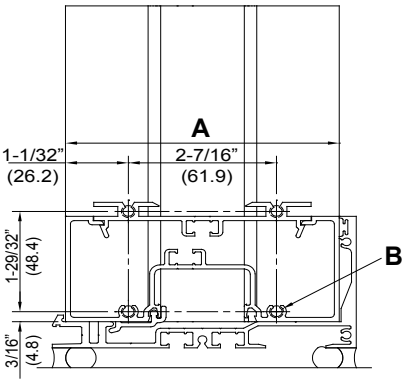
BRAKE METAL ADAPTER AT SILL FOR CENTER GLAZED OPTION



A	451VG150, 451TVG150 Brake Metal Adapter
B	451CG001, 451TCG001 Sill
C	451TCG366 Filler Clip
C	Sill Flashing

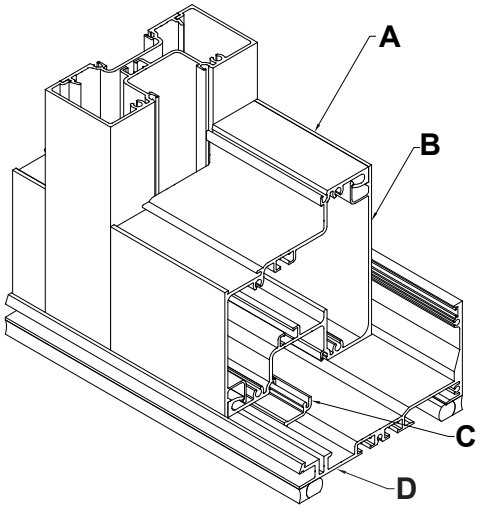
NOTE

- Follow sealing instructions and clip spacing from Wide Sidelite Base For Center Glazed Option.
- Sill clip not required at last bay.
- When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.



A	4.5 Ref
B	∅0.228 THRU, TYP 4X

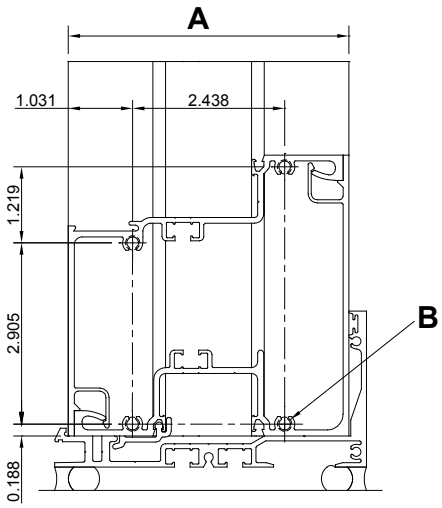
4-1/2" X 4-1/2" SILL FOR CENTER GLAZED OPTION



A	451CG115, 451TCG115 or 451CG035, 451TCG035 Sill
B	451CG035, 451TCG035 Sill
C	451TCG366 Tall Sill Filler Clip
D	Sill Flashing

NOTE

- Follow sealing instructions and clip spacing from Wide Sidelite Base For Center Glazed Option.
- Sill clip not required at last bay.
- When using the optional sill-to-sill flashing clip, in applications where the frame height is less than 6 feet tall, add 1/4" to the Shim Space at Head (SSH + 1/4" (6.4)) to obtain the proper clearance of the frame.



A	4.5 Ref
B	∅0.228 THRU, TYP 2X

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Notes

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