



Technical Glass Products Architectural Specification Manual

FIREFRAMES® ALUMINUM SERIES

Fireframes® Aluminum Series combined with Pilkington Pyrostop® fire-rated glass; provides a barrier to radiant and conductive heat transfer, allowing for unlimited areas of glazing in fire separations. The patented, high strength steel sub-frame assembly is only 2" (50.8mm) wide, yet has the strength for tall spans. The aluminum cover system gives the ultimate in durability and flexibility with many anodizing and coating options available. Fireframes Aluminum Series may incorporate Fireframes Designer Series doors or Fireframes Heat Barrier Series doors, and are classified and labeled with Underwriters' Laboratories, Inc.® (UL) and Underwriters' Laboratories of Canada (ULC).

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System Exploded Assembly
Interior Application

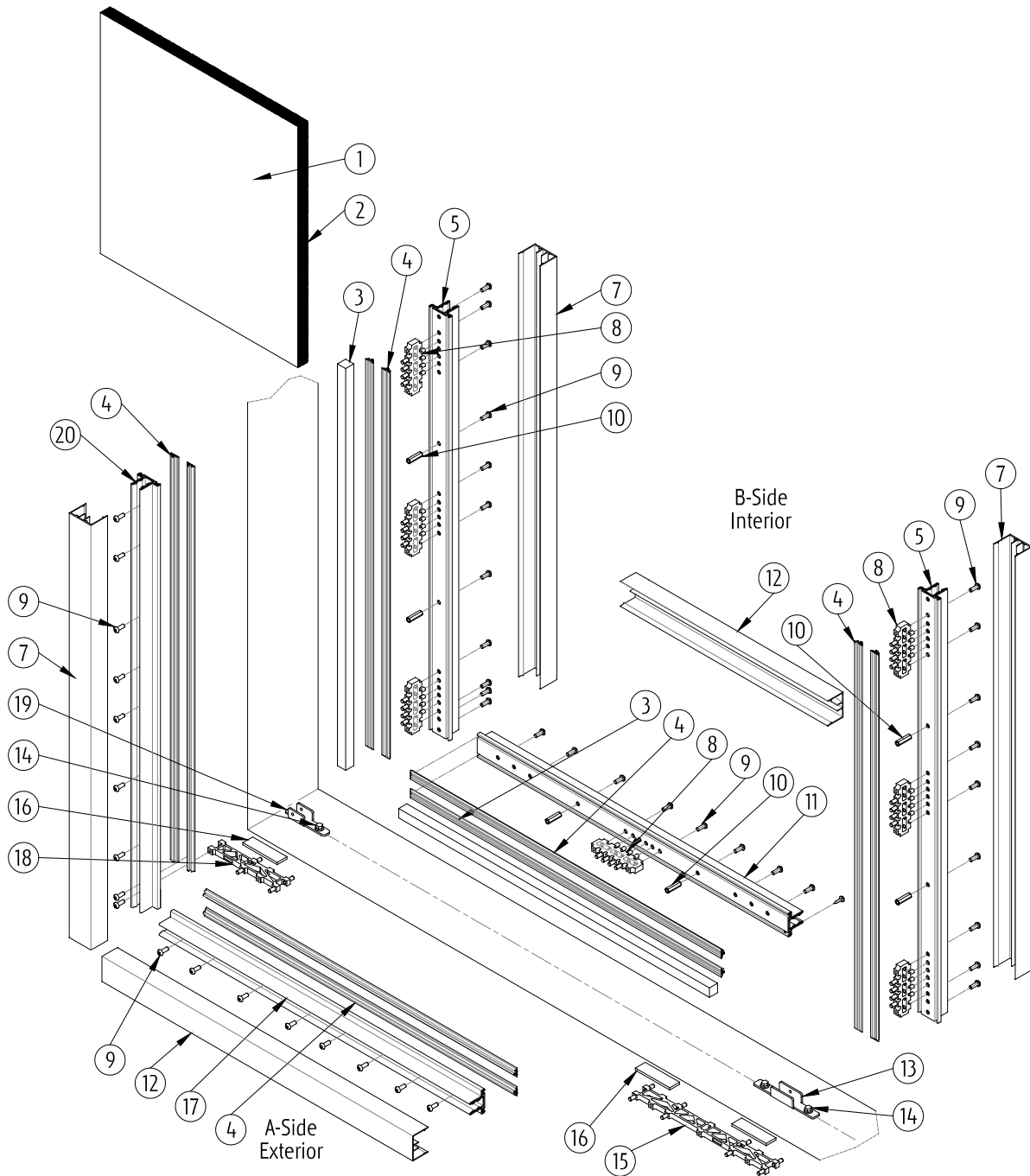


Figure 1a - System Exploded View

System Exploded Assembly
Exterior Application

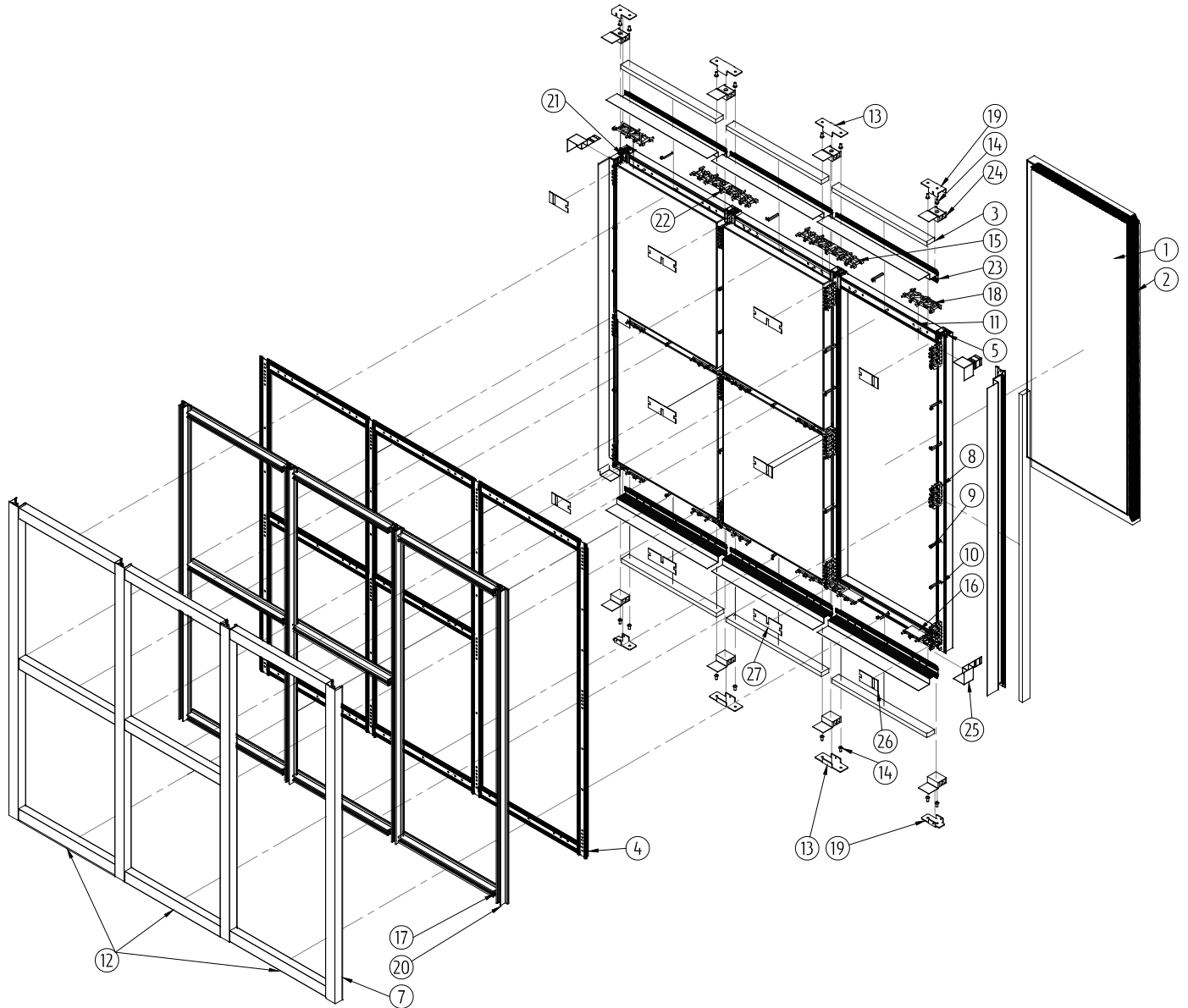


Figure 1b - System Exploded View

Material Key Chart

Item(s)	Material	Fasteners Provided With Fireframes Aluminum Series
9	M6 X 16 BHSCS	M6 x 16mm Button Head Socket Cap Screws used to secure Threaded Standoffs to mullions, and to secure Moment Braces to Mullions, and vertical mullions to anchors.
21	M6 X 1 SHFN	M6 x 1 A2 Stainless Steel Serrated Hex Flange Nut, used for securing anchors at head to vertical mullions.
22	M6 X 1 X 35 FHCS	M6 x 1 x 35mm Flat Head Socket Cap Screws, used to for securing the double connecting braces together.
Item(s)	Material	Components Provided With Fireframes Aluminum Series
16	SETTING PADS	7mm setting pads shipped loose for field installation.
15 and 18	CONNECTING BRACE	Single – secures the perimeter vertical mullions to the horizontal mullions. Double – secures the intermediate vertical mullions to the horizontal mullions.
2	INTUMESCENT TAPE	Required for Pilkington Pyrostop® glazing around perimeter edge of glass being interrupted only by the setting blocks.
-	CORNER	Fire-rated corners are available from TGP and are clad with 22ga aluminum finished to match the frame.
-	DOOR ADAPTOR	If project requires doors (Fireframes Designer Series, Fireframes Heat Barrier Series, or a DBO), a bolt on door adaptor and fasteners are provided.
3	HARDWOOD SPACER	Perimeter spacers are provided to compensate for glass thickness ensuring mullions secure correctly.
4	GASKET	Interior black silicone gasket (M2-021) used on all vertical and horizontal mullions. For AS Exterior, black silicone webbed gasket (M2-018) is used on the exterior side vertical and horizontal mullions.
23	GASKET WITH DIVERTER	Diverter mullion gaskets are inserted into the interior side mullions.
24	ANCHOR GASKET	Anchor gaskets are inserted at the anchor points to support the diverter gasket joint sealant.
25	CORNER GASKET	Corner gaskets are inserted at corners to bridge the diverter gasket joint sealant.
26 and 27	COVER PLATE	Perimeter Cover Plate – placed on the exterior of the glass underneath the profile at every T-joint (perimeter and doors). Intermediate Cover Plate – placed on the exterior of the glass underneath the profile at every X-joint.
5, 11, 17, and 20	MULLIONS	Vertical and horizontal mullions are cut to size and pre-machined.
8	MOMENT BRACE	Moment braces are used on vertical and horizontal mullions, between the connecting braces, to stabilize the A and B side mullions.
10	THREADED STANDOFF	Intermediate supports between moment braces. Depending on size of opening, there may be no, one or two threaded standoffs required between moment braces.
13 and 19	ANCHOR	Head anchors have slot(s) to allow for vertical movement. Sill anchors have threaded hole(s). End – Used at perimeter vertical mullions at head and sill, or at door jamb at sidelite. Mid – Used at intermediate vertical mullions at head and sill. Jamb – Used when a door jamb is at the perimeter condition.
7 and 12	COVER CAP	Horizontal and vertical snap on Cover Caps are provided in a variety of styles. Shown herein a standard (square). Cover Caps are shipped LONG for cutting to size by the installer.

Figure 2a - Provided by TGP Material Key Chart

Material Key Chart

Item(s)	Material	Required Material NOT PROVIDED With Fireframes Aluminum Series
14	ANCHOR FASTENER	As wall constructions vary widely in design, TGP does not provide perimeter fasteners. All anchors are pre-drilled with a 5/16" \varnothing pilot hole.
-	BACKER ROD AND FINISH SEALANT	Sealant installed into the interior and exterior perimeter cavity. Select sealant color to match frame or as directed by project architect. Hybrid or closed cell backer rod sized appropriately for the joint width should be used.
-	FIRESAFING	Firmly packed Mineral Wool and/or Intumescent Caulk must be installed in a continuous fashion between frame assembly and wall construction, being interrupted only by the perimeter anchors and shims. The intumescent caulk must meet ASTM E 1966 (UL 2079) standards for fire-resistive joints. Sealant manufacturers such as 3M, Tremco or others may supply this material.
-	SHIMS	Perimeter shims at anchor locations are to be of hardwood (oak) or non-combustible (steel) materials. Plastic shims may not be used. A 3/8" (~10mm) caulk joint between frame and all wall conditions is recommended.
-	WALL CONDITION	Rated wall construction by other trades.

Figure 2b - Not Provided by TGP Material Key Chart

General Information

This document is meant as a general description of typical installations. As such, it is the responsibility of the installer to ensure the window and doors are installed per the conditions that exist on any given project in accordance with these instructions and project drawings. TGP project drawings may detail modifications to the surrounding conditions required for a given project, (if architectural details or sketches were provided to TGP) and should be used in conjunction with these instructions. In the event of any conflict between these instructions and TGP project drawings, the TGP project drawings shall govern. TGP does not accept any warranty and / or liability for installations not in compliance with this document or other non-conforming use of the TGP products and / or system. Contact TGP with questions concerning these details as they apply to the particulars of a given project.

FEATURES

- Narrow steel profiles
- Easy installation
- Frames supplied “K-D” (knock-down) ready for installation
- Standard finish is clear anodized. Powder coating and other anodized finishes are available.
- Incorporates large individual panes of Pilkington Pyrostop® comprised of low-iron Pilkington OptiWhite™ glass
- Passes positive pressure test standards **UL 10C**.

LISTINGS

- Classified and labeled by Underwriters Laboratories, Inc.® (UL) as Design Number U558 and Underwriters Laboratories of Canada (ULC) as U416.
- Test report number for labeled 45/60/120 minute fire-rated frame assemblies is **UL File No. R-19207**.
- Frame tested in accordance with **UL 263, ASTM E119**, for 60 and 120 minute ratings; CAN/ULC-S101, CAN4 S-106, NFPA 251, NFPA 257, UL 9, and UL 10C.
- Fireframes Designer Series and Fireframes Heat Barrier Series doors tested in accordance with UL 10B and UL 10C.
- Approved for use in Los Angeles – **LARR 25798**.

General Information

SIZING GUIDELINES

FRAME ASSEMBLY						
Rating	Maximum Width		Maximum Height		Maximum Exposed Area	
	inches	mm	inches	mm	sq. ft.	sq. m
Window Assembly	162	4,115	162	4,115	152	14.12
Wall Assembly	N/A	N/A	N/A	N/A	N/A	N/A

GLASS SIZES					
Product	Rating (Minutes)	Maximum Single Dimension		Maximum Exposed Area	
		inches	mm	sq. in.	sq. m
Pilkington Pyrostop®	45	95-1/4	2,419	4,500	2.90
	60 (23 mm)	96	2,438	5,616	3.62
	60 (26 mm and thicker)	118-1/8	3,000	7,442	4.80
	120	111	2,819	3,730	2.41

AMERICANS WITH DISABILITY ACT STANDARDS ON FIRE PROTECTION DOORS

If fire doors were required to meet A.D.A. (Americans with Disability Act) Standards, many would not open or close with adequate force to prevent passage of flame and smoke. Recognizing this special fire safety need, NFPA 101 (National Fire Protection Association) allows operational features for fire doors (opening forces, closing speeds, etc.) that are different than for non-fire-rated doors. These fire “protective” steel doors carry ratings from 20-90 minutes for fire protection. Heat transfer through the door is not an issue, so they are constructed without interior insulation.

DOORS IN FIREFRAMES ALUMINUM SERIES FRAMES

Fireframes Designer Series and Fireframes Heat Barrier Series door frames and doors may be installed into the Fireframes Aluminum Series frames. For more details on installation, refer to those specific product’s Architectural Specification Manuals.

Conventional fire-rated wood or hollow metal doors can also be installed into a Fireframes Designer Series door frame within the narrow profiled Fireframes Aluminum Series frame, but will require coordination with respect to preparation of door hardware. Prior to producing your shop drawings, TGP will need to evaluate relevant hardware schedule information. When ordering wood or hollow metal doors, you must supply our engineering staff with the manufacturer, model number, fabrication templates, door handing and, if required, physical samples. If TGP must prepare special fabrication drawings to accommodate your hardware needs, your project lead time may be extended.

FIRE-RATED GLAZING OPTIONS

Technical Glass Products provides a complete line of fire-rated glazing options to complement the Fireframes Designer Series or Fireframes Heat Barrier Series doors when used with the Fireframes Aluminum Series. Refer to those specific product’s Architectural Specification Manuals, or your Technical Glass Products SpeciFIRE® Selection Guide, available from your sales representative or online at www.fireglass.com.

Please consult your Technical Glass Products sales representative to determine the best option for your application.

General Information

GLAZING SPECIFICATIONS

Pilkington Pyrostop® fire resistant glass provides up to a two hour fire rating. It can also be combined with other glazing products to achieve nearly any level of security protection.

The Fireframes Aluminum Series framing system is available for 45 minute fire-rated windows and 60 or 120 minute transparent glass wall applications. Wall applications are UL rated as per UL263 / ASTM E119 and allow for large expanses of glass and frame. The 45 minute window systems are classified as an Opening Protective as per UL 9, ASTM E2010 with a maximum overall frame size of 152 square feet.

Glazing Product	Application	Weight (Approx.) Lbs./Sq. Ft.	Glazing Thickness	Fire Rating (Minutes)	Max Exposed Glass Area Per Piece	Max Exposed Glass Single Dimension
Pilkington Pyrostop® 45-200	Interior Exterior	9.22	3/4" (19 mm)	45	31.25 Sq. Ft. (4,500 Sq. In.) 2.9 Sq. Meter	95-1/4" (2419 mm)
Pilkington Pyrostop® 45-360	Interior Exterior	12.29	1-5/16" (33 mm)	45	31.25 Sq. Ft. (4,500 Sq. In.) 2.9 Sq. Meter	95-1/4" (2419 mm)
Pilkington Pyrostop® 60-101	Interior	10.86	7/8" (23 mm)	60	39 Sq. Ft. (5,616 Sq. In.) 3.6 Sq. Meter	96" (2438 mm)
Pilkington Pyrostop® 60-201	Interior Exterior	12.90	1-1/16" (27 mm)	60	51.7 Sq. Ft. (7,442 Sq. In.) 4.8 Sq. Meter	Max. Width: 96" (2438 mm) Max. Height: 118-1/8" (3000 mm)
Pilkington Pyrostop® 60-361	Interior Exterior	15.98	1-5/8" (41 mm)	60	51.7 Sq. Ft. (7,442 Sq. In.) 4.8 Sq. Meter	Max. Width: 96" (2438 mm) Max. Height: 118-1/8" (3000 mm)
Pilkington Pyrostop® 120-106	Interior	22.94	2-1/4" (57 mm)	120	25.9 Sq. Ft. (3,730 Sq. In.) 2.41 Sq. Meter	111" (2819 mm)
Pilkington Pyrostop® 120-362	Interior Exterior	21.71	2-1/8" (54 mm)	120	25.9 Sq. Ft. (3,730 Sq. In.) 2.41 Sq. Meter	111" (2819 mm)

General Information

GLAZING SPECIFICATIONS

Pilkington Pyrostop® 45-200 (Interior Application Shown)	Pilkington Pyrostop® 45-360 (Exterior Application Shown)
<p>2 [50.8mm] $\frac{3}{4}$ [19mm] 4 [101.6mm] Horizontal Cover Cap 4 $\frac{1}{4}$ [107.7mm] Vertical Cover Cap</p>	<p>2 [50.8mm] $\frac{3}{4}$ [6mm] $\frac{3}{8}$ [19mm] $\frac{3}{16}$ [8mm] $\frac{1}{16}$ [33mm] 4 $\frac{1}{8}$ [118.5mm] Horizontal Cover Cap 4 $\frac{5}{16}$ [124.7mm] Vertical Cover Cap</p>
Pilkington Pyrostop® 60-101 (Interior Application Shown)	Pilkington Pyrostop® 60-201 (Interior Application Shown)
<p>2 [50.8mm] $\frac{3}{8}$ [23mm] 4 $\frac{3}{8}$ [105.6mm] Horizontal Cover Cap 4 $\frac{3}{8}$ [111.7mm] Vertical Cover Cap</p>	<p>2 [50.8mm] $\frac{1}{8}$ [27mm] 4 $\frac{5}{8}$ [109.6mm] Horizontal Cover Cap 4 $\frac{9}{16}$ [115.7mm] Vertical Cover Cap</p>
Pilkington Pyrostop® 60-361 (Exterior Application Shown)	Pilkington Pyrostop® 120-106 (Interior Application Shown)
<p>2 [50.8mm] $\frac{3}{4}$ [6mm] $\frac{1}{16}$ [27mm] $\frac{3}{16}$ [8mm] $\frac{1}{8}$ [41mm] 5 [126.5mm] Horizontal Cover Cap 5 $\frac{1}{4}$ [132.7mm] Vertical Cover Cap</p>	<p>2 [50.8mm] $\frac{3}{8}$ [23mm] 1 [26mm] $\frac{5}{16}$ [8mm] 2 $\frac{1}{4}$ [57mm] 5 $\frac{1}{2}$ [139.6mm] Horizontal Cover Cap 5 $\frac{3}{4}$ [145.7mm] Vertical Cover Cap</p>
Pilkington Pyrostop® 120-362 (Exterior Application Shown)	
<p>2 [50.8mm] $\frac{3}{4}$ [6mm] $\frac{1}{16}$ [40mm] $\frac{3}{16}$ [8mm] 2 $\frac{1}{8}$ [54mm] 5 $\frac{1}{2}$ [139.5mm] Horizontal Cover Cap 5 $\frac{3}{4}$ [145.7mm] Vertical Cover Cap</p>	

General Information

ANGLE SEGMENTED FRAMES (INTERIOR APPLICATION ONLY)

The horizontals and glass can be angled up to a maximum of 6 degrees on either side of the shared vertical mullion. See Figures 3 and 4.

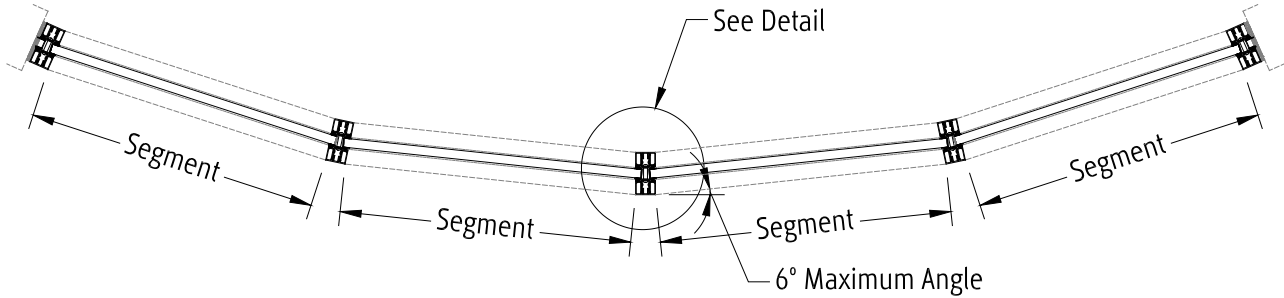


Figure 3 - Segmented Frame Plan View

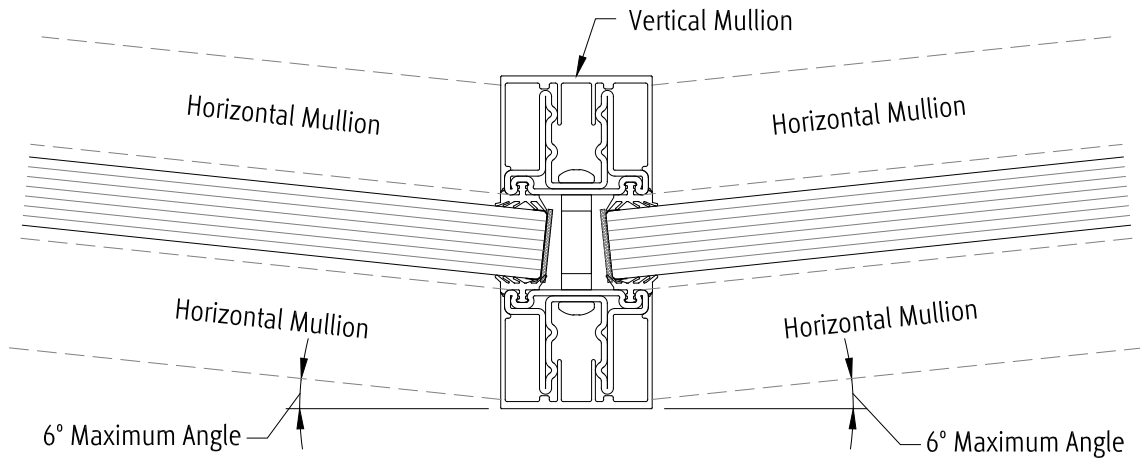


Figure 4 - Segmented Frame Detail

Recommended Guidelines

1. REVIEW CONTRACT DOCUMENTS

Review architectural drawings, specifications, and approved TGP project drawings, installation instructions, and shipping lists to become thoroughly familiar with the project. The TGP project drawings take precedence and include specific details for your installation. These installation instructions are of a general nature and cover most conditions.

2. BUILDING CODES

Due to the diversity in local, state / provincial, or federal laws and the codes that govern design and application of architectural products, it is the responsibility of the individual architect / owner and installer to ensure that products selected for use on projects comply with all the applicable building codes and laws. Technical Glass Products exercises no control over the use or application of its products, glazing materials, and operating hardware and assumes no responsibility thereof. Compliance of TGP project drawings with applicable codes for a given project shall be the responsibility of the Buyer.

3. COORDINATION WITH OTHER TRADES

Coordinate with the general contractor any sequence with other trades which impact installation (i.e. fire proofing, back-up walls, partitions, ceilings, mechanical ducts, converters etc.) or in which installation may impact the work of adjacent trades.

4. INSTALLATION

All materials are to be installed plumb and level.

5. BENCH MARKS

All work should start from bench marks and/or column lines as established by the architectural drawings and the general contractor with guaranteed accuracy. Using these datum points and lines, determine:

- a. The plane of the wall in reference to offset lines provided on each floor;
- b. The finish floor lines in reference to bench marks on the outer building columns; and
- c. Mullion spacing from both ends of openings to prevent dimensional build-up of daylight opening.

6. SURROUNDING CONDITIONS

- a. Coordination of adjacent material and construction tolerances to TGP's systems may be facilitated by TGP as part of preparing project drawings, and these drawings may indicate acceptable tolerances for critical dimensions. The installer should verify that surrounding construction is in accordance with the approved project drawings. Do not accept rough opening dimensions less than shown on project drawings. It is assumed that the minimal joint dimensions shown on the TGP project drawings match the field conditions. A frame may fit within a given opening but sealants may not perform as detailed if a smaller sealant joint is installed. Expansion / contraction issues may also be compromised. **IF THE JOINTS ARE SMALLER THAN THAT SHOWN ON THE TGP PROJECT DRAWINGS, DO NOT PROCEED.** Notify the General Contractor that the conditions are not as detailed and wait for corrective work to be completed before starting this work.

Recommended Guidelines

- b. The installer **MUST** notify and receive approval from TGP and the general contractor when conditions are not in accordance with approved project drawings and/or change any aspect of the structural performance of the Fireframes series before making any modifications to the TGP-furnished material or making changes which are different from those shown on the TGP project drawings. These conditions include, but are not limited to, anchor placement/location, changes in adjacent materials the anchor is being connected to or changes to dimensional relationships between framing, anchors and connection to adjacent materials.
- c. TGP must review and approve any changes required prior to the subcontractor installing any “corrective” work. These reviews may incur additional charges, which must be approved by the TGP customer prior to TGP’s review.

7. FRAME CONSTRUCTION VARIES

Depending on size restrictions, frames are shipped fully welded ready for installation or “K-D” (knock-down) to be assembled on site with mechanical joints.

8. FASTENING

Within the body of these instructions, “fastening” means any method of securing one part to another or to adjacent materials by means other than welding, adhering or using a mechanical fastener as shown on the approved details. Only those fasteners used within the system are specified in these instructions. **Due to the varying perimeter conditions and performance requirements, perimeter and anchor fasteners are not specified in these instructions and are the responsibility of the installer.**

9. SEALANTS

- a. Sealants must be compatible with all materials they are in contact with, including other sealant surfaces. Consult with sealant manufacturer for recommendations relative to joint size, shelf life, compatibility, cleaning/priming, tooling, adhesion, etc.
- b. The chemical compatibility and/or adhesion of all glazing materials and framing sealants with each other and with like materials used in glass and frame fabrication must be established by the installer. This is required on every project.
- c. If required by the project specifications, it is the responsibility of the glazing contractor to submit any documentation or samples from the sealant manufacturer indicating that glass and glazing material has been tested for chemical compatibility and / or adhesion with glazing sealants. **This applies to all TGP materials in contact with any sealant.** TGP will furnish samples of these materials upon request.
- d. The implementation of the test results is the responsibility of the installing contractor, and includes material performance and recommendations for primers and substrate preparation required to obtain adhesion.

10. PERIMETER JOINTS

Perimeter seals and/or expansion joints shown in these instructions and in the TGP project drawings are shown at nominal size. Actual dimensions may vary due to perimeter conditions and / or difference in metal temperature between the time of fabrication and the time of installation. Design and detailing have been based on a fabrication / installation temperature of 70° F (21° C). If extreme temperatures exist at time of installation, gaps between expansion members may require slight adjustment.

Recommended Guidelines

11. CLAMPING SCREW TORQUE

Edge pressure must not exceed 11.5 pounds per linear inch. This pressure is required on the Fireframes Aluminum Series mullion gaskets. It must be uniformly applied by the exterior mounted pressure plate, through the glass, to the mullion gaskets. Excessive or irregular edge pressure WILL CAUSE deformation and breakage.

12. WATER HOSE TEST

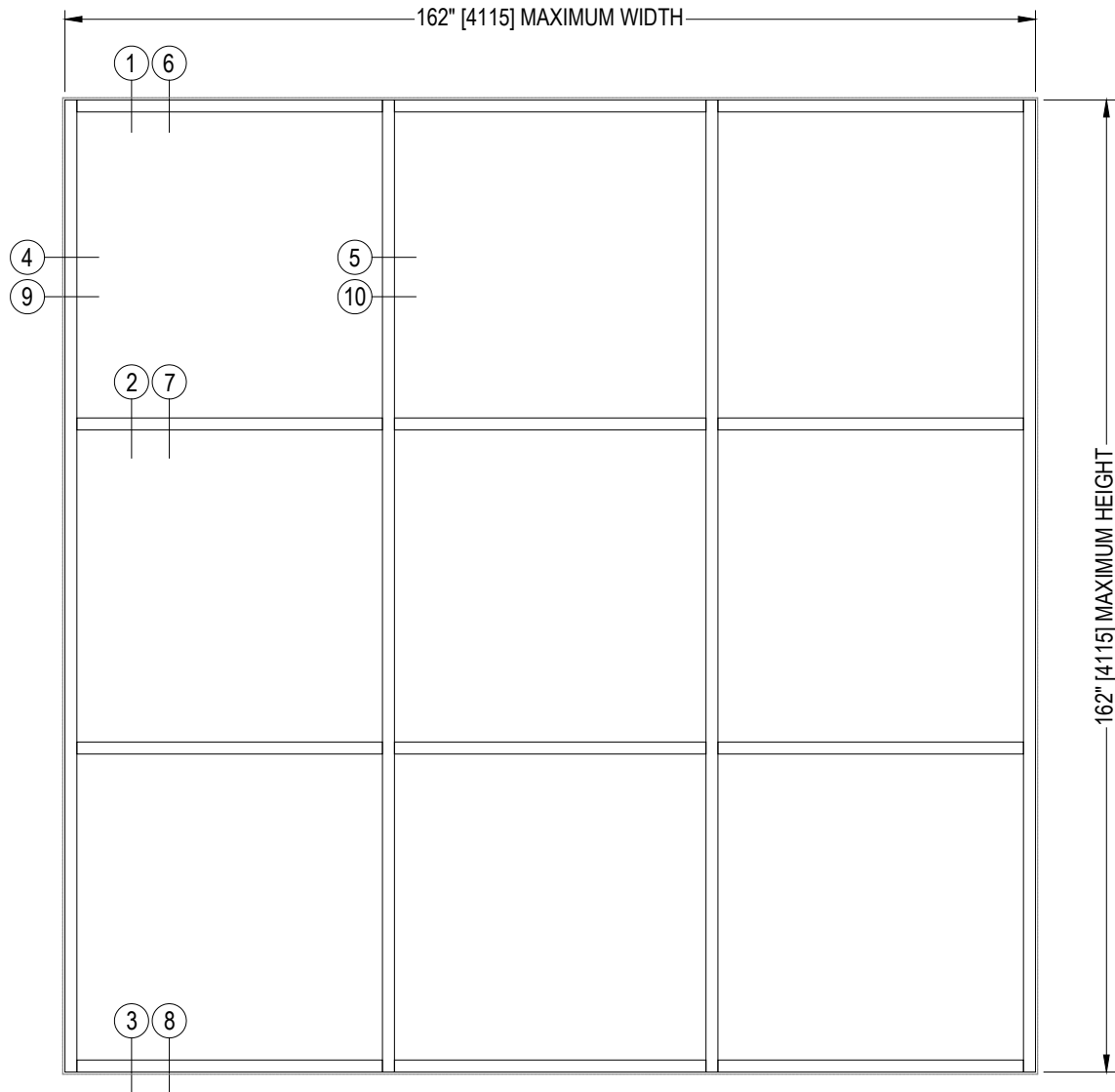
Exterior installations may require a water test in accordance with AAMA 501.2. As soon as a representative amount of the wall has been glazed (500 square feet or 46.5 square meters) a water hose test should be conducted. This test should be repeated for every 500 square feet (46.5 square meters), or as stipulated by specification, after all components have been installed.

13. FIELD ANCHORS

Steel anchors that are welded to steel structure or are bolted to embed must be line set before mullions are placed. Outstanding leg of anchors must be at 90° to offset lines. Mullion spacing should be held to $\pm 1/32''$ (0.8 mm). Anchors may vary per job conditions. Always refer to approved project drawings for specific job site conditions.

- e. AWS-certified welders are recommended to be used to install all field weld conditions called out in the TGP project drawings. The responsibility of using experienced, certified welders is the installing contractor's, not TGP's.
- f. All field welding must be adequately shielded to avoid any splatter on glass or frame components. Results of inadequately shielded field welding will be unsightly and /or structurally unsound. Advise general contractor and other trades accordingly.
- g. TGP typically finishes all steel material to protect from corrosion during shipping and storage on site prior to installation. For powder coated finishes, it is required to grind off the finish at the expected weld location prior to welding operations. The field weld must be re-finished with a zinc rich primer (in unexposed areas) or with touch-up paint (in exposed areas) after the welding is completed. Welds should never be left unpainted or unfinished. TGP can furnish small quantities of touch-up paint as required to match the original finish.

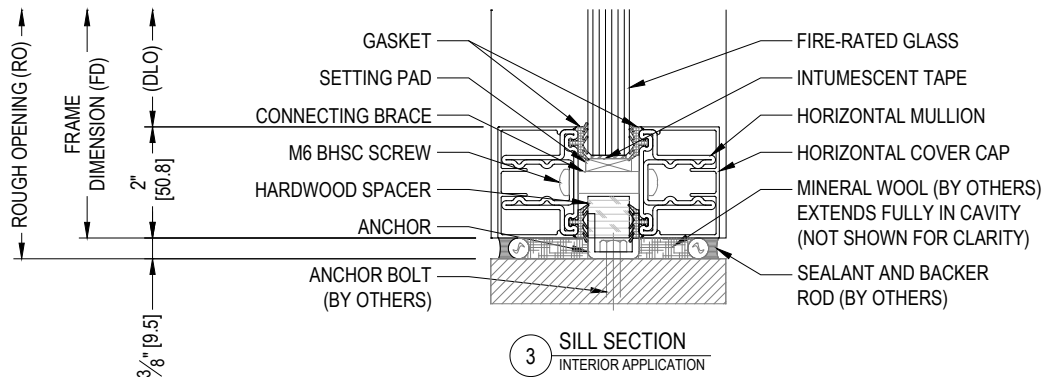
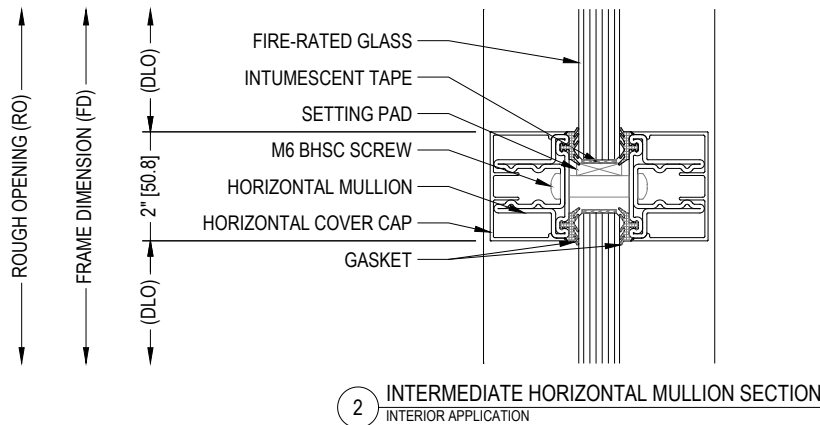
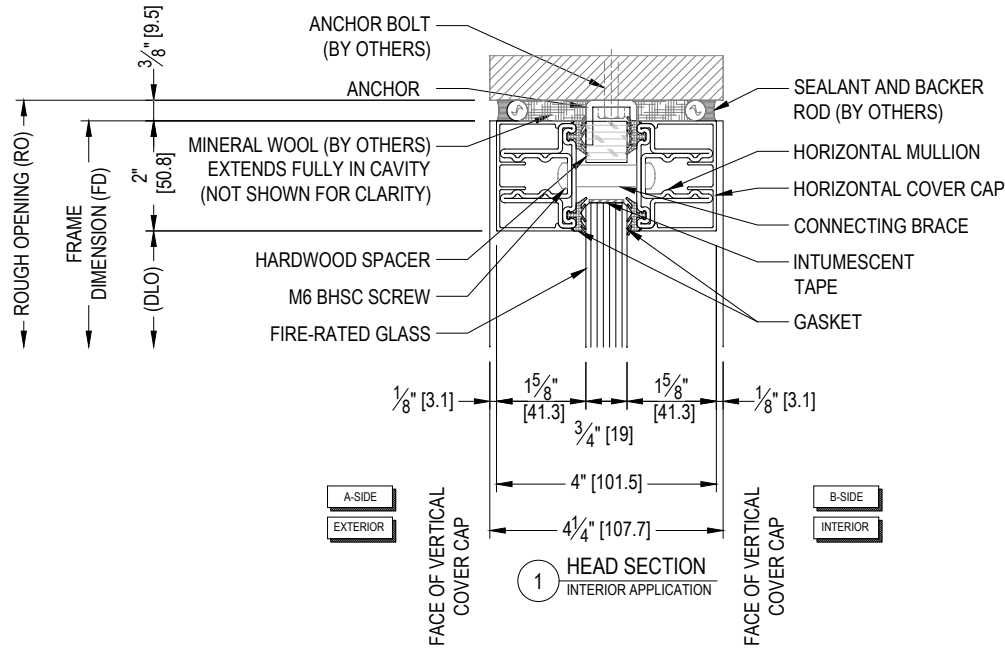
45 Minute – Window Elevation



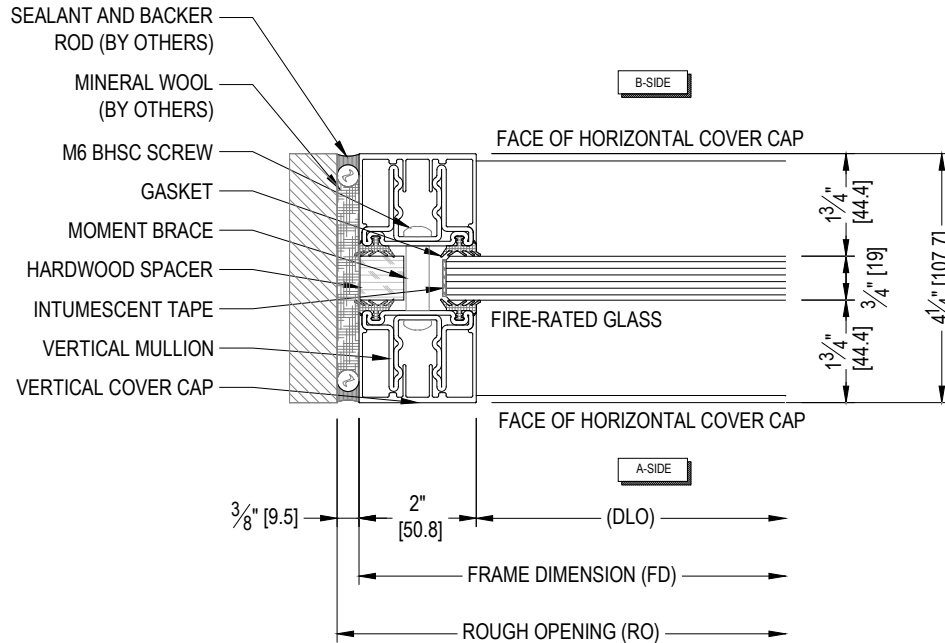
A WINDOW
45 MINUTE FIRE-RATED

- * 45 minute window systems are classified as an Opening Protective as per UL 9, with the maximum width or height dimension of 162", while not exceeding 152 square feet.
- ** 60 and 120-minute tests conducted per UL 263 / ASTM E-119. Therefore assembly is classified as a wall assembly, and not subject to "opening" area limitations.

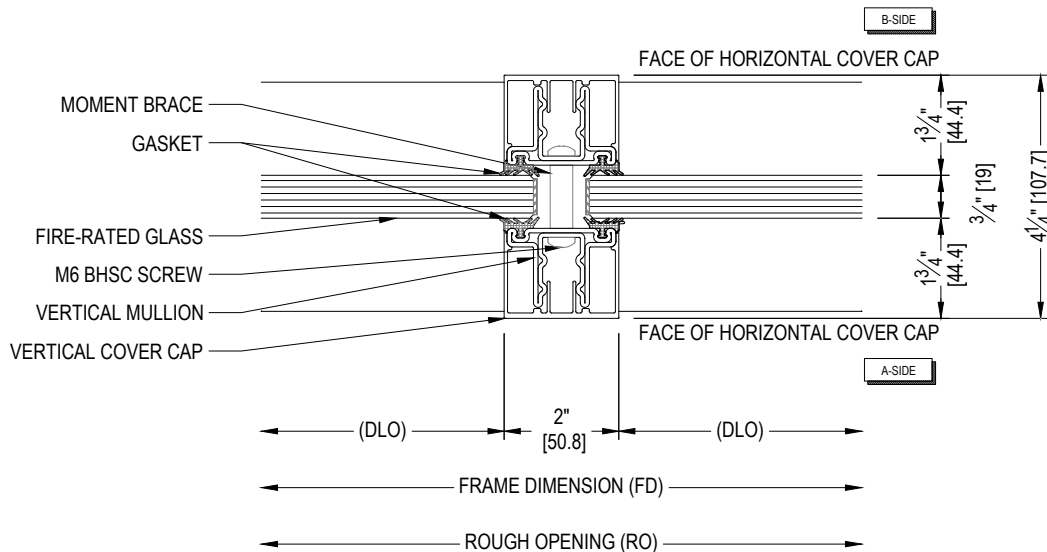
45 Minute – Window Details Interior Application



45 Minute – Window Details
Interior Application

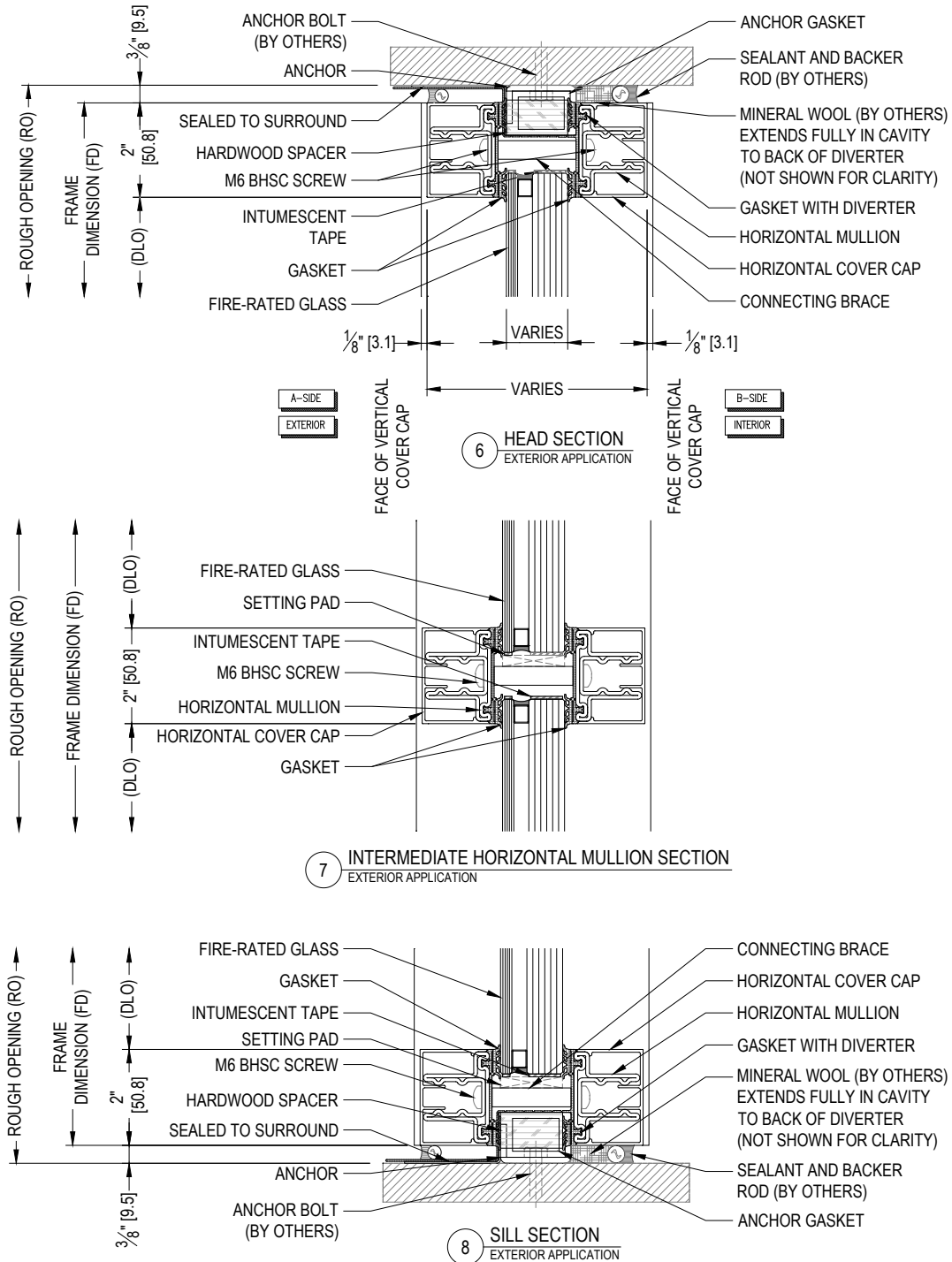


4 JAMB SECTION
INTERIOR APPLICATION

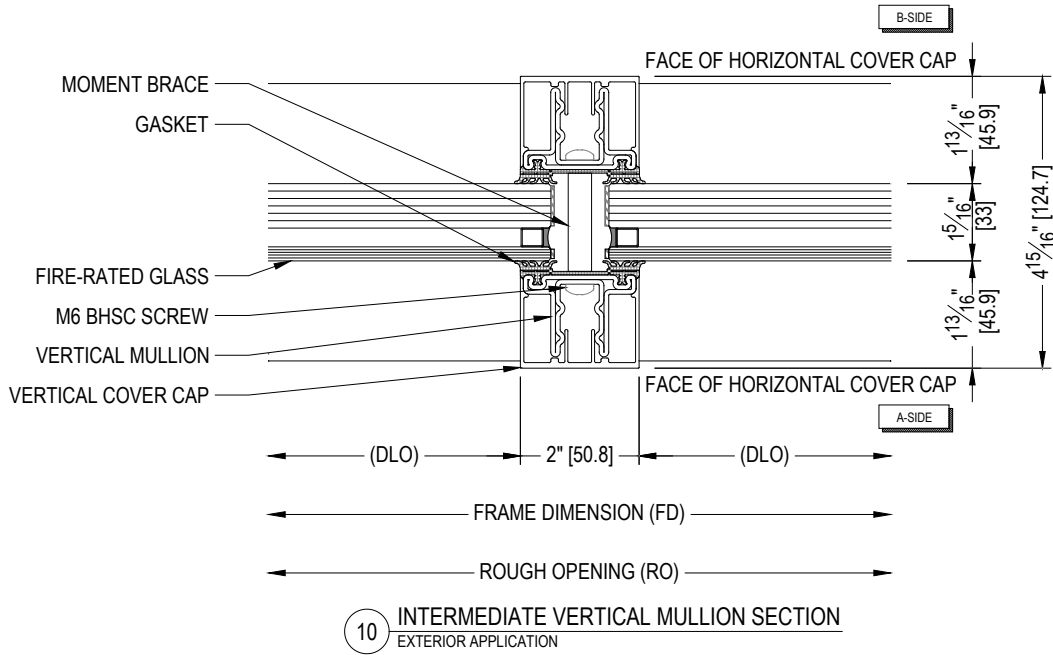
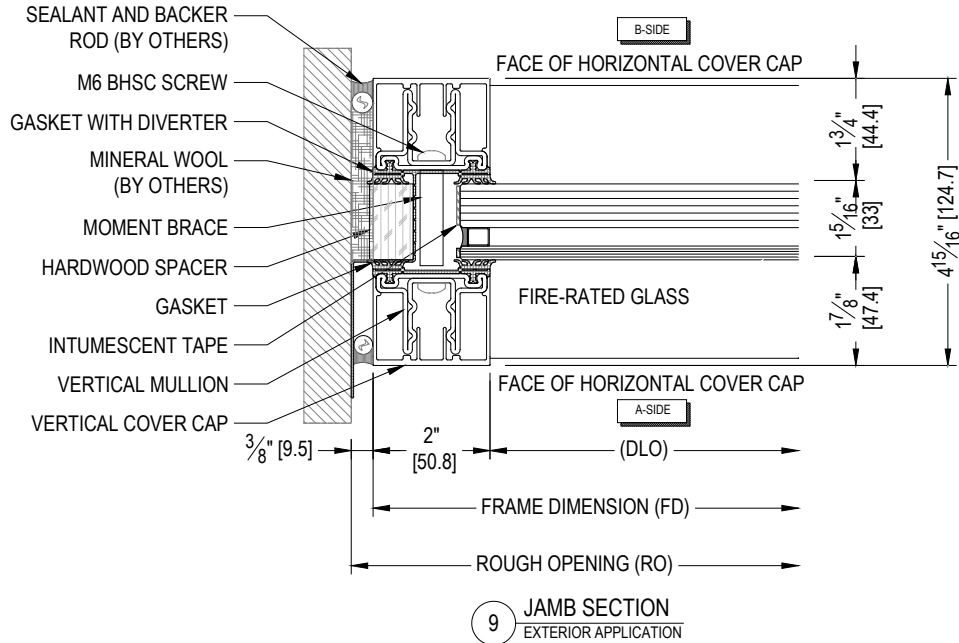


5 INTERMEDIATE VERTICAL MULLION SECTION
INTERIOR APPLICATION

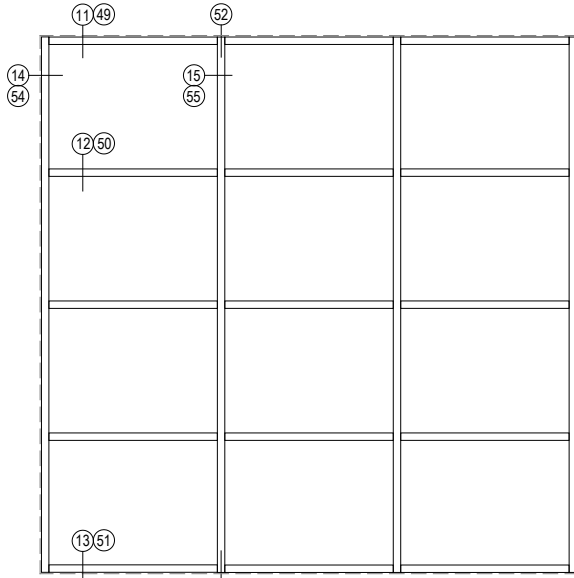
45 Minute – Window Details Exterior Application



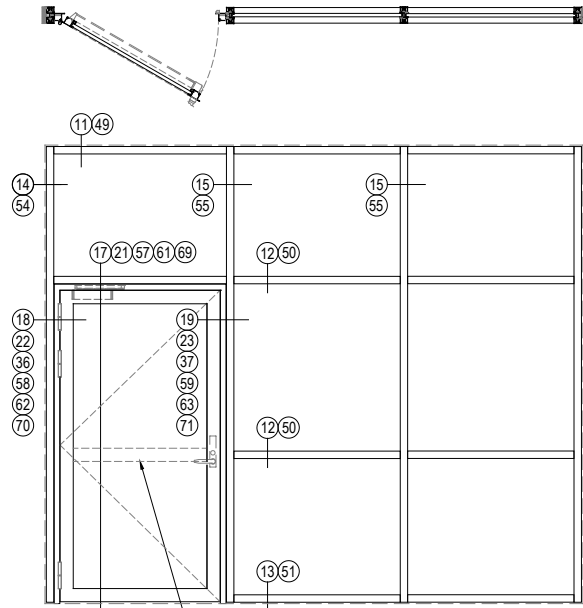
45 Minute – Window Details
Exterior Application



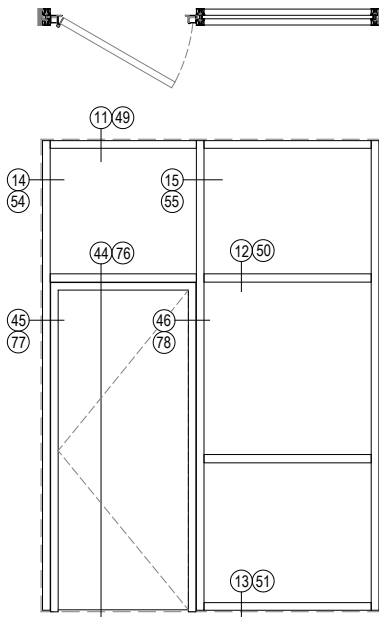
60 and 120 Minute – Elevations



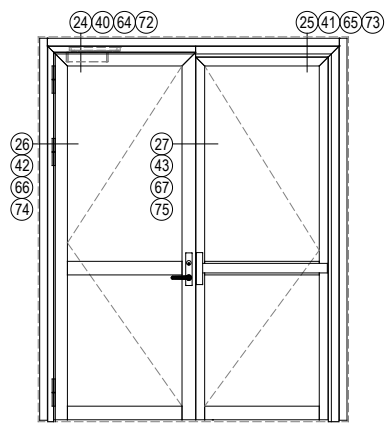
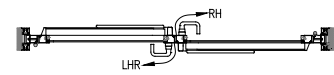
53 (47) 90° CORNER
(48) VARIABLE CORNER
B WINDOW
60 AND 120 MINUTE FIRE-RATED



HORIZONTAL MID RAIL
REQUIRED FOR
90 MINUTE DOORS
C WINDOW AND SINGLE DOOR
60 AND 120 MINUTE FIRE-RATED



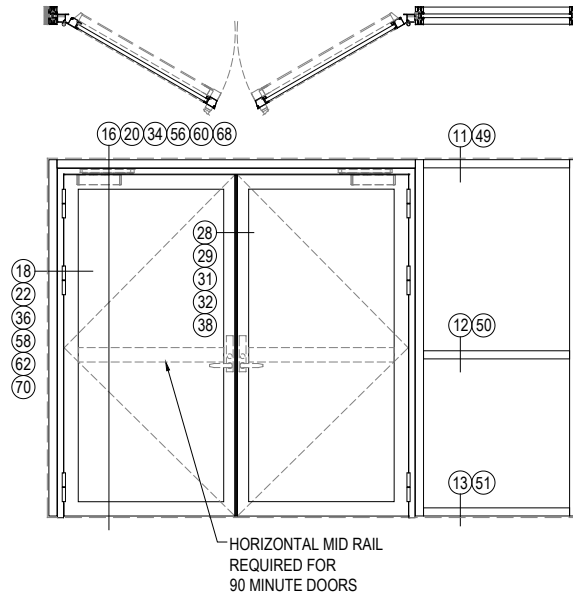
D WINDOW AND DOOR BY OTHERS WITH DESIGNER SERIES FRAME
60 AND 120 MINUTE FIRE-RATED



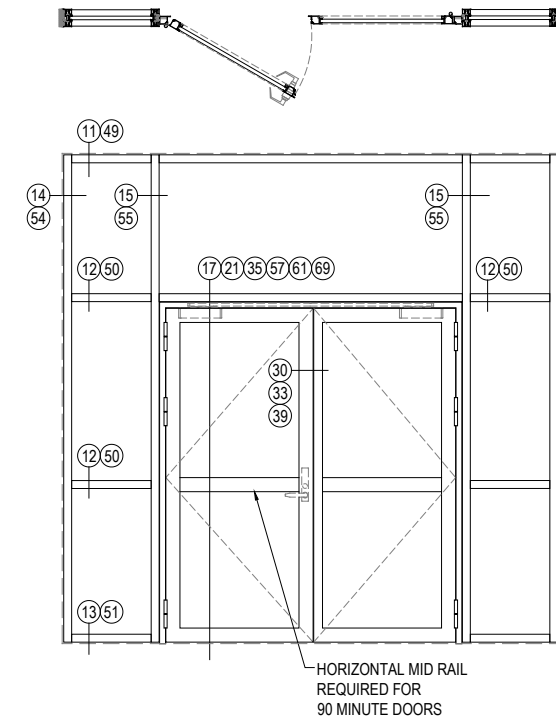
E DOUBLE EGRESS DOOR
60 AND 120 MINUTE FIRE-RATED

NOTE: Fireframes Designer Series temperature rise doors cannot have mid rails.

60 and 120 Minute – Elevations



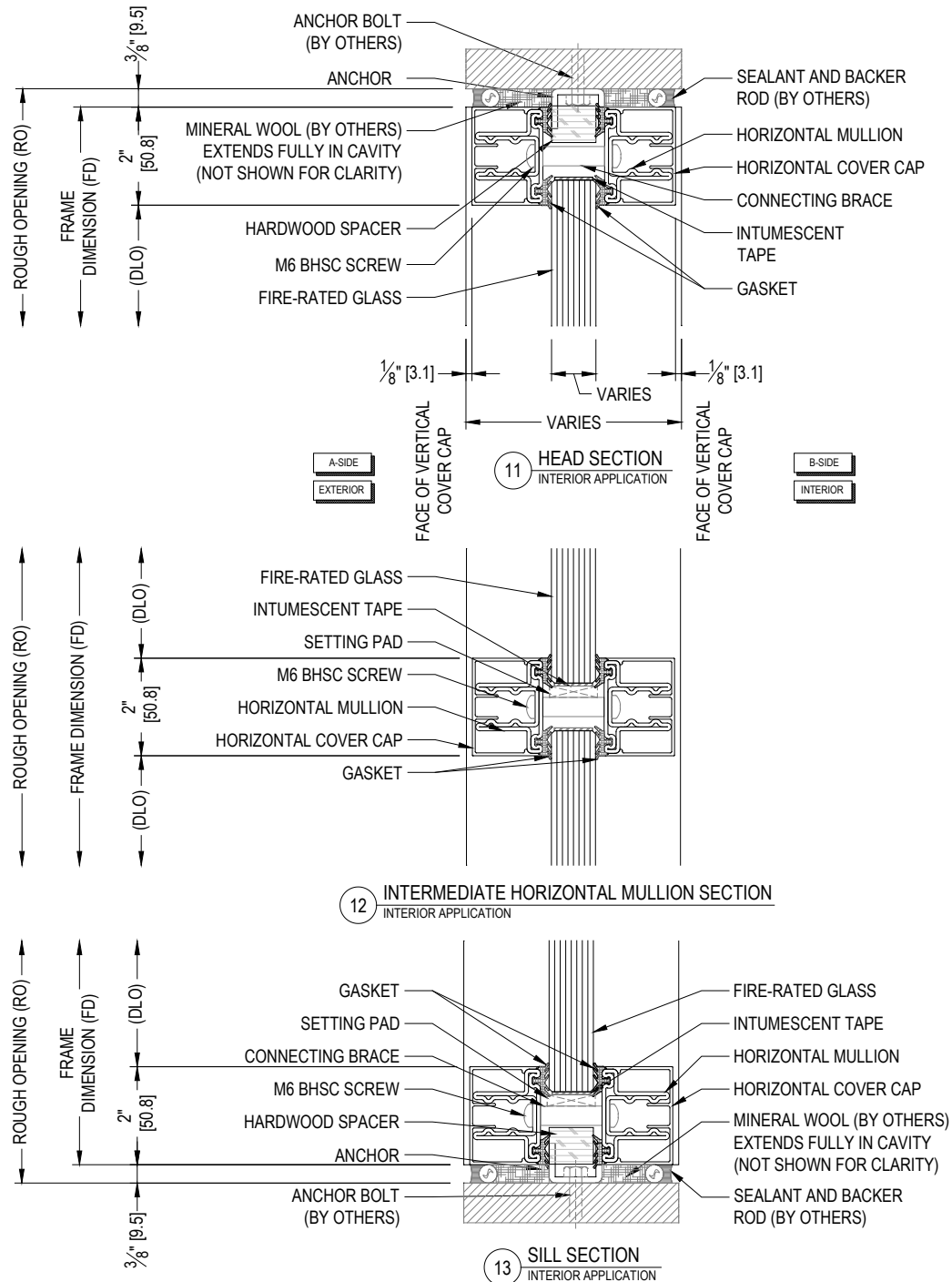
F WINDOW AND ACTIVE/ACTIVE DOORS
60 AND 120 MINUTE FIRE-RATED



G WINDOW AND ACTIVE/FIXED DOORS
60 AND 120 MINUTE FIRE-RATED

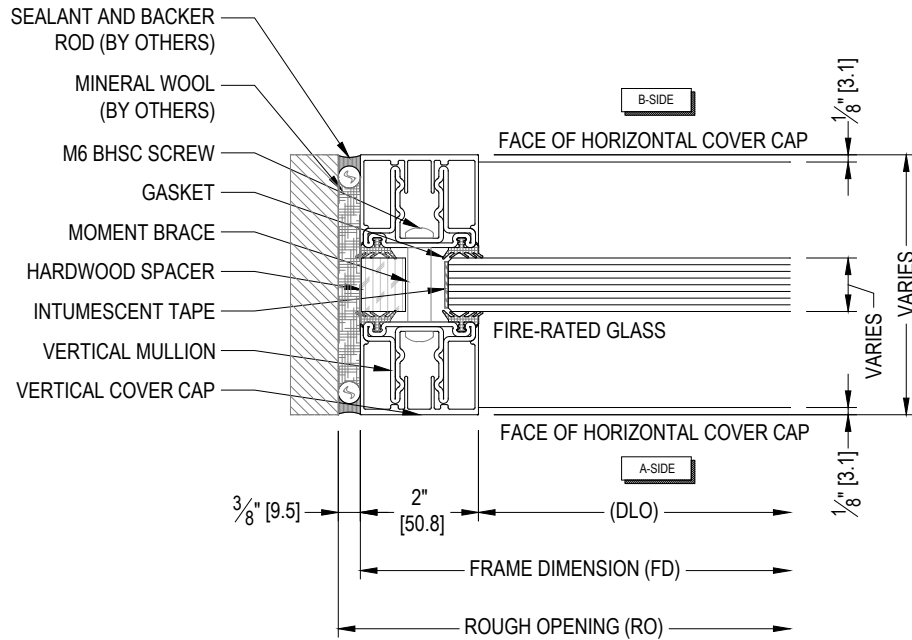
NOTE: Fireframes Designer Series temperature rise doors cannot have mid rails.

60 and 120 Minute – Window Details Interior Application

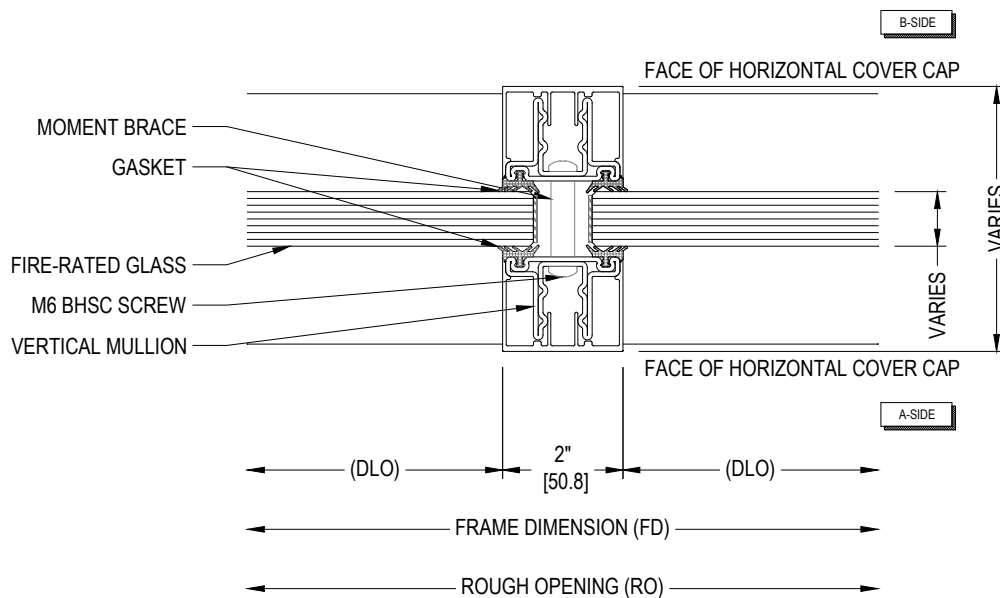


NOTE: 60 minute fire rating shown in the details above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.

60 and 120 Minute – Window Details Interior Application



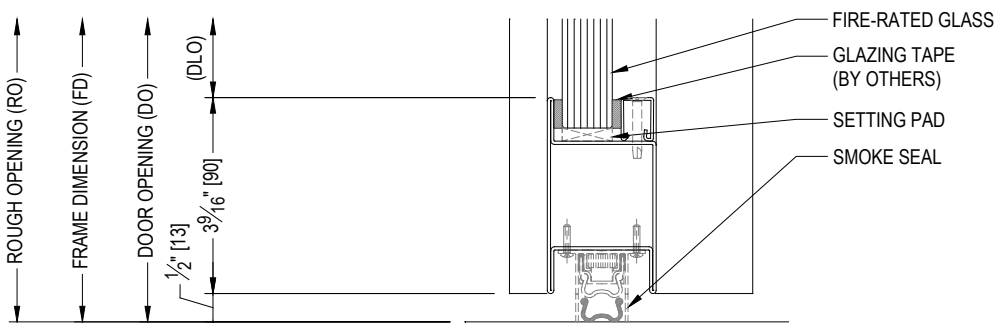
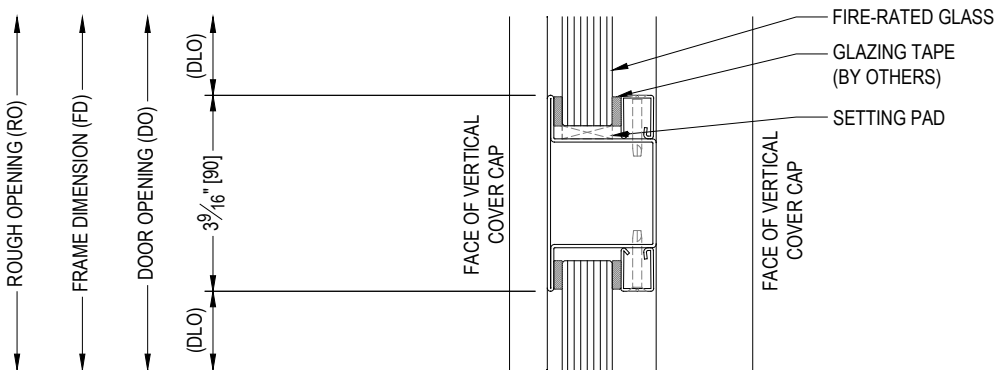
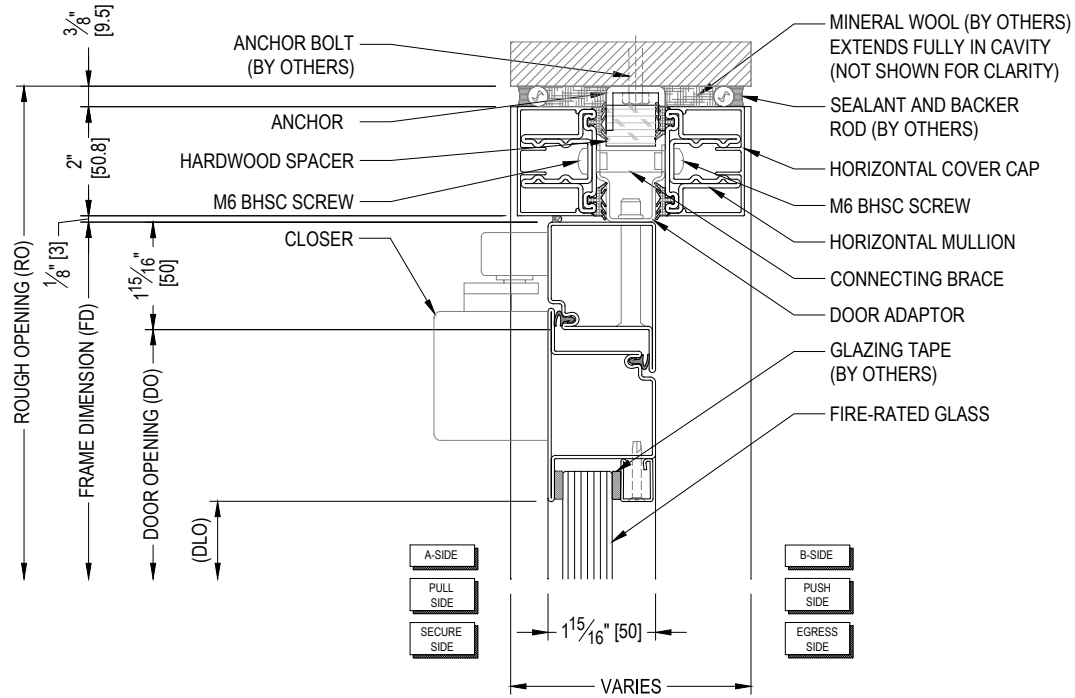
14 JAMB SECTION
INTERIOR APPLICATION



15 INTERMEDIATE VERTICAL MULLION SECTION
INTERIOR APPLICATION

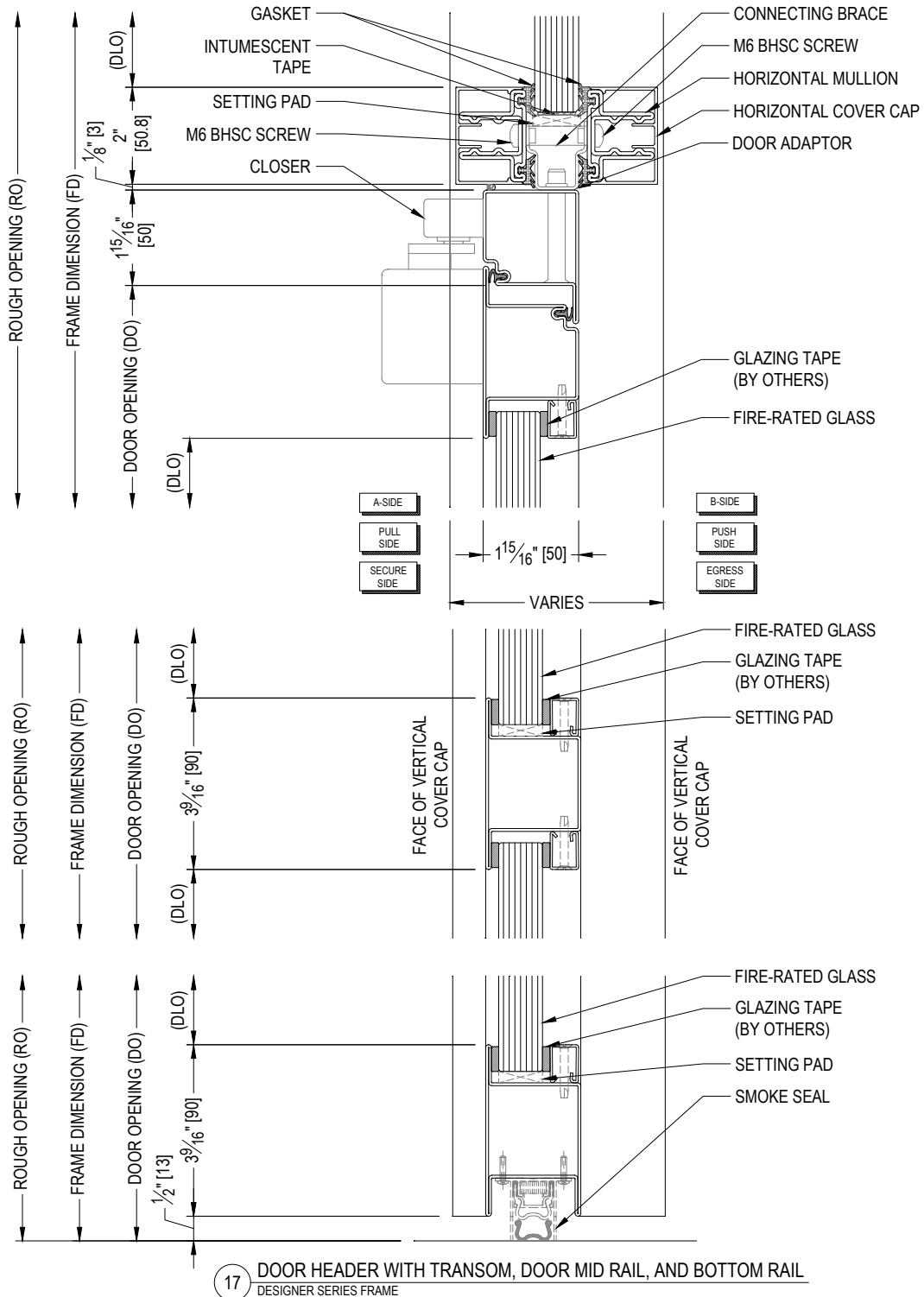
NOTE: 60 minute fire rating shown in the details above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.

60 and 120 Minute – Fireframes Designer Series Door Details Interior Application

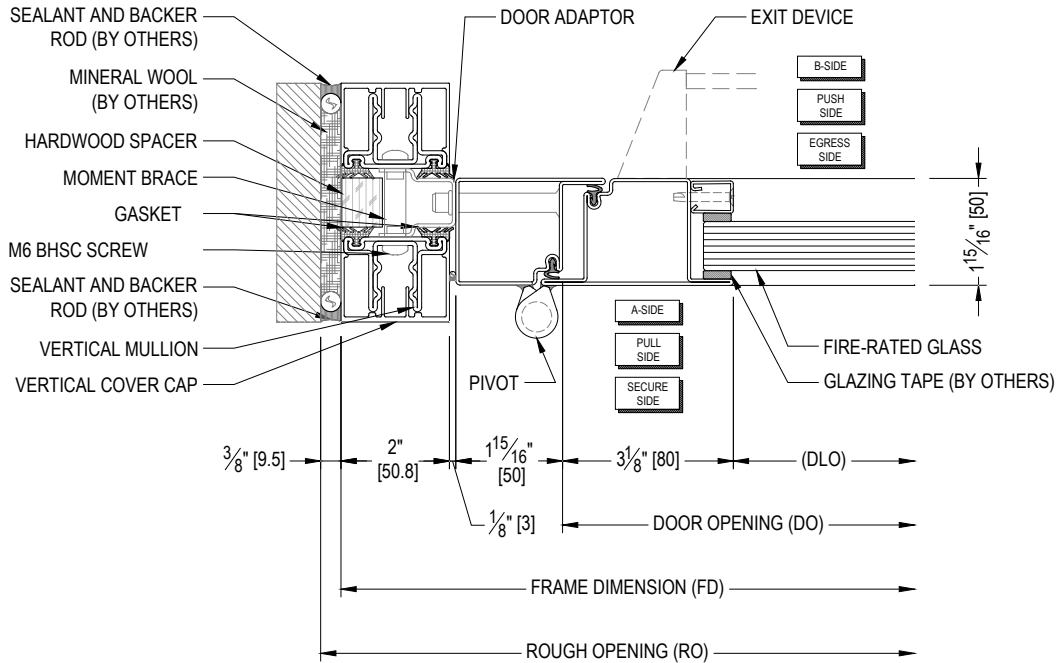


16 DOOR HEADER, HORIZONTAL MID RAIL, AND BOTTOM RAIL
DESIGNER SERIES FRAME

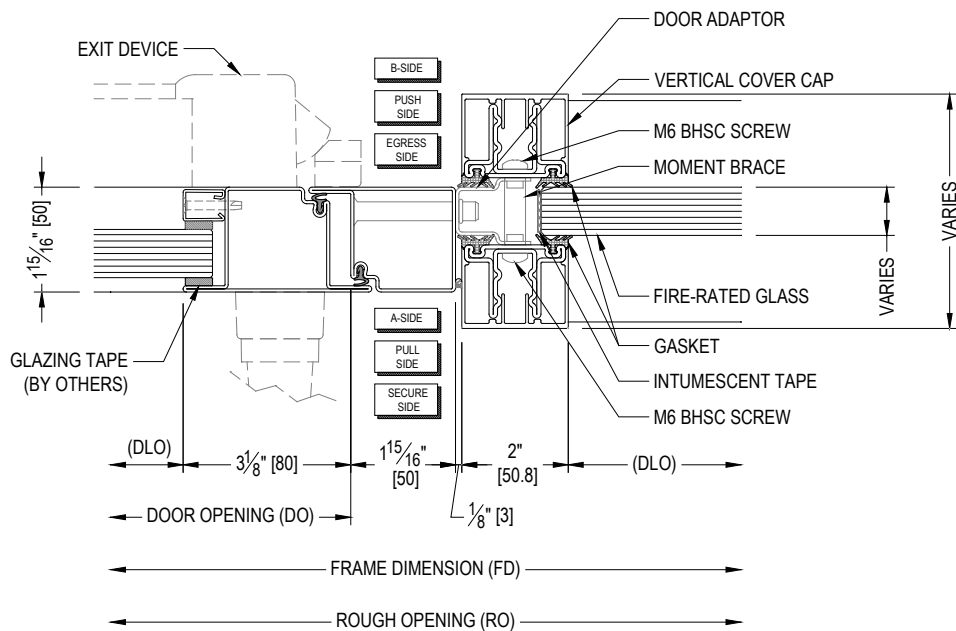
60 and 120 Minute – Fireframes Designer Series Door Details Interior Application



60 and 120 Minute – Fireframes Designer Series Door Details Interior Application

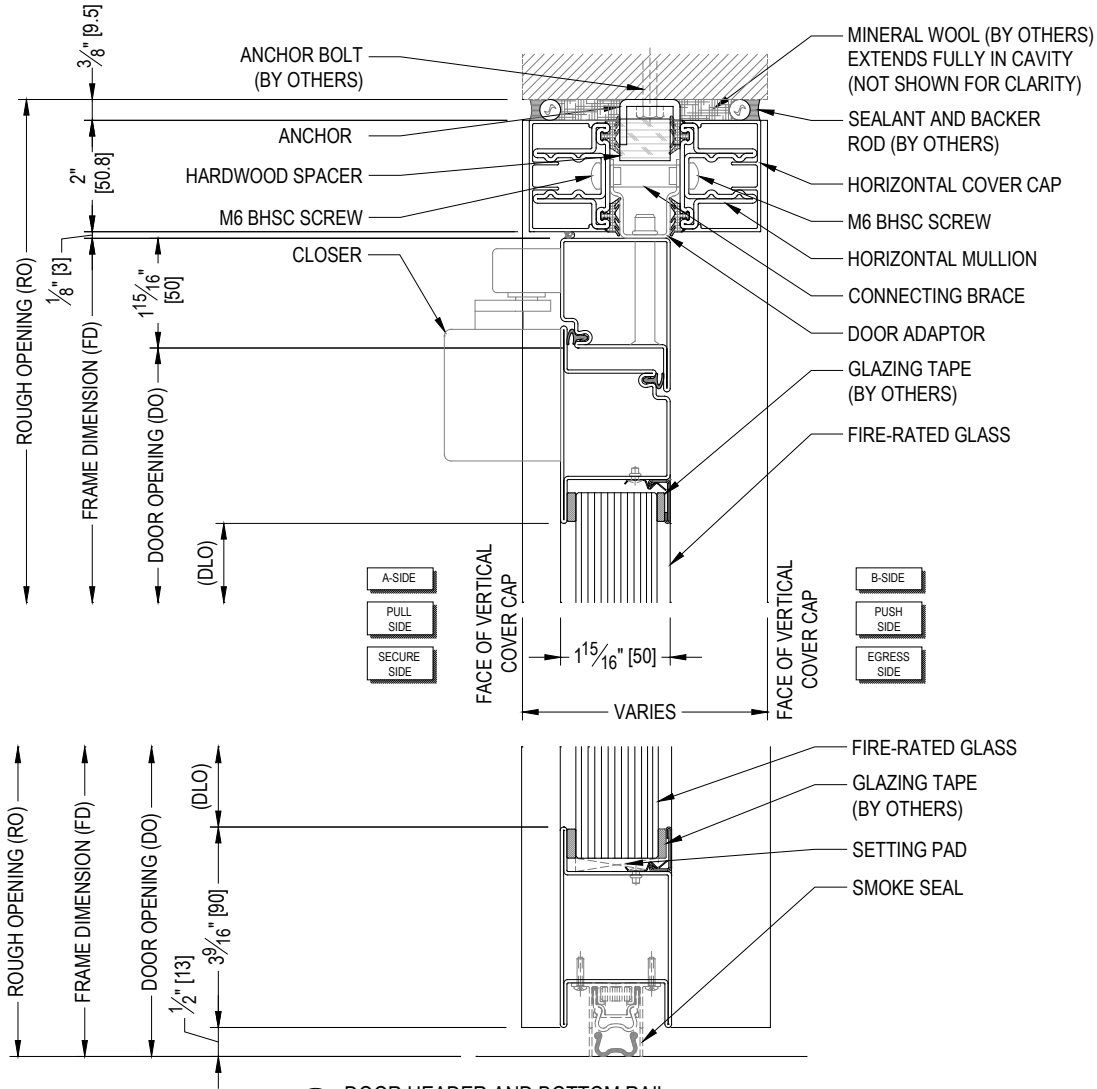


18 VERTICAL MULLION WITH OUTSWING DOOR AT PIVOT JAMB
DESIGNER SERIES FRAME



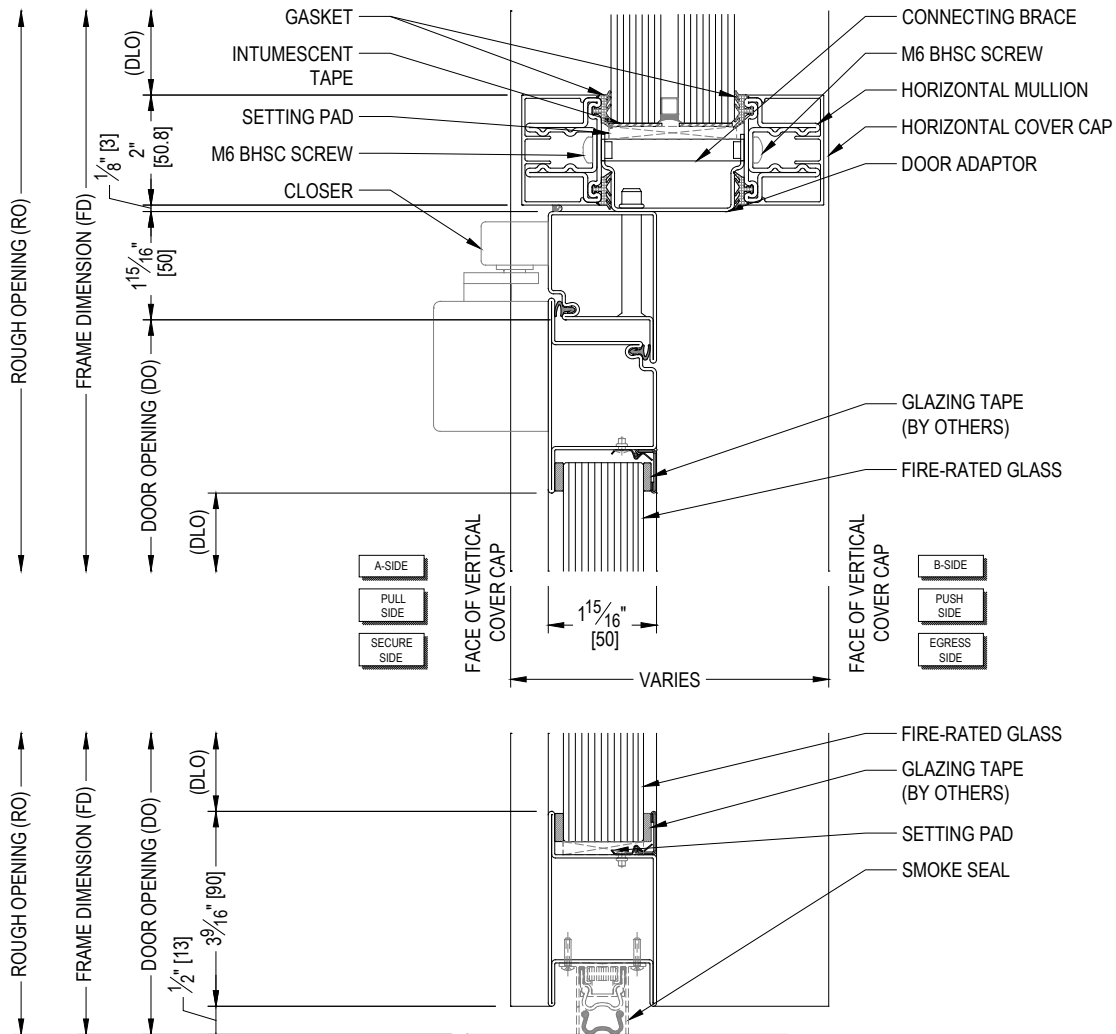
19 VERTICAL MULLION WITH OUTSWING DOOR AT LOCKING JAMB
DESIGNER SERIES FRAME

60 and 120 Minute – Fireframes Designer Series Door Details Interior Application



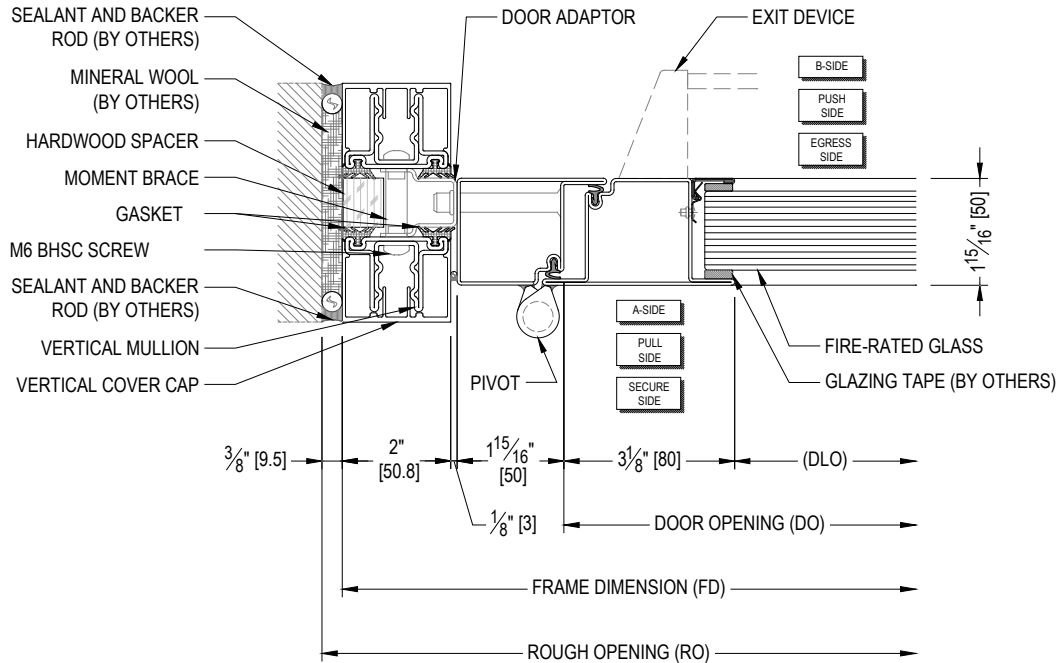
20 DOOR HEADER AND BOTTOM RAIL
DESIGNER SERIES FRAME (TEMPERATURE RISE)

60 and 120 Minute – Fireframes Designer Series Door Details Interior Application

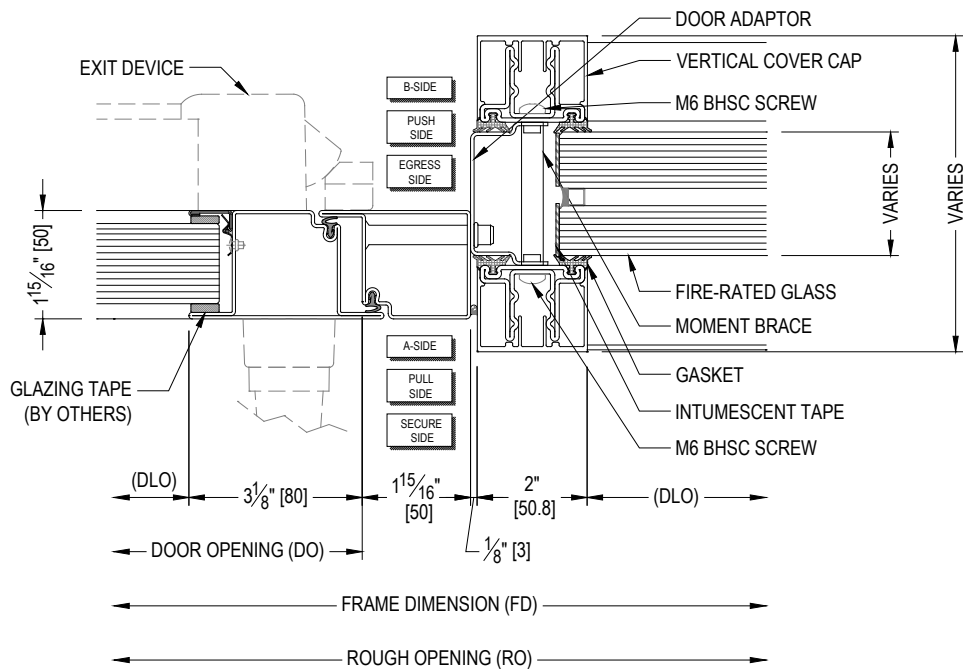


21 DOOR HEADER WITH TRANSOM, DOOR MID RAIL, AND BOTTOM RAIL
DESIGNER SERIES FRAME (TEMPERATURE RISE)

60 and 120 Minute – Fireframes Designer Series Door Details Interior Application

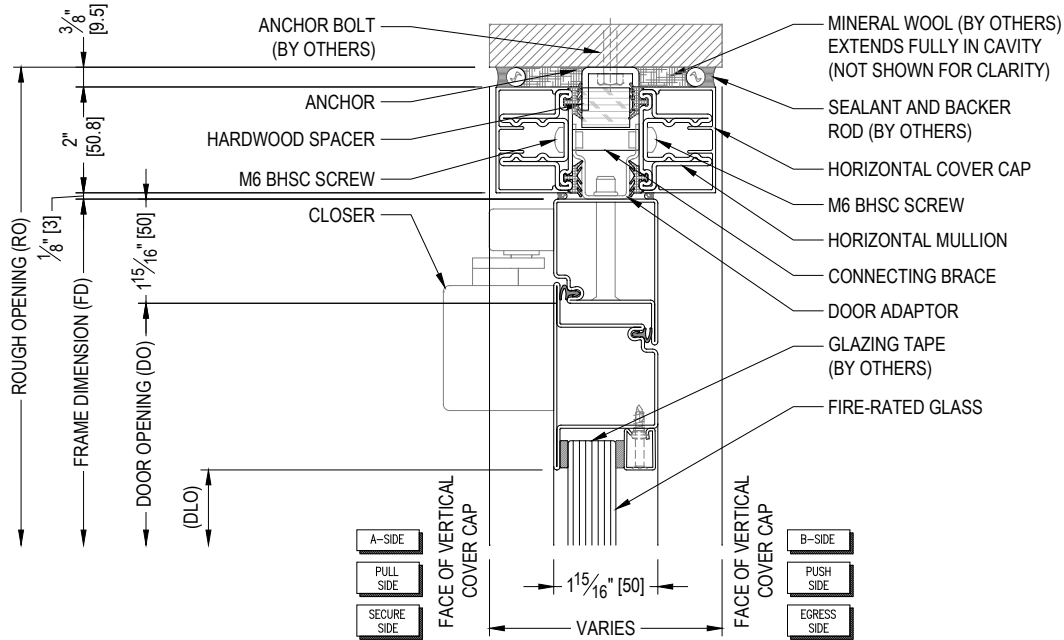


22 VERTICAL MULLION WITH OUTSWING DOOR AT PIVOT JAMB
DESIGNER SERIES FRAME (TEMPERATURE RISE)

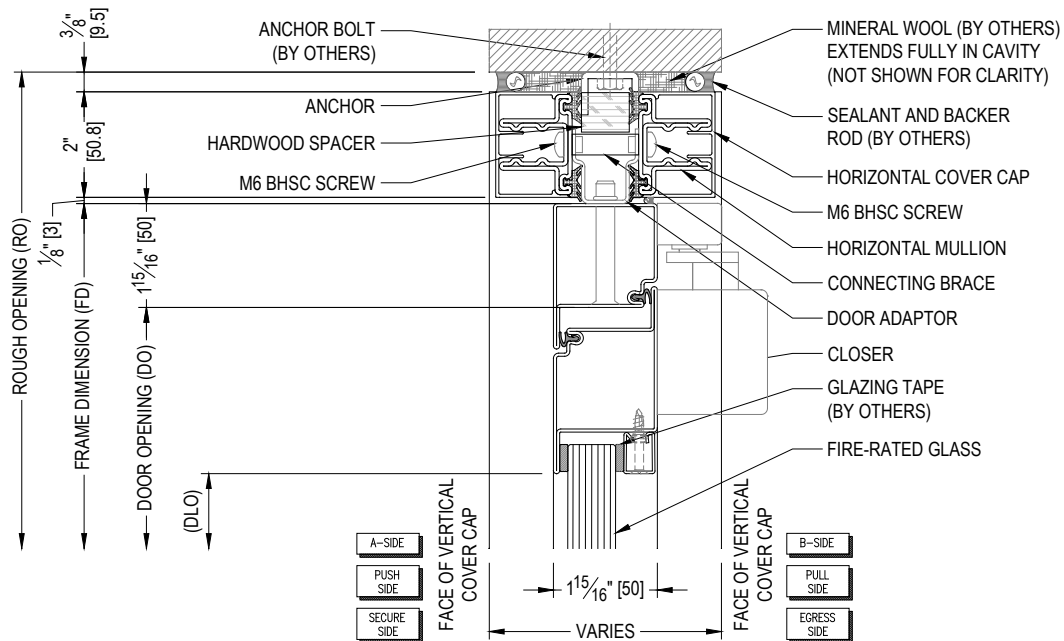


23 VERTICAL MULLION WITH OUTSWING DOOR AT LOCKING JAMB
DESIGNER SERIES FRAME (TEMPERATURE RISE)

60 and 120 Minute – Fireframes Designer Series Door Details Interior Application

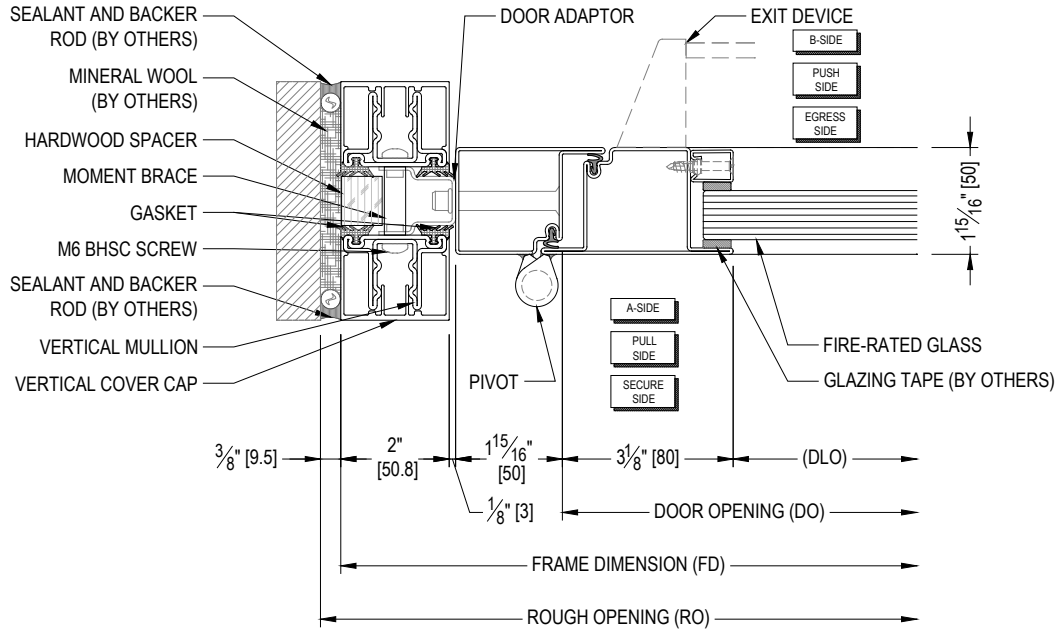


24 DOUBLE EGRESS DOOR HEADER
DESIGNER SERIES FRAME

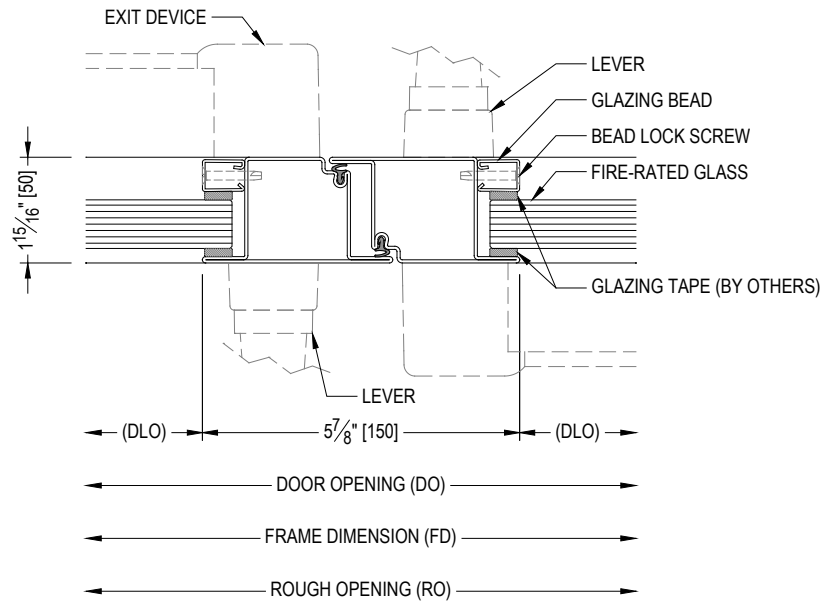


25 DOUBLE EGRESS DOOR HEADER
DESIGNER SERIES FRAME

60 and 120 Minute – Fireframes Designer Series Door Details Interior Application

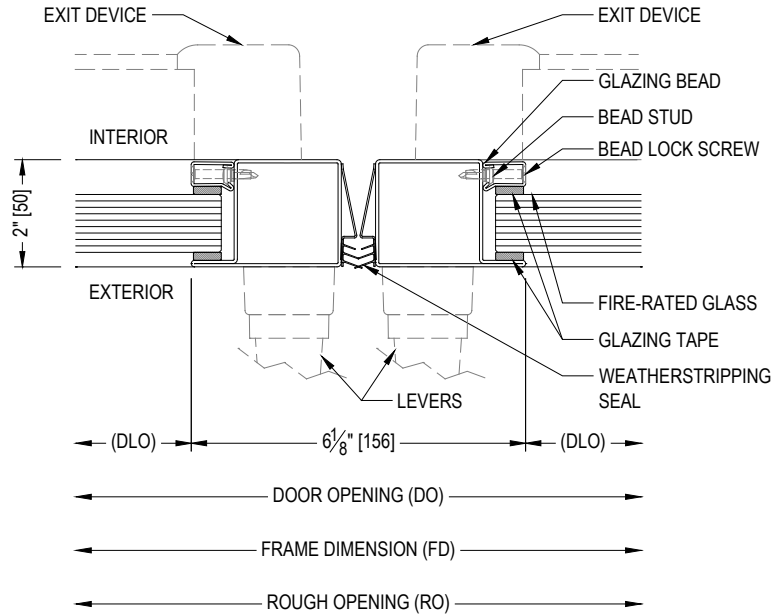


26 VERTICAL MULLION WITH OUTSWING DOUBLE EGRESS DOOR AT PIVOT JAMB
DESIGNER SERIES FRAME

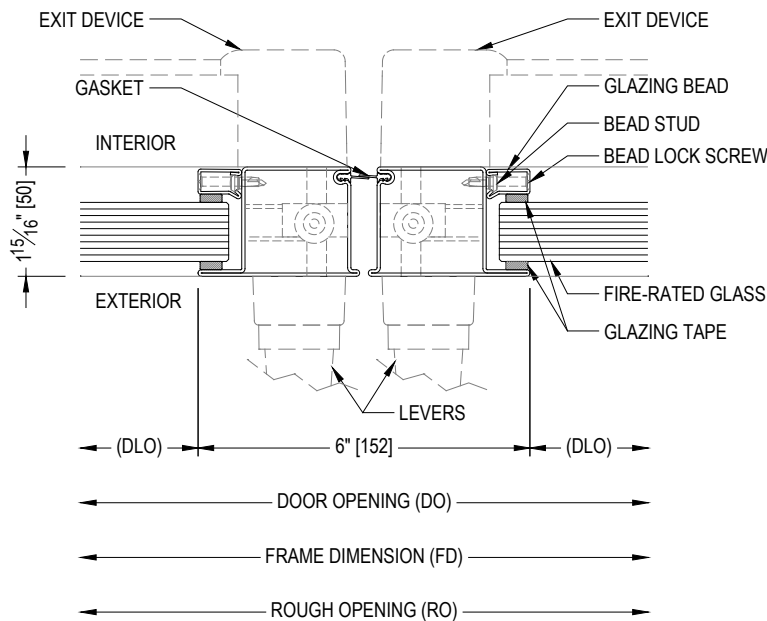


27 DOUBLE EGRESS MEETING STILE
DESIGNER SERIES FRAME

60 and 120 Minute – Fireframes Designer Series Door Details Interior and Exterior Application

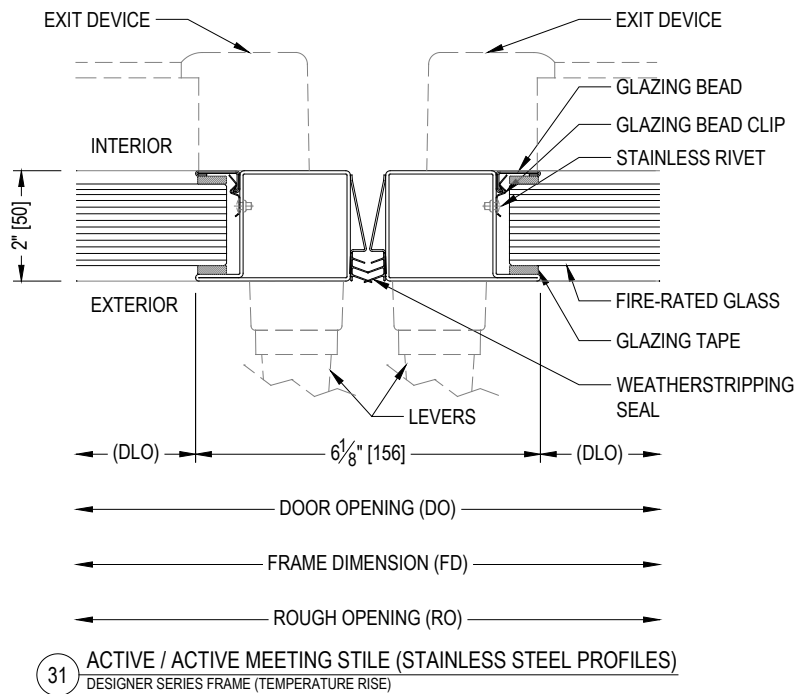
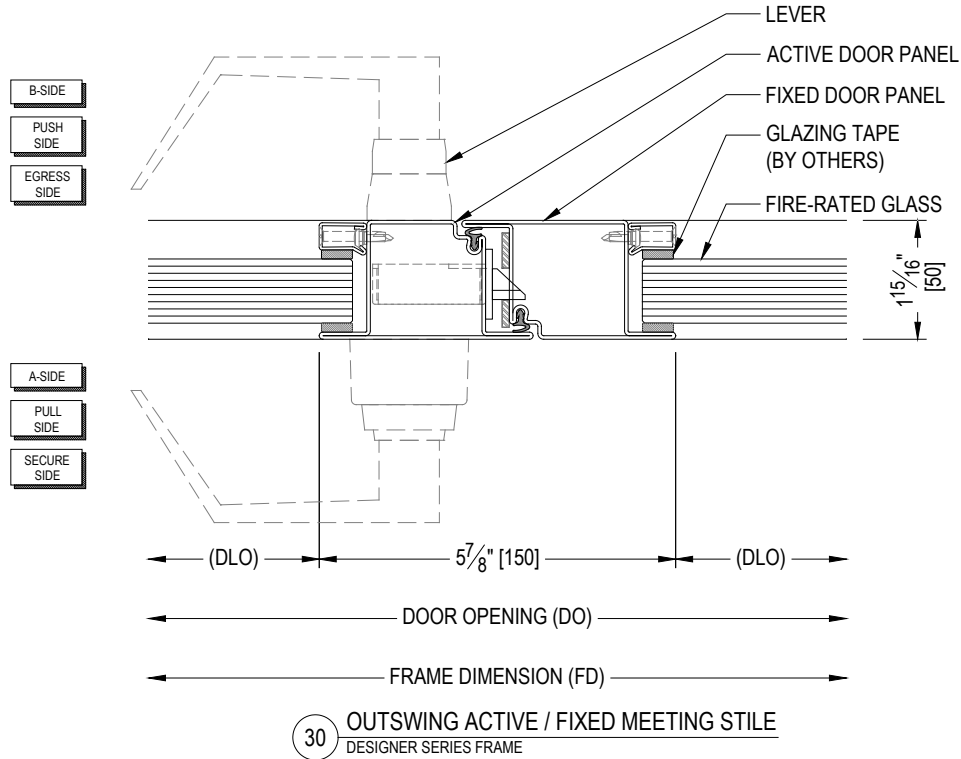


28 ACTIVE / ACTIVE MEETING STILE (STAINLESS STEEL PROFILES)
DESIGNER SERIES FRAME

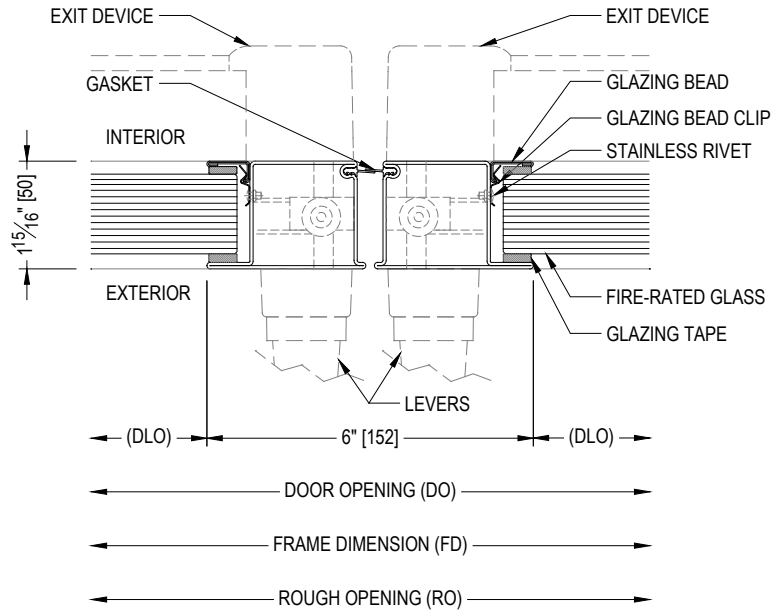


29 ACTIVE / ACTIVE MEETING STILE (STEEL PROFILES)
DESIGNER SERIES FRAME

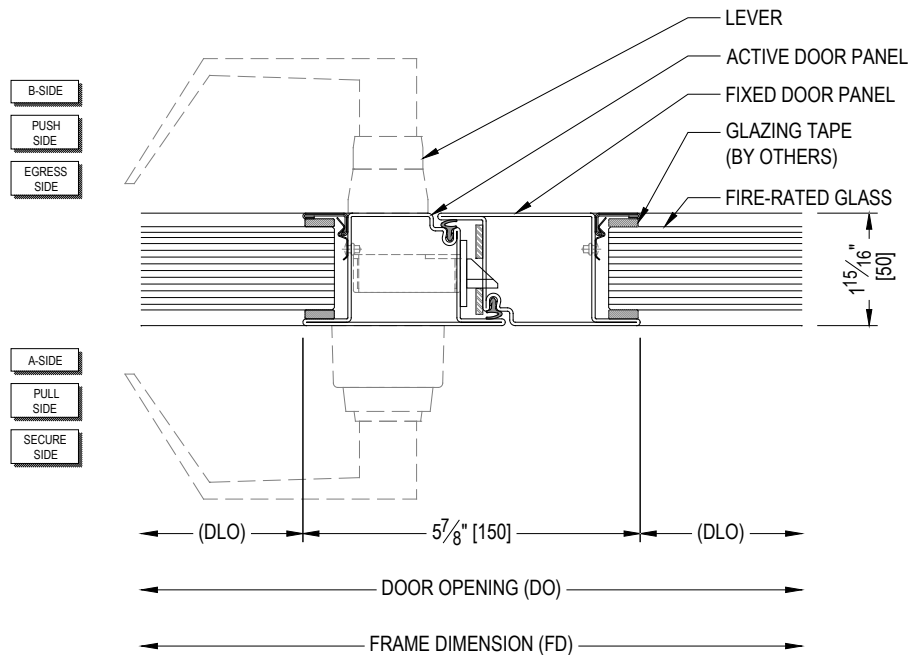
60 and 120 Minute – Fireframes Designer Series Door Details Interior and Exterior Application



60 and 120 Minute – Fireframes Designer Series Door Details Interior and Exterior Application

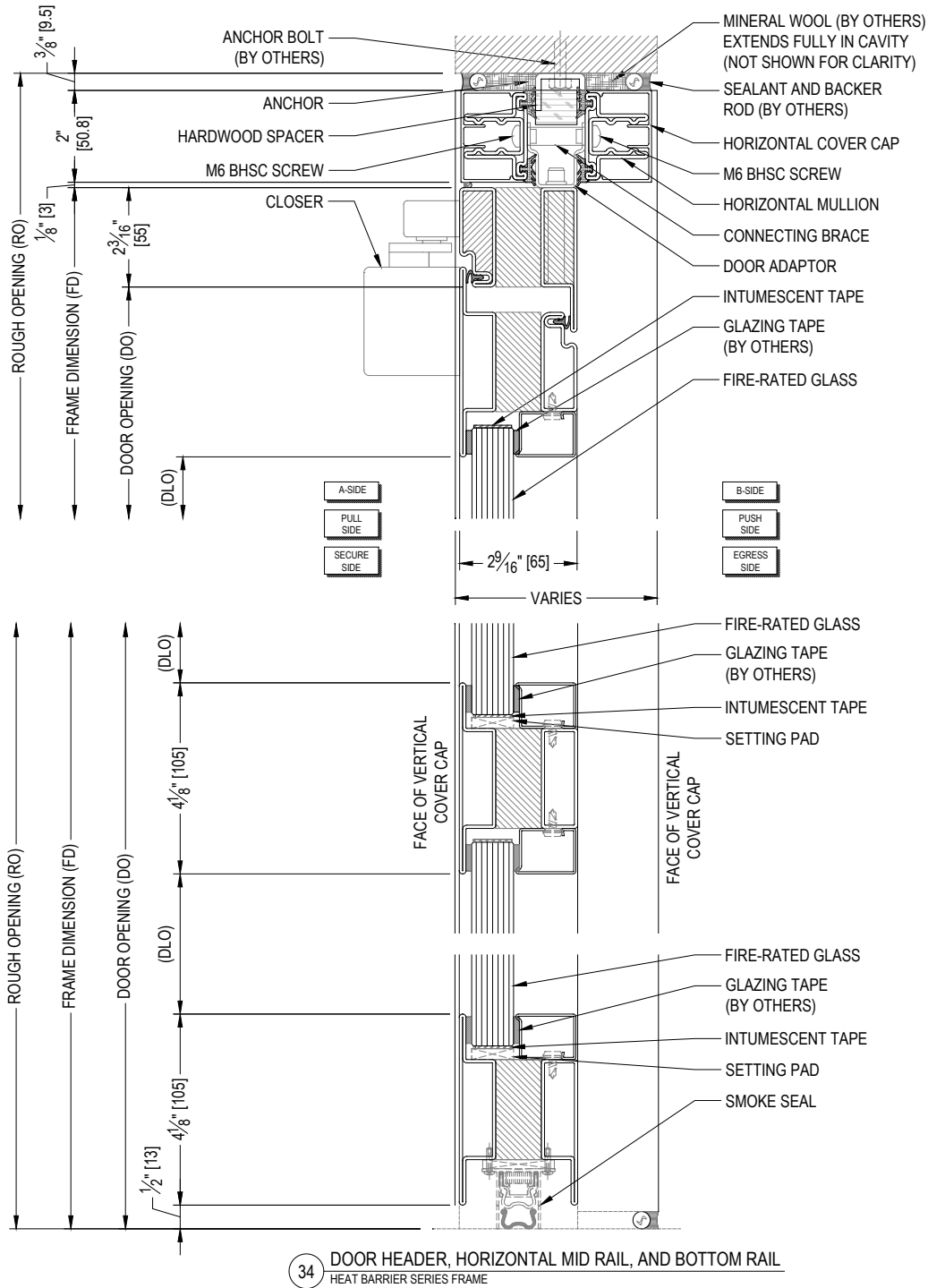


32 ACTIVE / ACTIVE MEETING STILE (STEEL PROFILES)
DESIGNER SERIES FRAME (TEMPERATURE RISE)



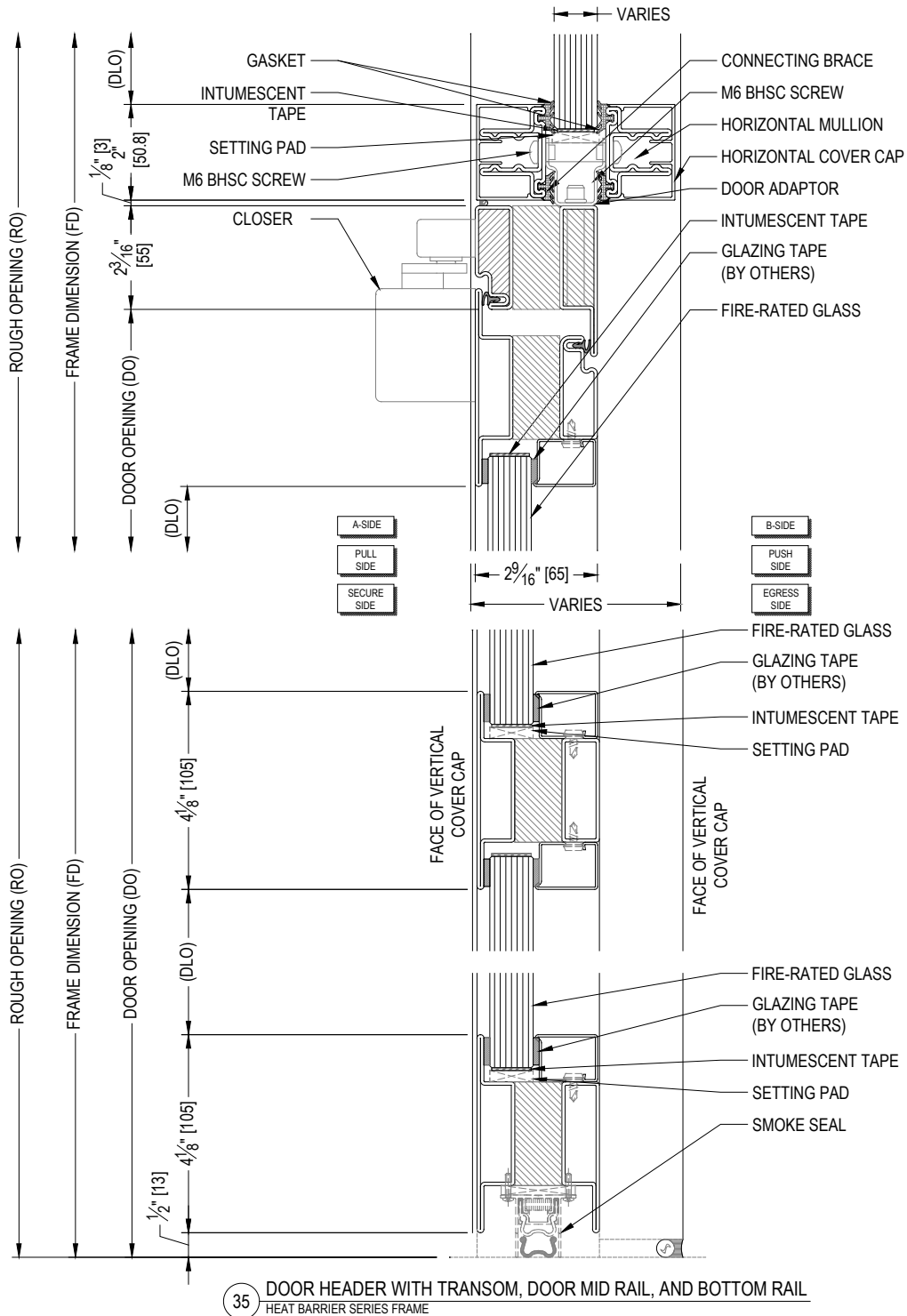
33 OUTSWING ACTIVE / FIXED MEETING STILE
DESIGNER SERIES FRAME (TEMPERATURE RISE)

60 and 120 Minute – Fireframes Heat Barrier Series Door Details Interior Application



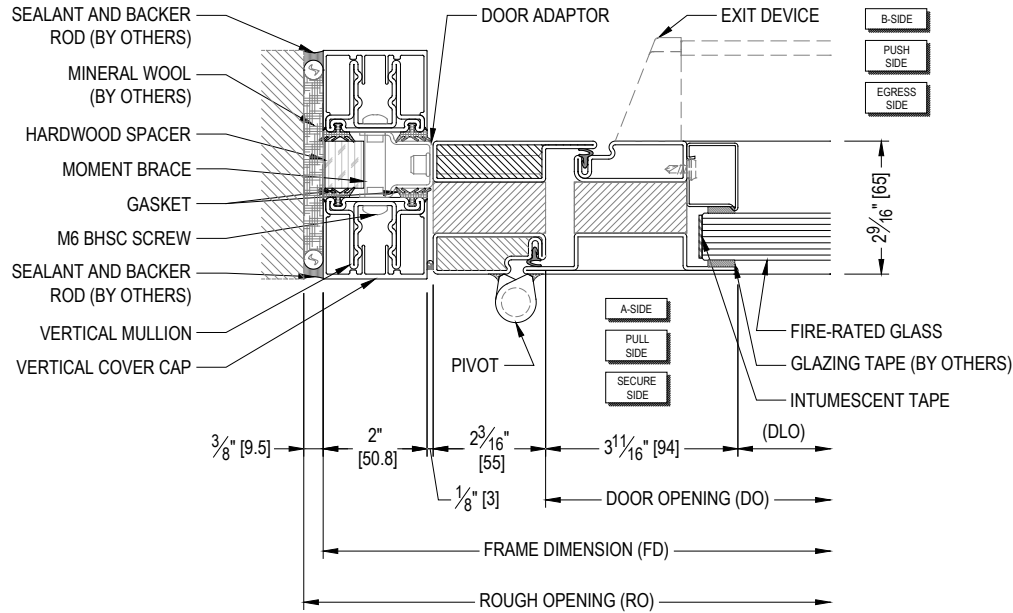
NOTE: 1. 60 minute fire rating shown in the details above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.
2. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

60 and 120 Minute – Fireframes Heat Barrier Series Door Details Interior Application

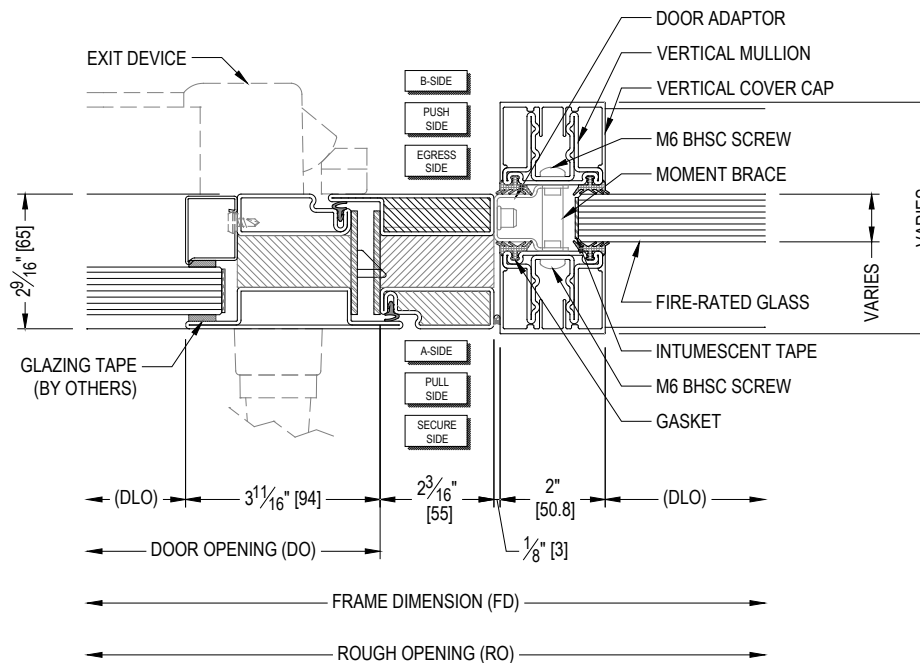


NOTE: 1. 60 minute fire rating shown in the details above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.
2. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

60 and 120 Minute – Fireframes Heat Barrier Series Door Details Interior Application



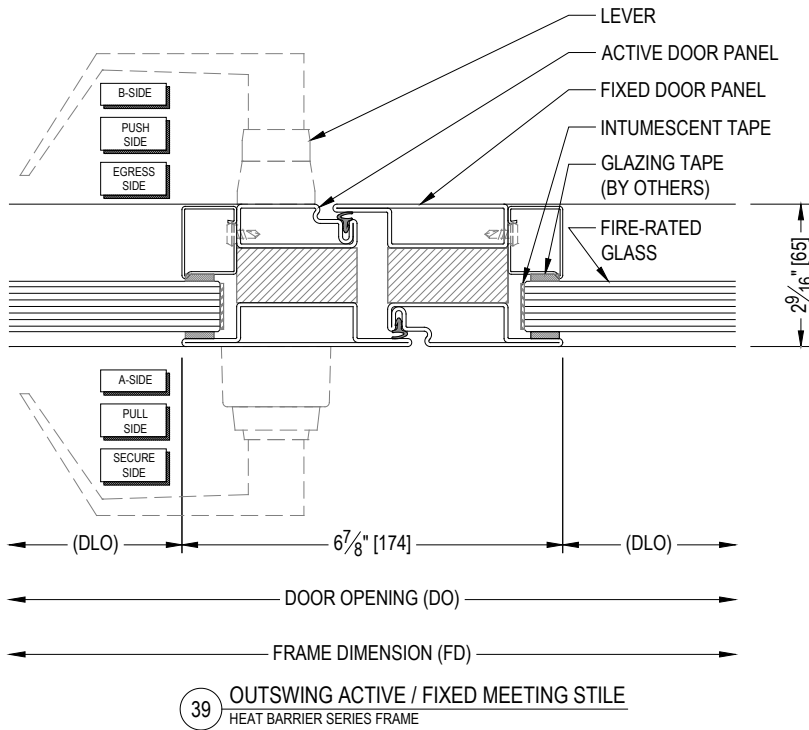
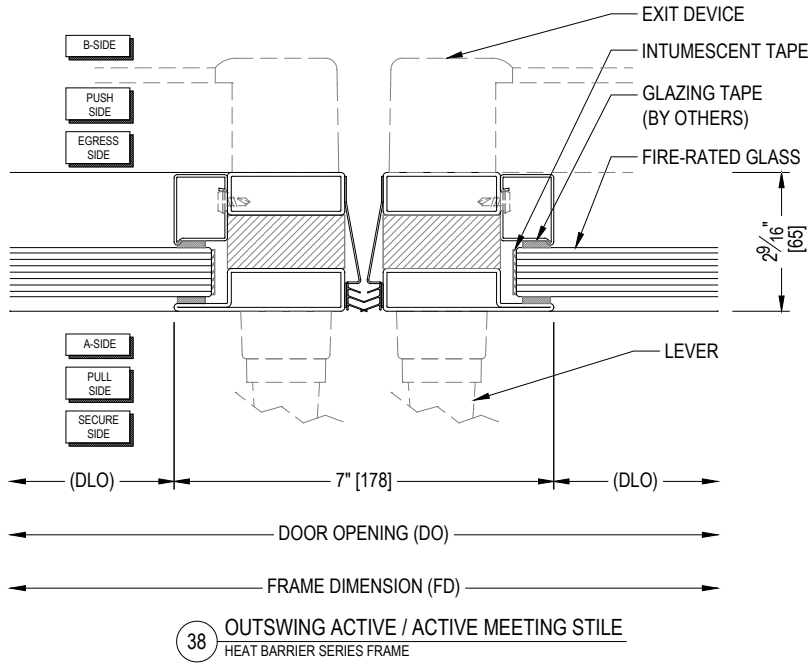
36 VERTICAL MULLION WITH OUTSWING DOOR AT PIVOT JAMB
HEAT BARRIER SERIES FRAME



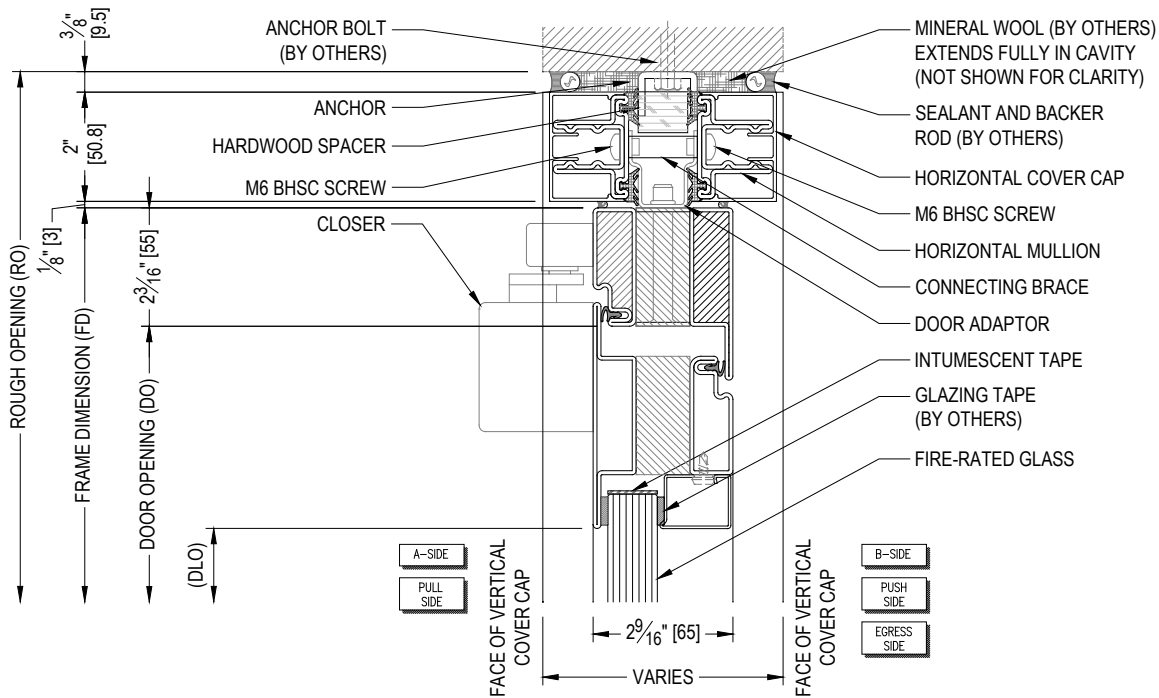
37 VERTICAL MULLION WITH OUTSWING DOOR AT LOCKING JAMB
HEAT BARRIER SERIES FRAME

NOTE: 1. 60 minute fire rating shown in the details above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.
2. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

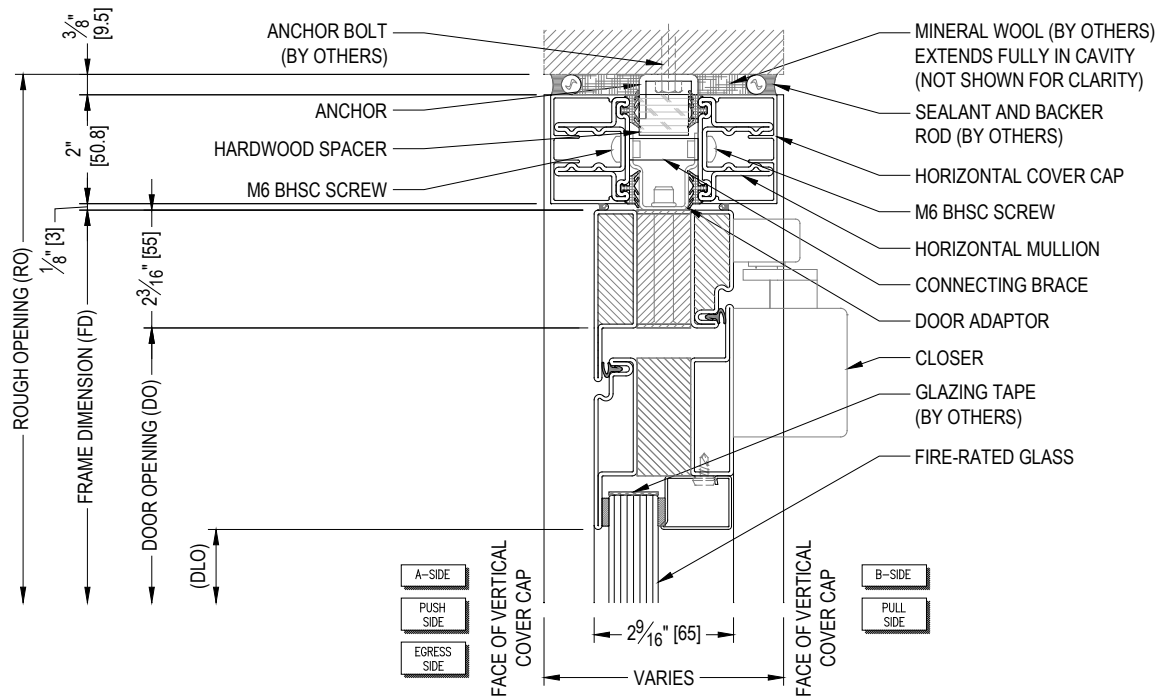
60 and 120 Minute – Fireframes Heat Barrier Series Door Details Interior and Exterior Application



60 and 120 Minute – Fireframes Heat Barrier Series Door Details Interior Application

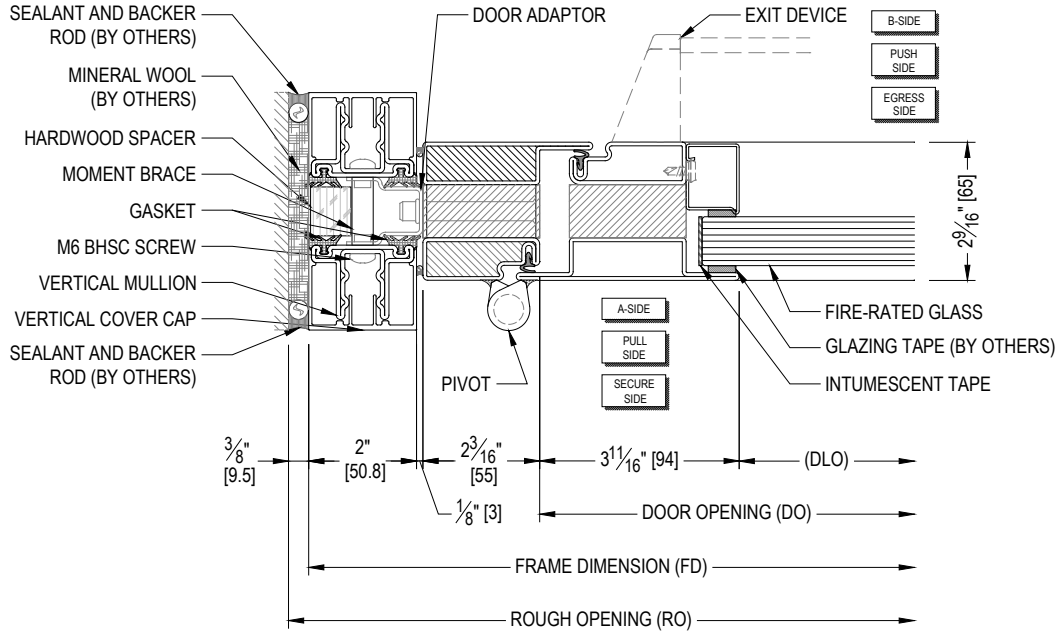


40 HORIZONTAL MULLION WITH HBS DOUBLE EGRESS DOOR
HEAT BARRIER SERIES FRAME

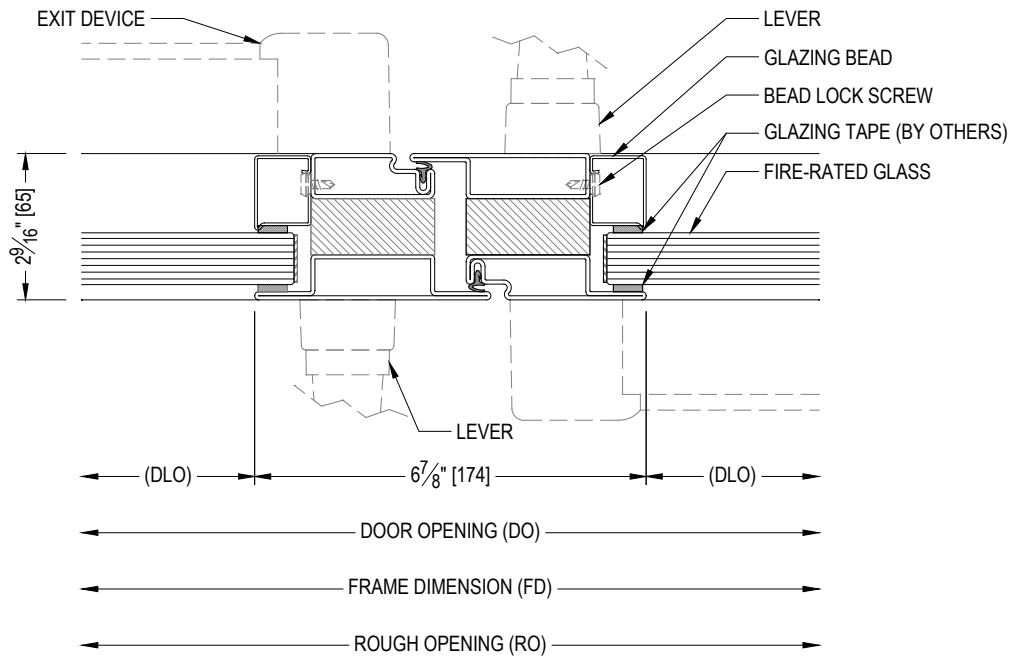


41 HORIZONTAL MULLION WITH HBS DOUBLE EGRESS DOOR
HEAT BARRIER SERIES FRAME

60 and 120 Minute – Fireframes Heat Barrier Series Door Details Interior Application

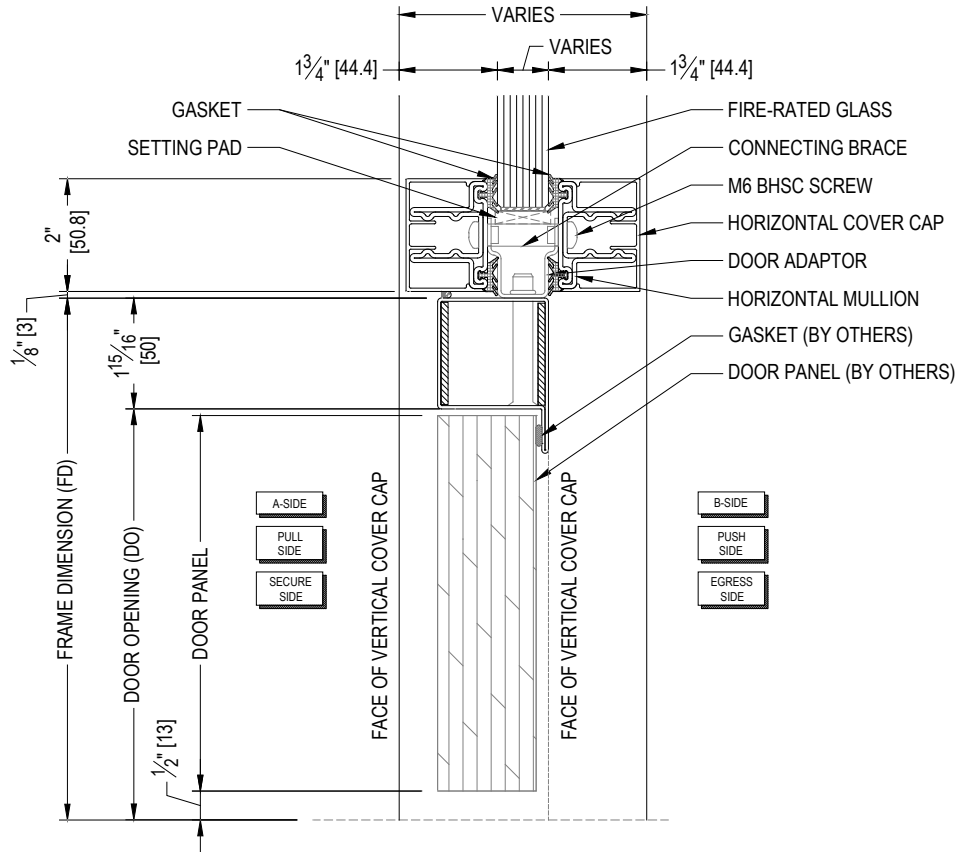


42 VERTICAL MULLION WITH OUTSWING DOUBLE EGRESS DOOR AT PIVOT JAMB
HEAT BARRIER SERIES FRAME



43 DOUBLE EGRESS MEETING STILE
HEAT BARRIER SERIES FRAME

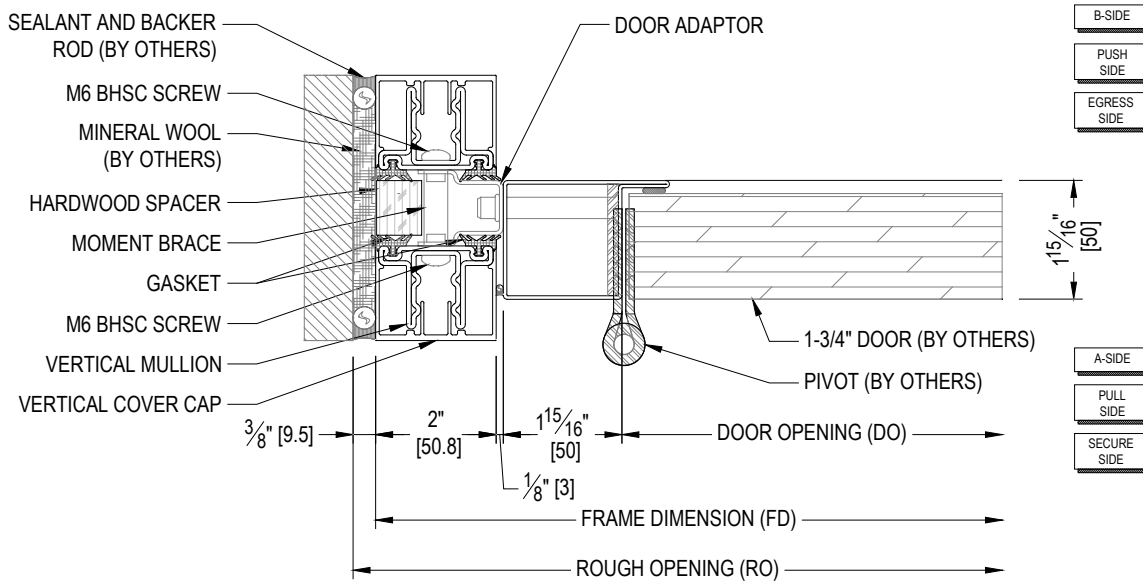
60 and 120 Minute – Fireframes Designer Series Frame with Door By Others Interior Application



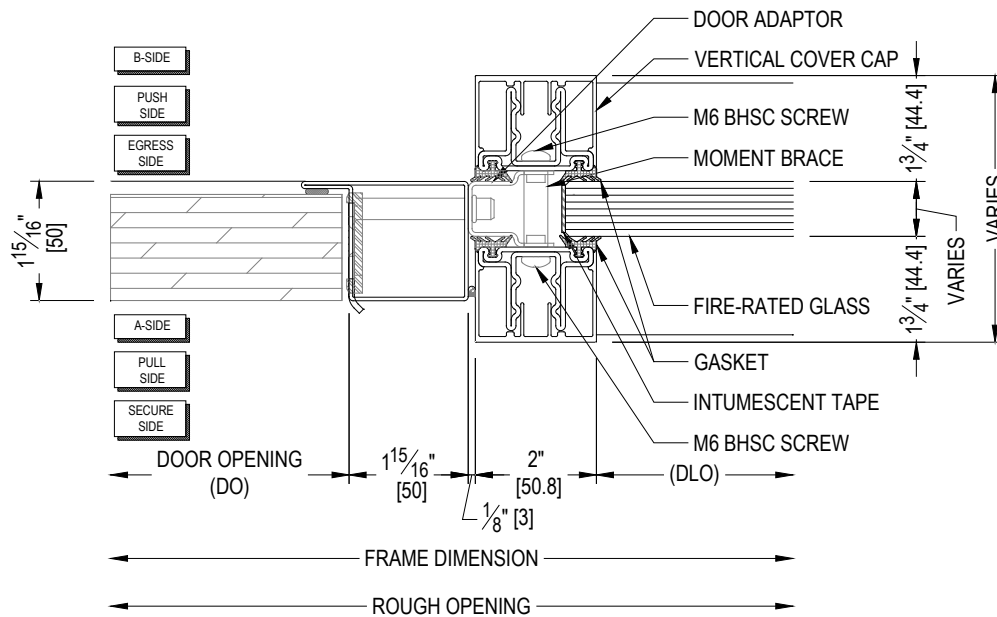
44 OUTSWING DOOR HEADER WITH TRANSOM
DESIGNER SERIES FRAME

NOTE: 1. 60 minute fire rating shown in the details above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.
2. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

60 and 120 Minute – Fireframes Designer Series Frame with Door By Others Interior Application



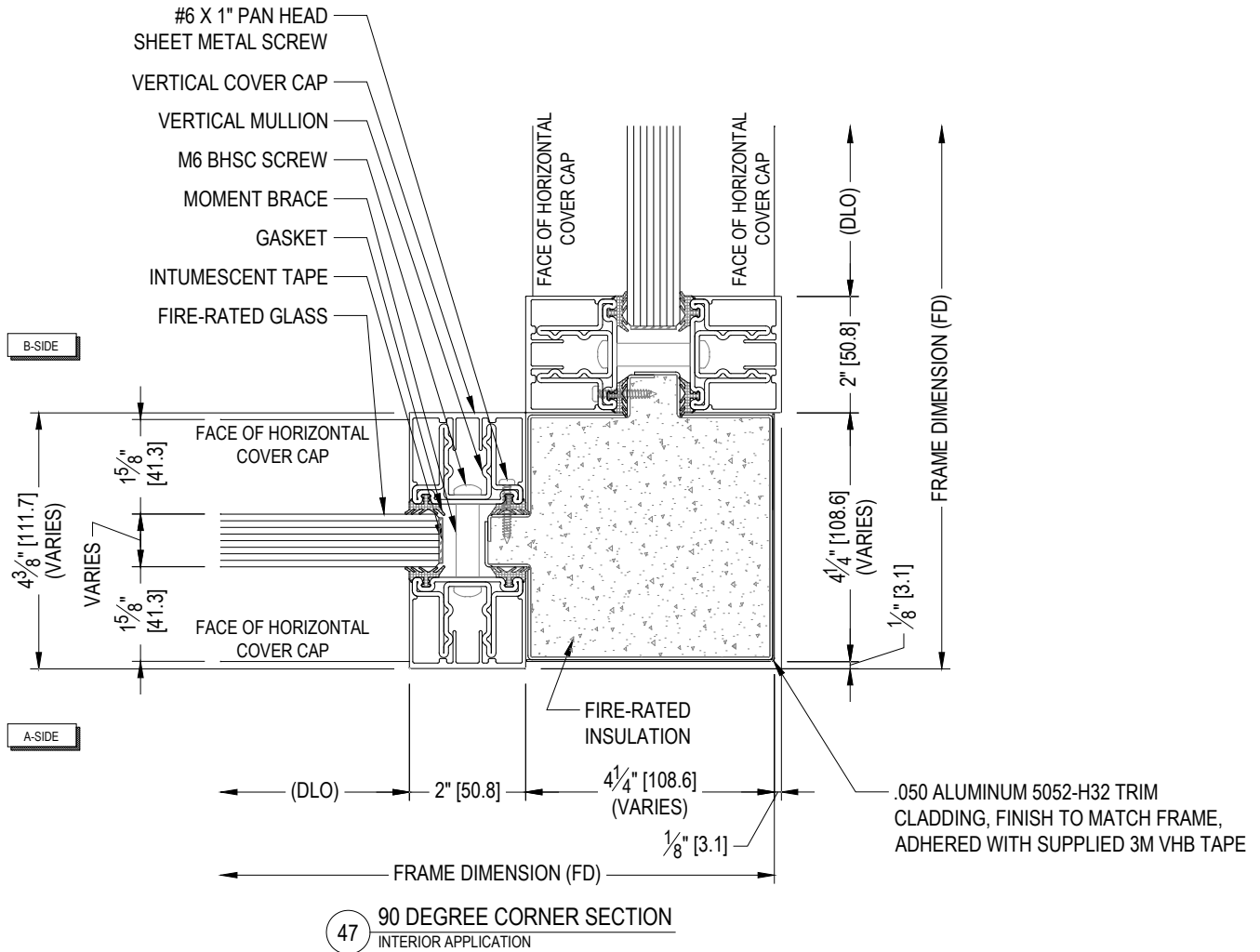
45 VERTICAL MULLION WITH OUTSWING DOOR BY OTHERS AT PIVOT JAMB
DESIGNER SERIES FRAME



46 VERTICAL MULLION WITH OUTSWING DOOR BY OTHERS AT LOCKING JAMB
DESIGNER SERIES FRAME

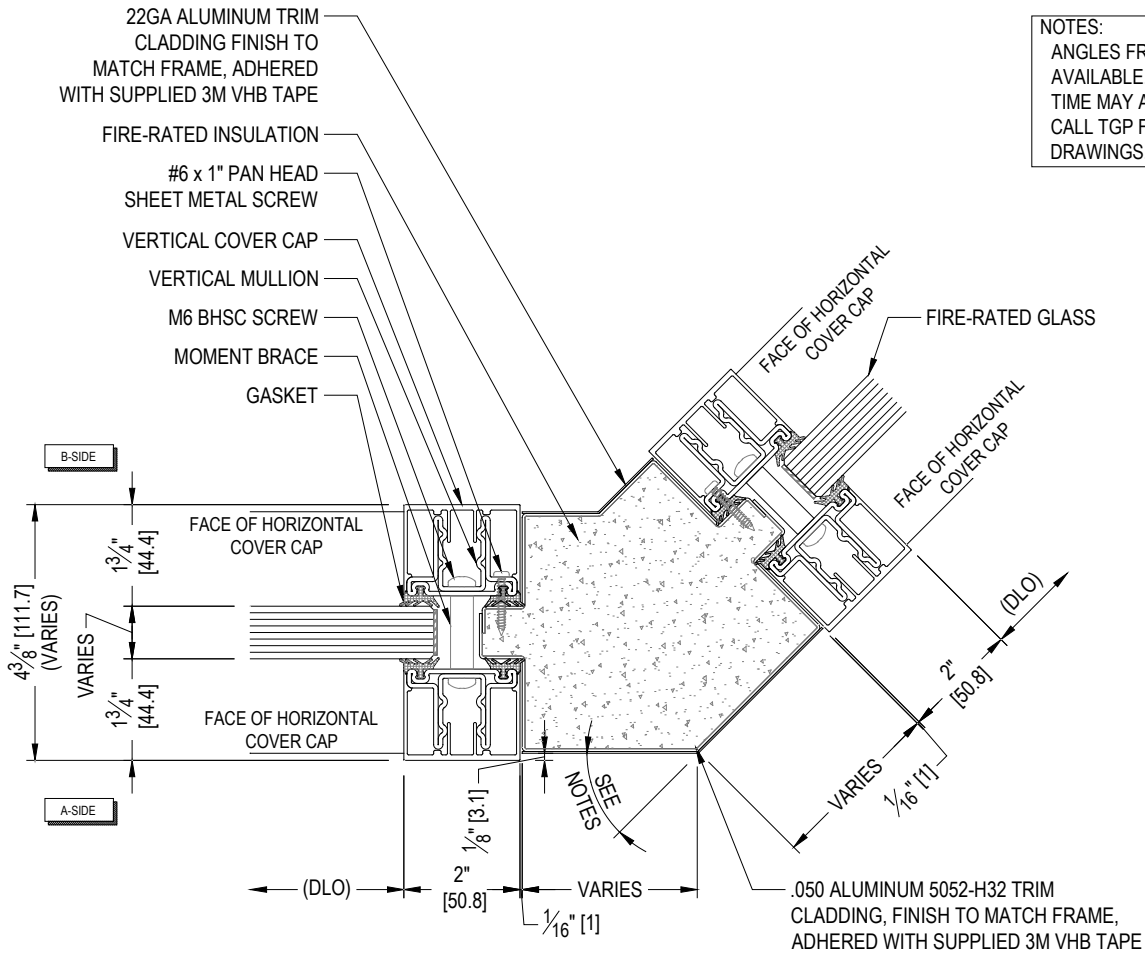
NOTE: 1. 60 minute fire rating shown in the details above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.
2. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

60 and 120 Minute – Corner Detail
Interior Application



NOTE: 1. 60 minute fire rating shown in the detail above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.

60 and 120 Minute – Corner Detail Interior Application

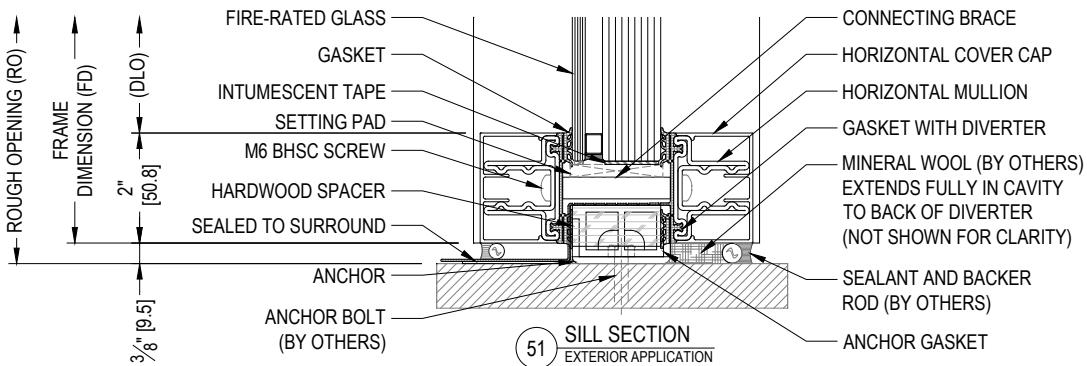
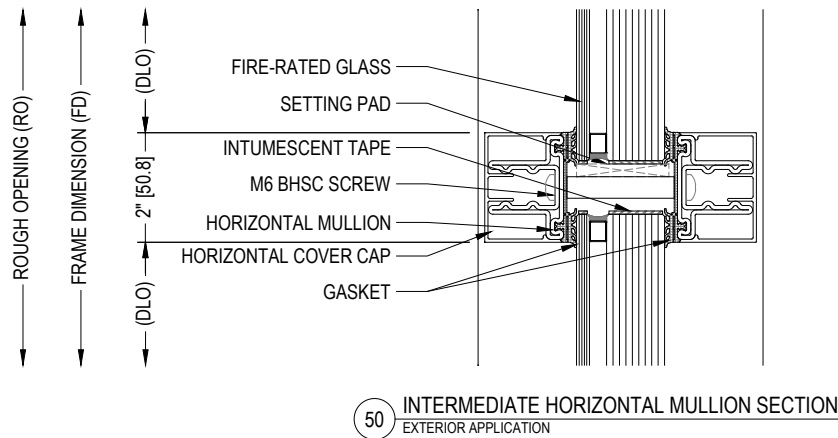
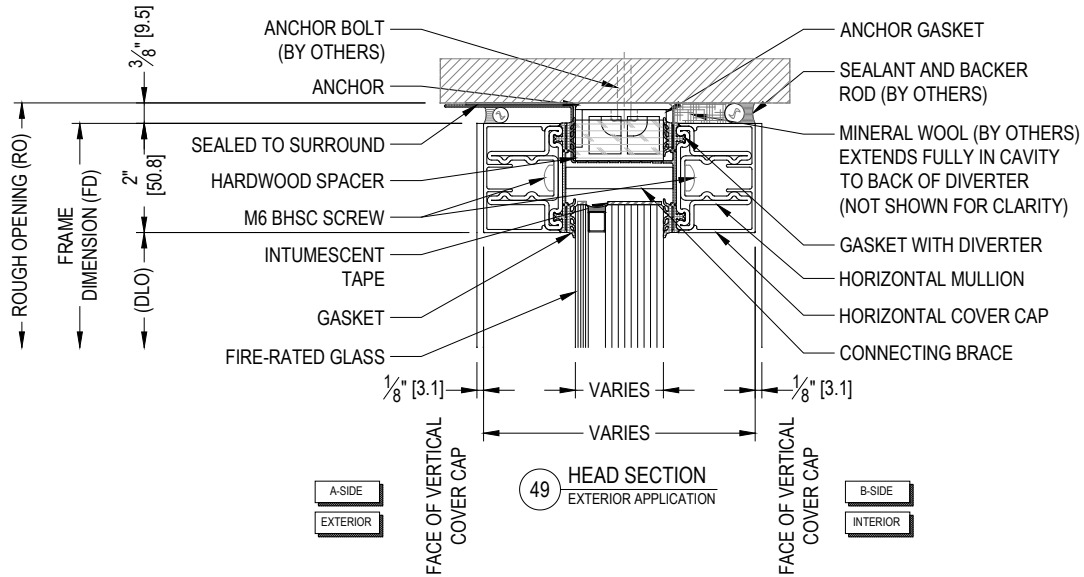


NOTES:
ANGLES FROM 10° TO 135° ARE
AVAILABLE. ADDITIONAL LEAD
TIME MAY APPLY.
CALL TGP FOR DETAILS
DRAWINGS.

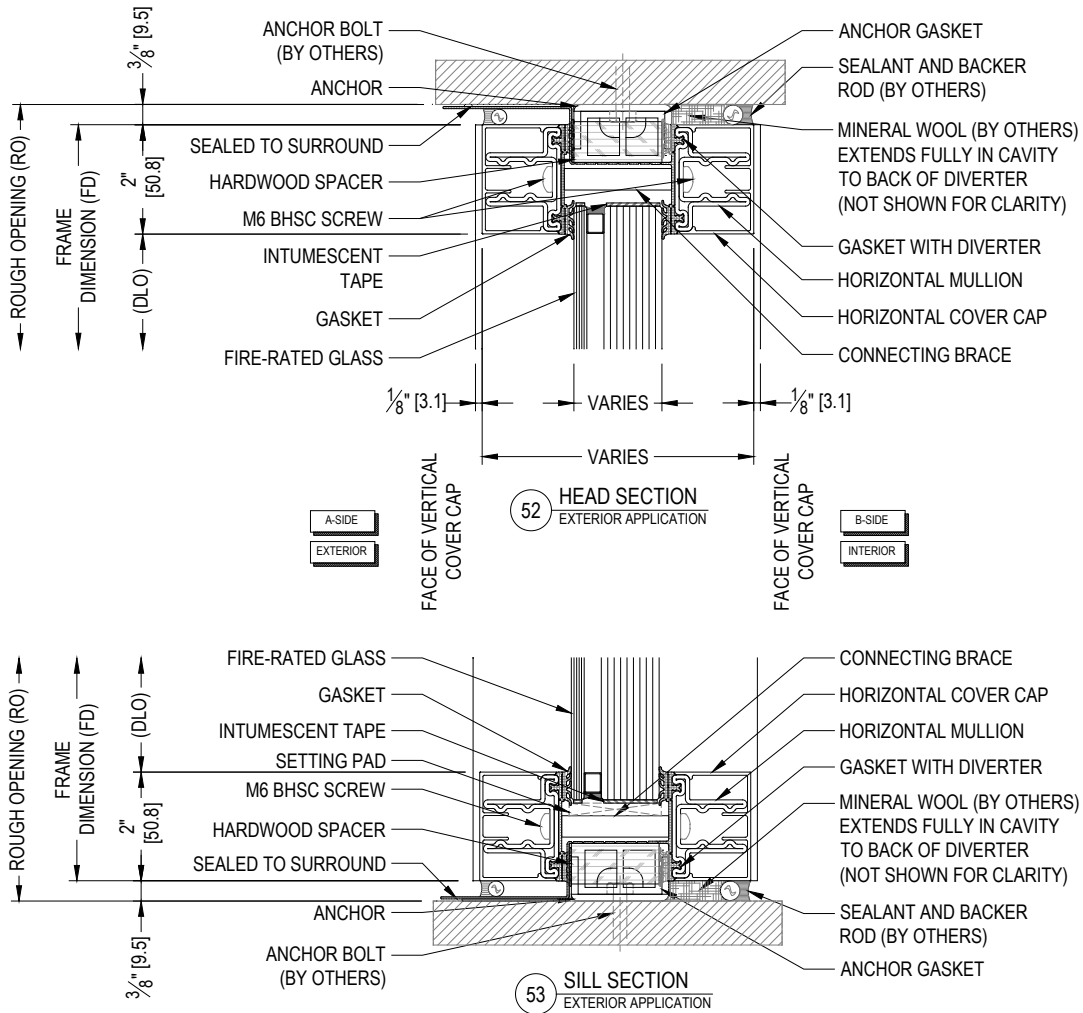
48 VARIABLE DEGREE CORNER SECTION
INTERIOR APPLICATION

NOTE: 1. 60 minute fire rating shown in the detail above. 120 minute fire rating will have IGU glass; see Glazing Specifications section.

60 and 120 Minute – Window Details Exterior Application

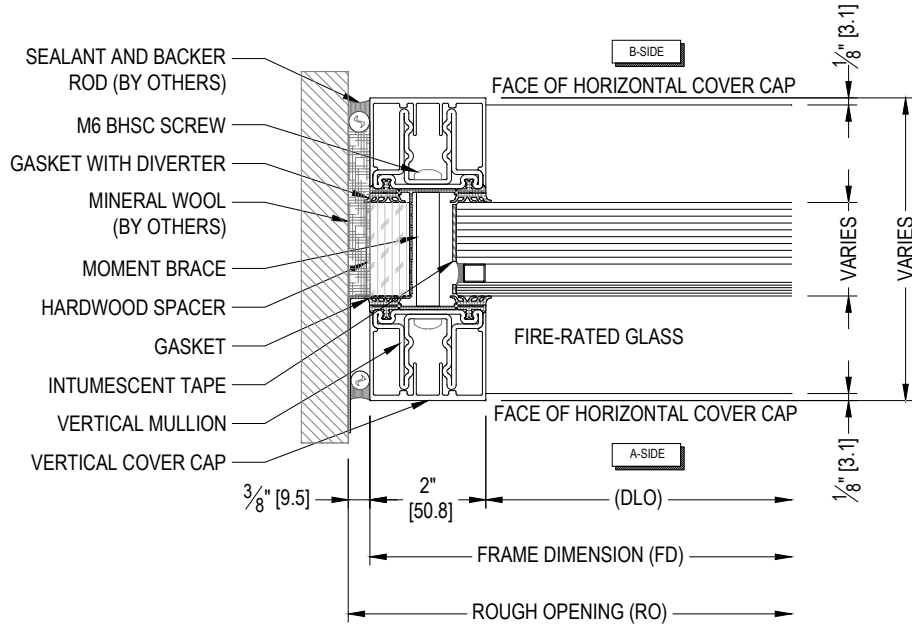


60 and 120 Minute – Window Details Exterior Application

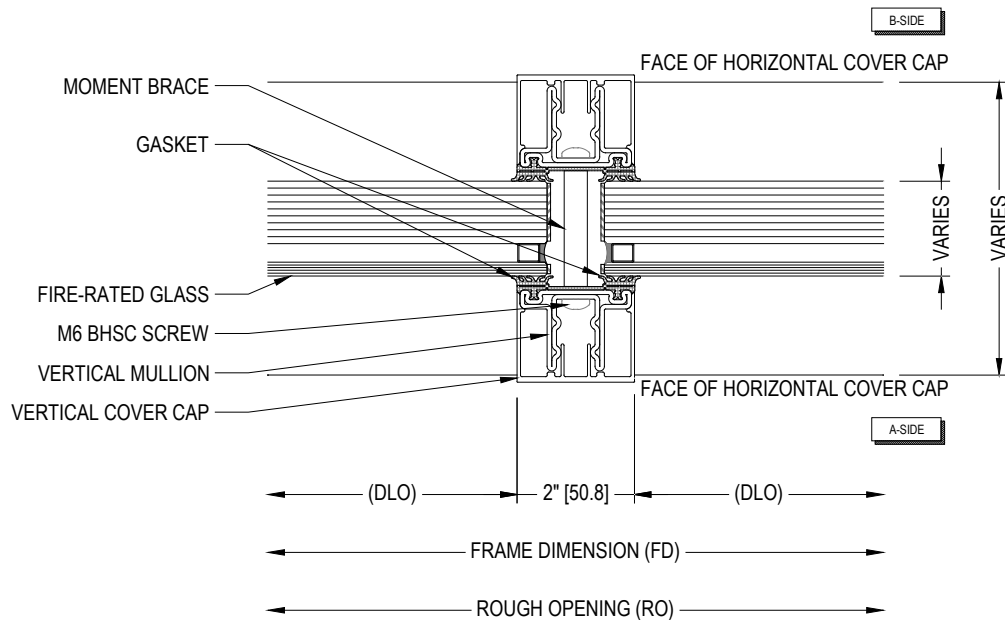


NOTE: 1. The anchors are flush with the notched portions of the gasket with diverter.

60 and 120 Minute – Window Details Exterior Application

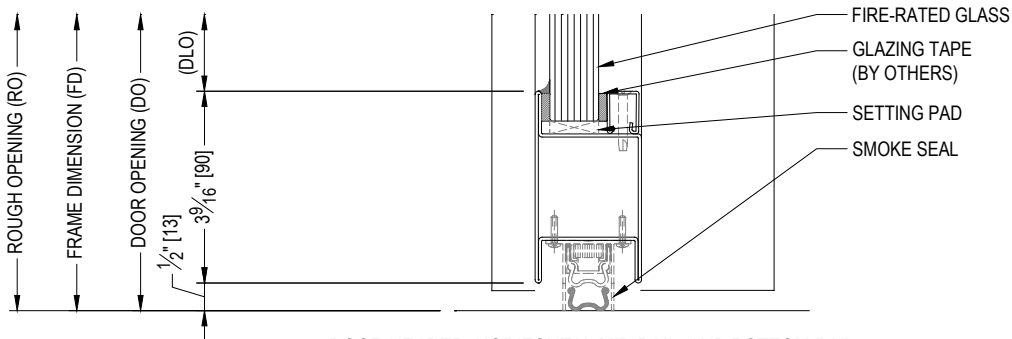
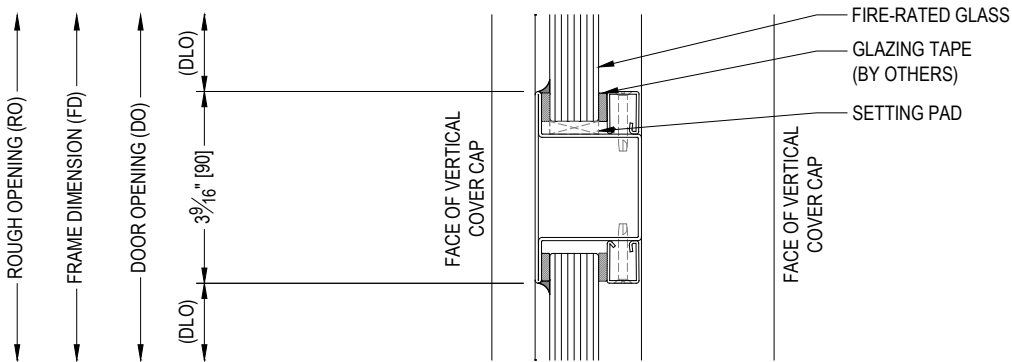
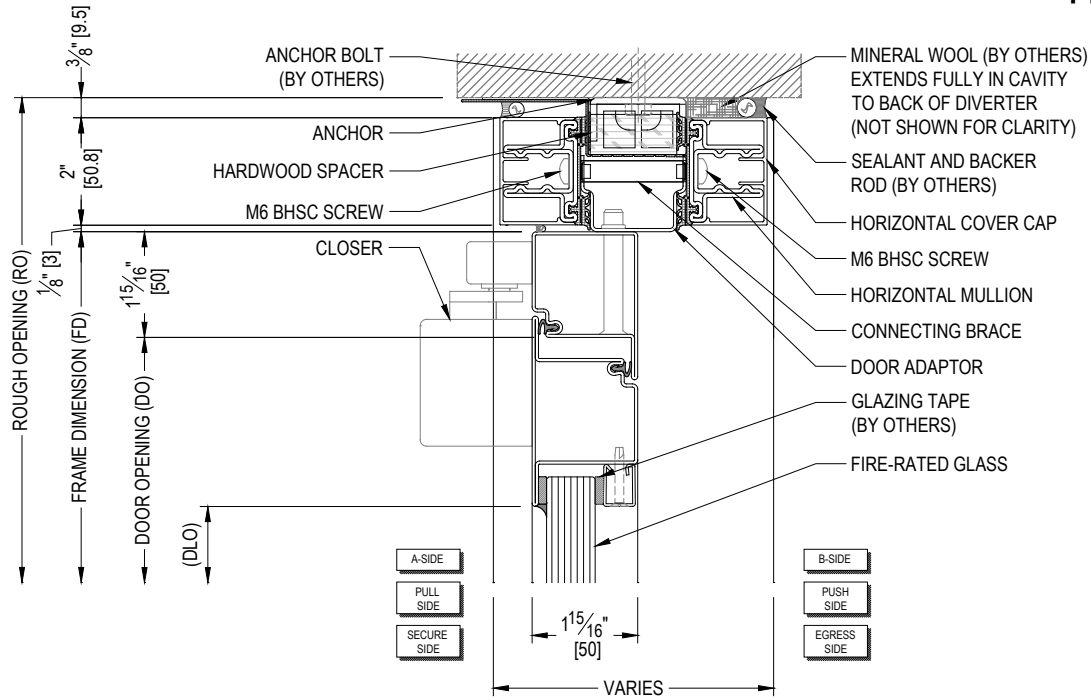


54 JAMB SECTION
EXTERIOR APPLICATION



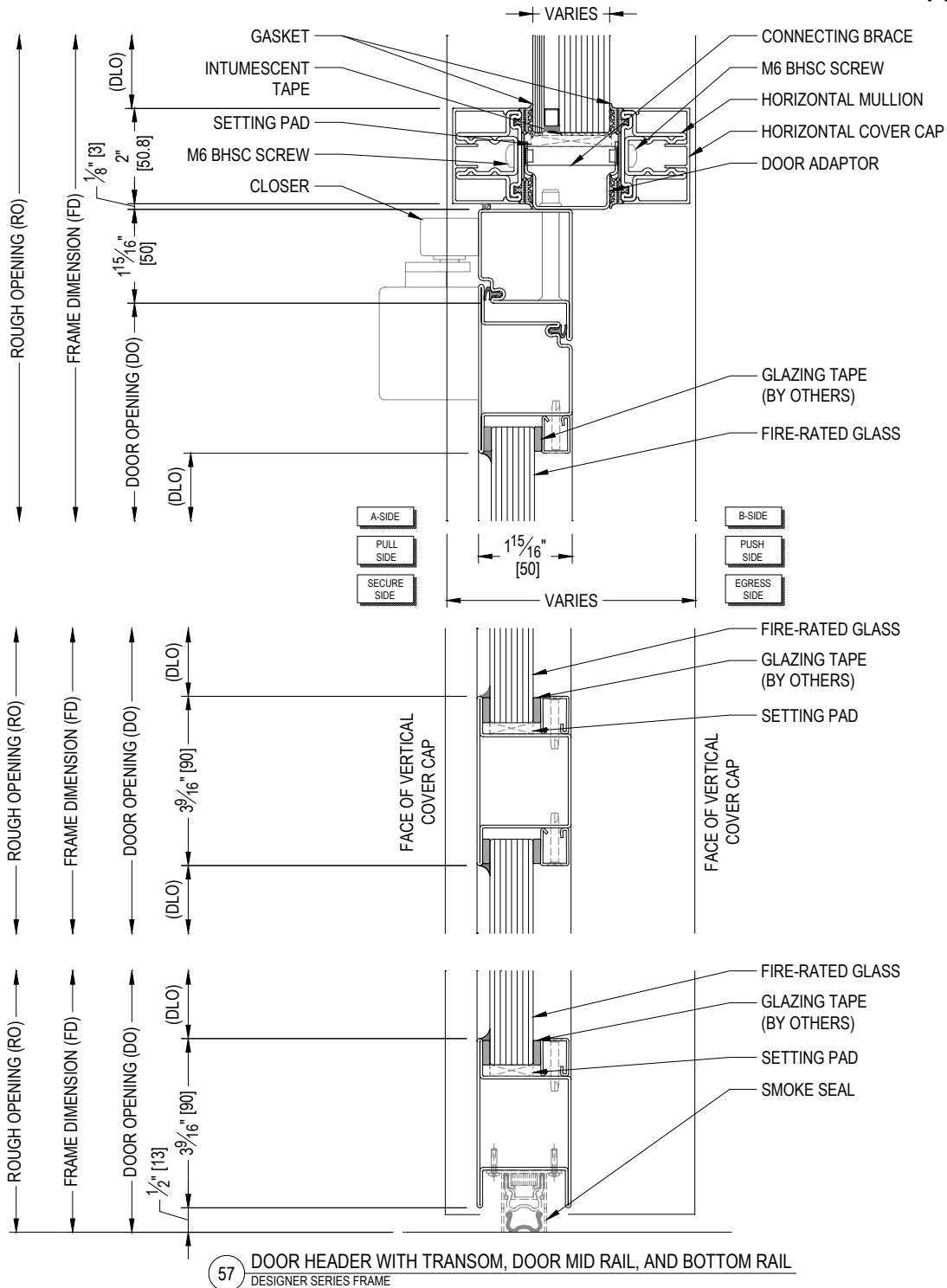
55 INTERMEDIATE VERTICAL MULLION SECTION
EXTERIOR APPLICATION

60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application

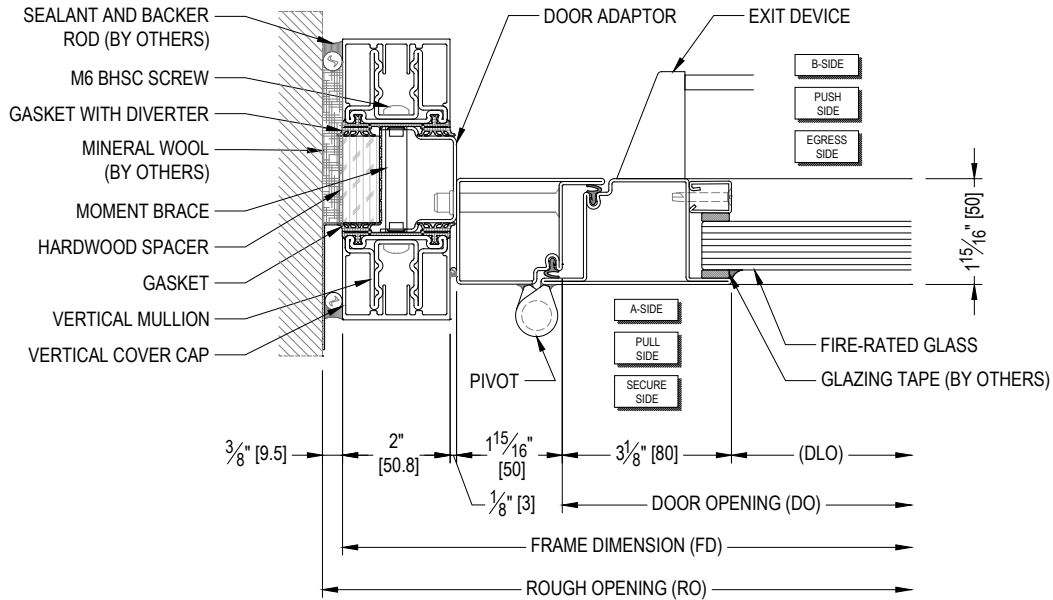


56 DOOR HEADER, HORIZONTAL MID RAIL, AND BOTTOM RAIL
DESIGNER SERIES FRAME

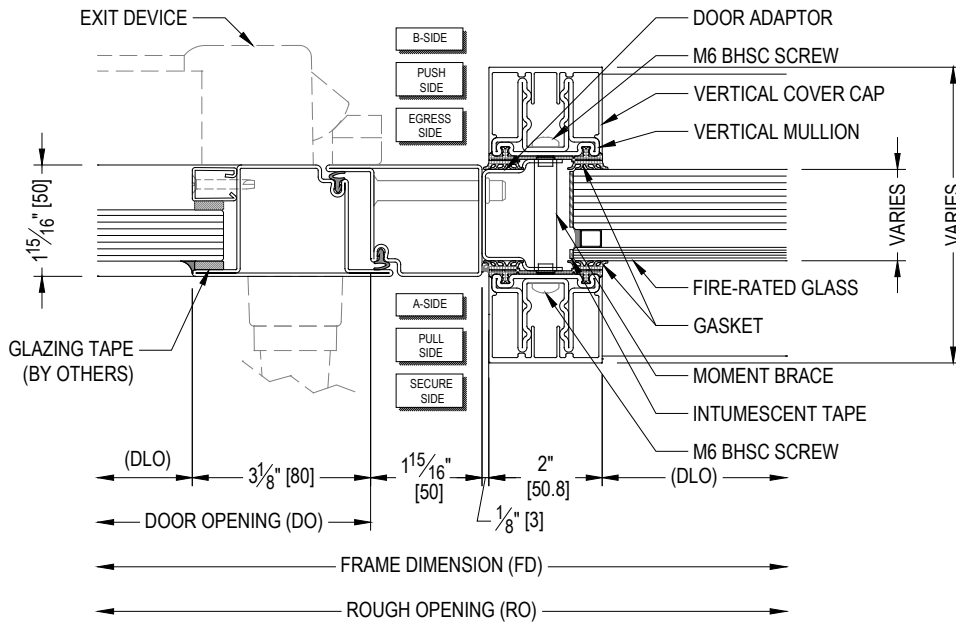
60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application



60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application

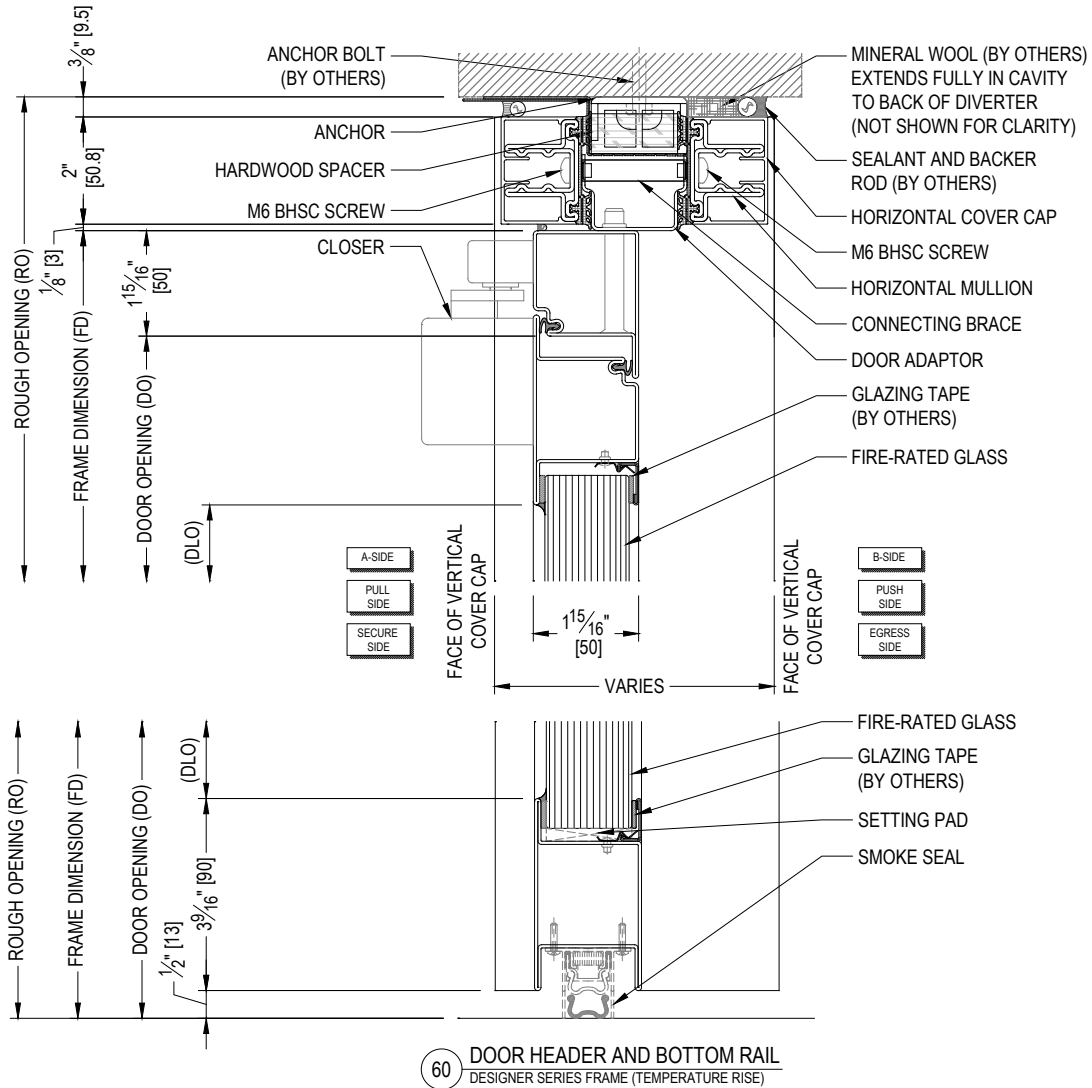


58 VERTICAL MULLION WITH OUTSWING DOOR AT PIVOT JAMB
DESIGNER SERIES FRAME

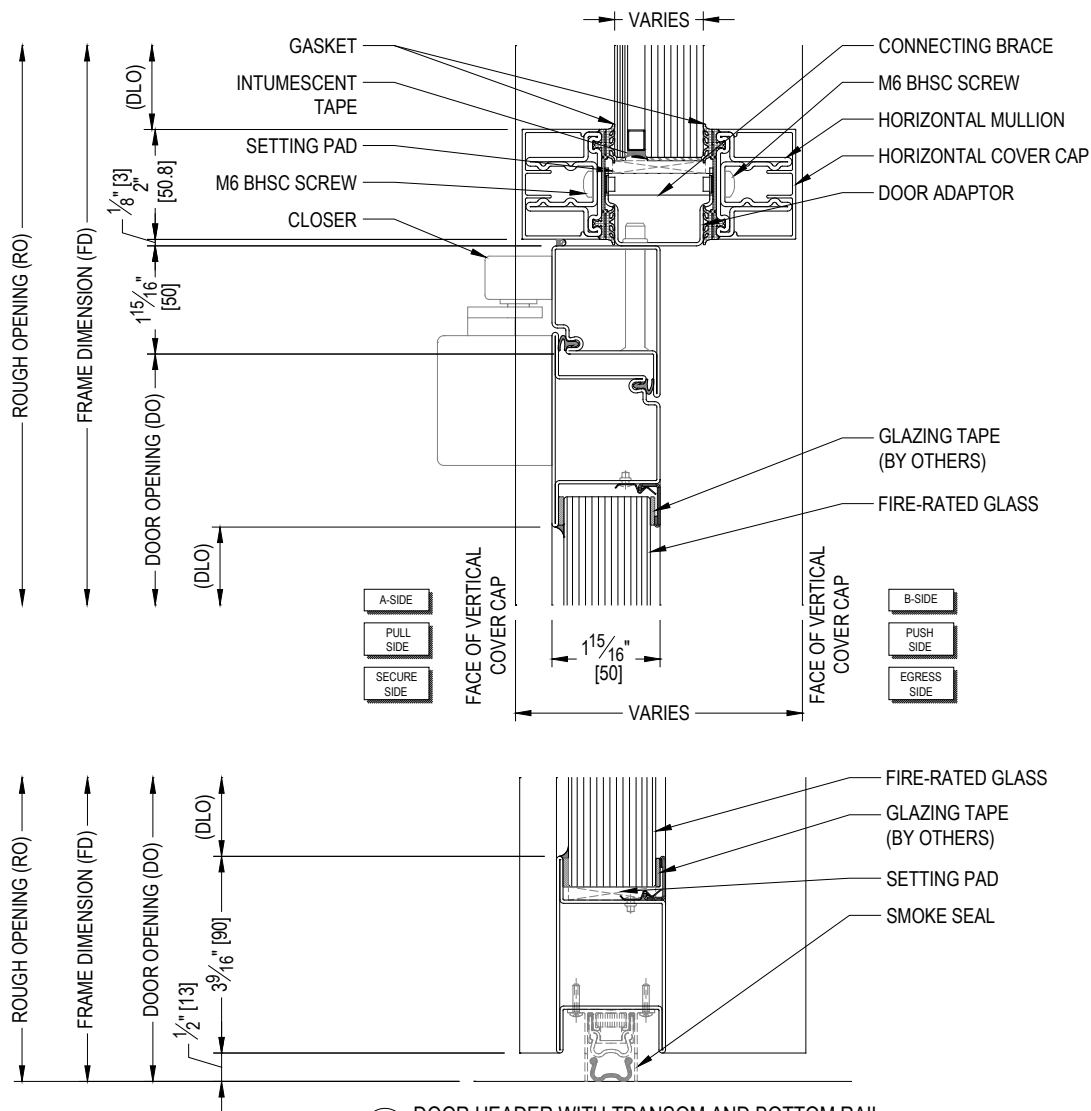


59 VERTICAL MULLION WITH OUTSWING DOOR AT LOCKING JAMB
DESIGNER SERIES FRAME

60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application

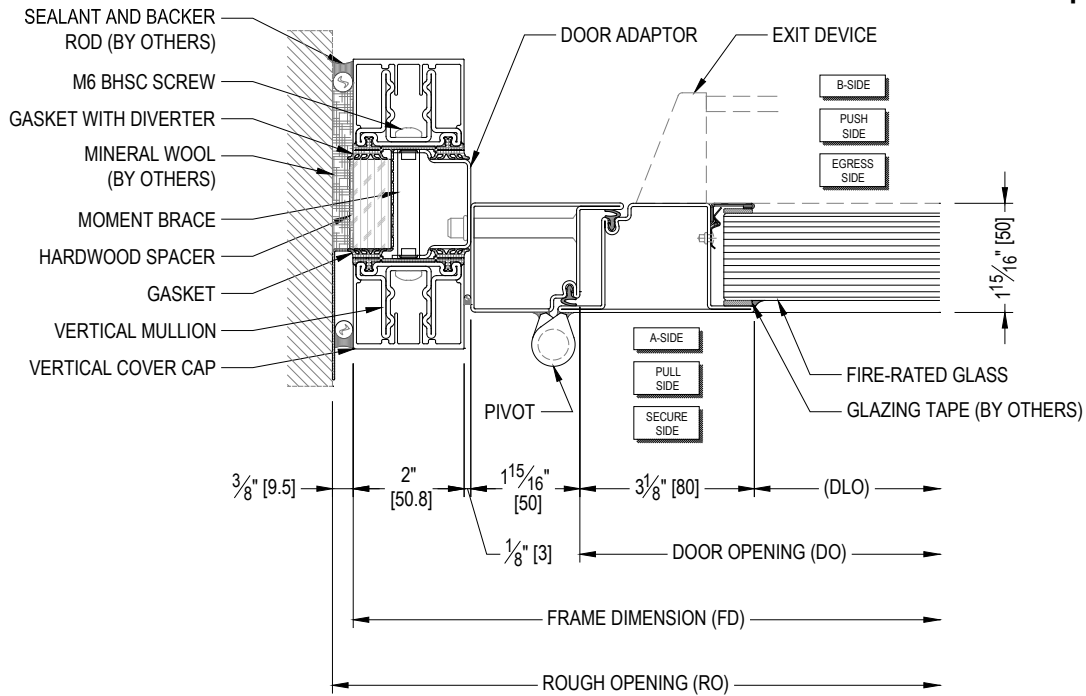


60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application

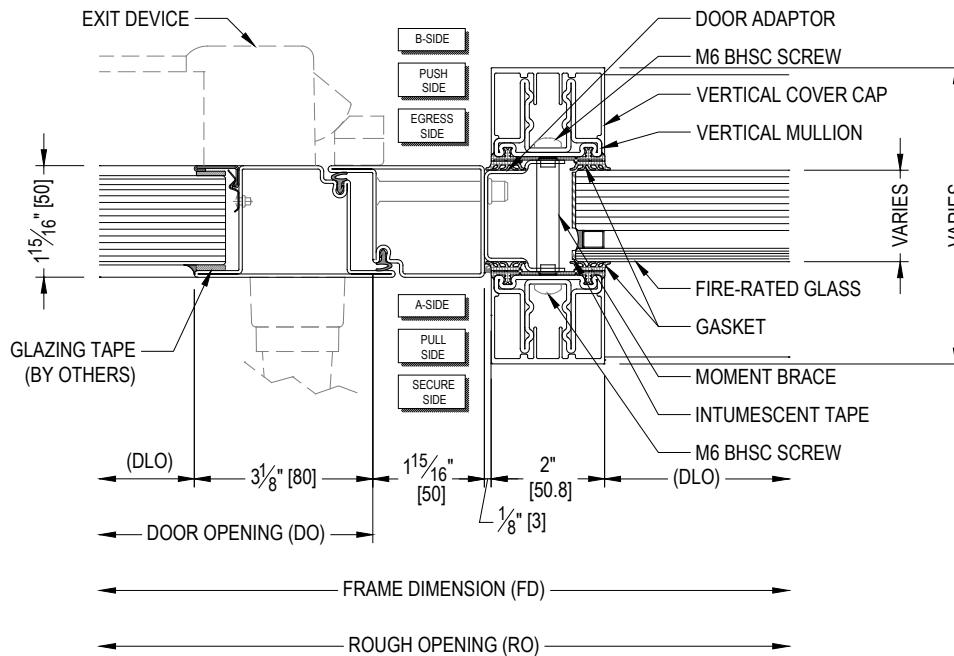


61 DOOR HEADER WITH TRANSOM AND BOTTOM RAIL
DESIGNER SERIES FRAME (TEMPERATURE RISE)

60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application

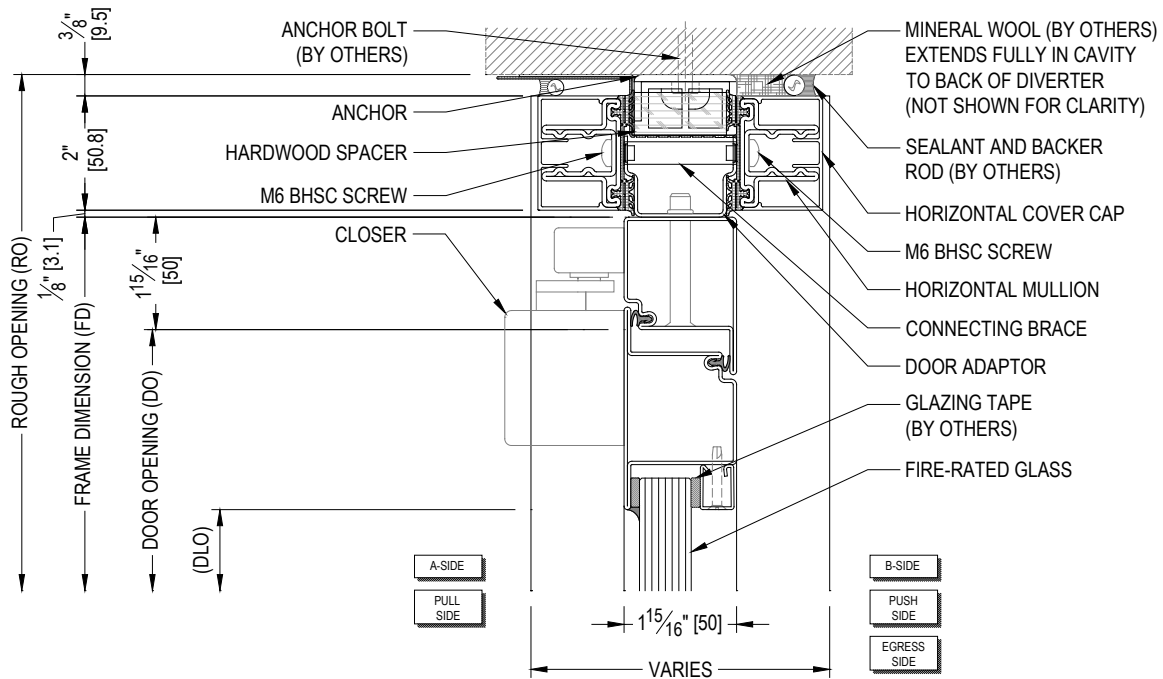


62 VERTICAL MULLION WITH OUTSWING DOOR AT PIVOT JAMB
DESIGNER SERIES FRAME (TEMPERATURE RISE)

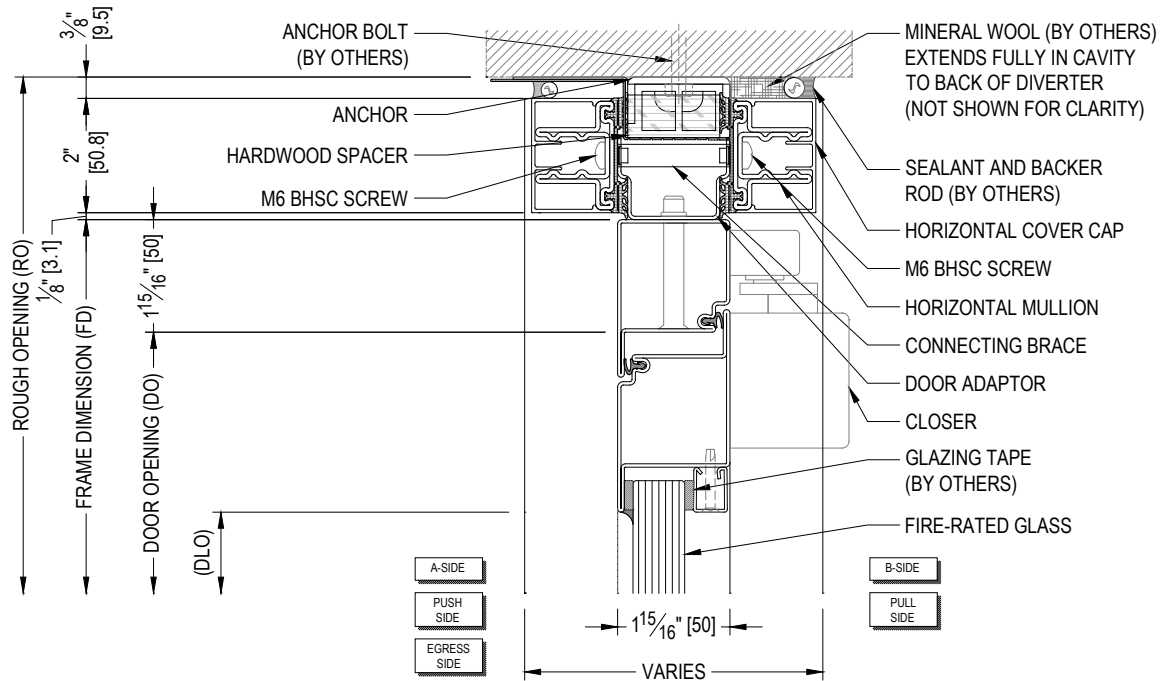


63 VERTICAL MULLION WITH OUTSWING DOOR AT LOCKING JAMB
DESIGNER SERIES FRAME (TEMPERATURE RISE)

60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application

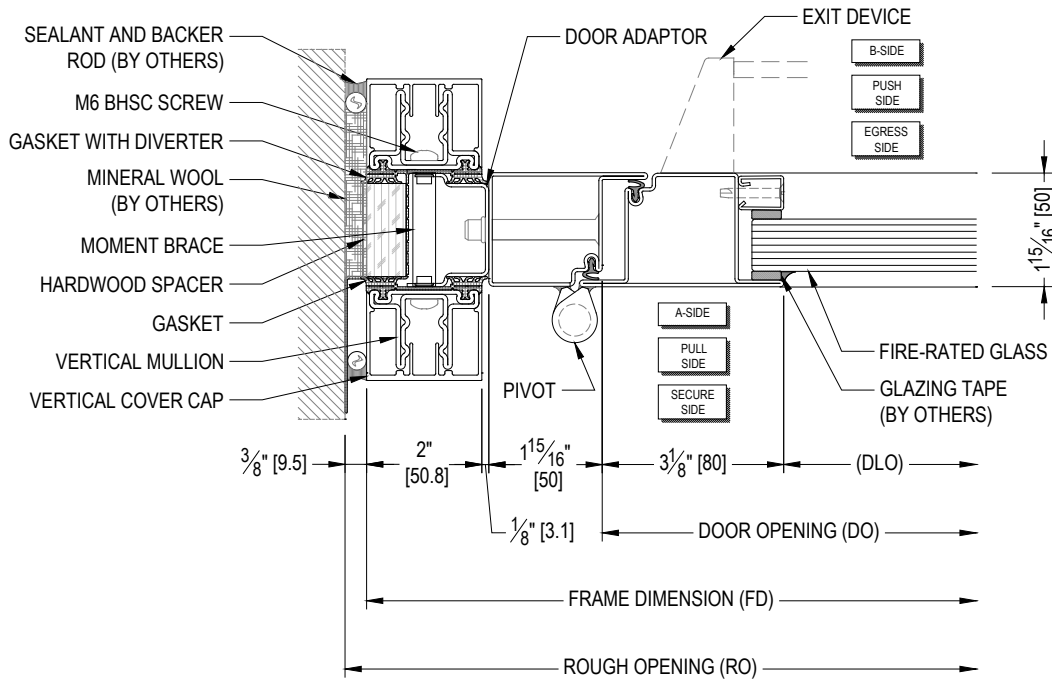


64 DOUBLE EGRESS DOOR HEADER
DESIGNER SERIES FRAME

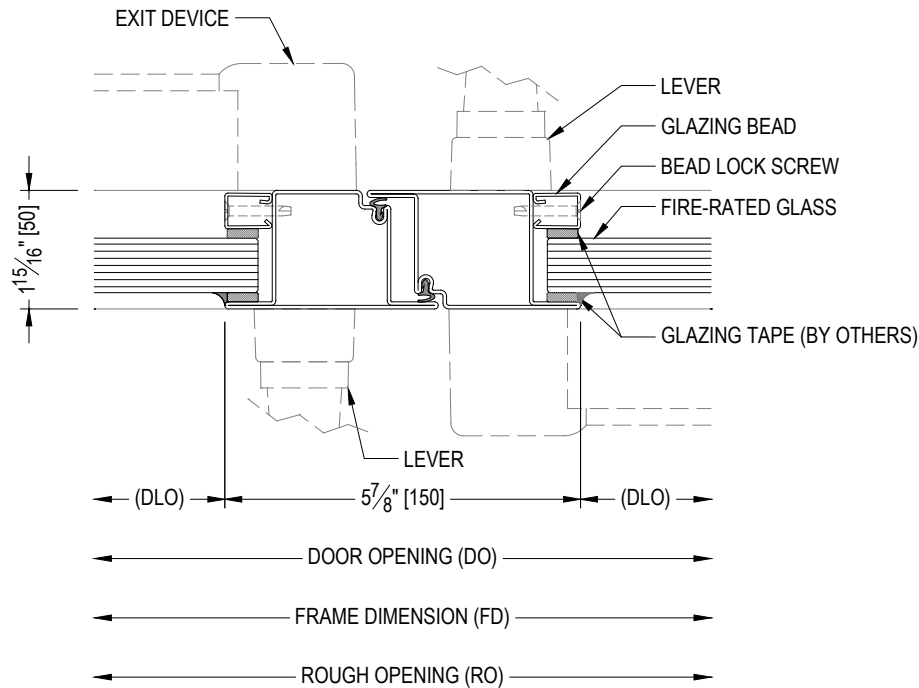


65 DOUBLE EGRESS DOOR HEADER
DESIGNER SERIES FRAME

60 and 120 Minute – Fireframes Designer Series Door Details Exterior Application

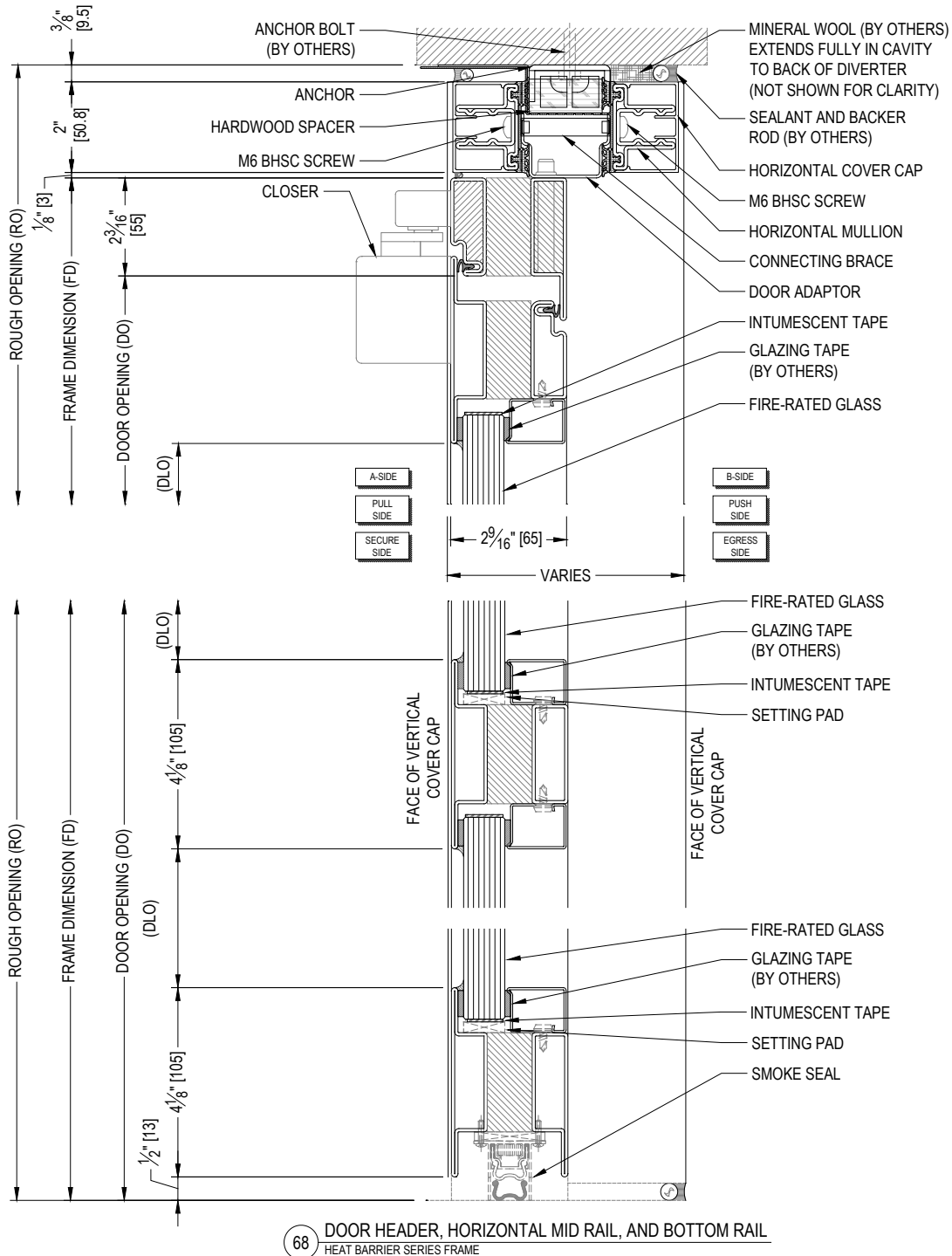


66 VERTICAL MULLION WITH OUTSWING DOUBLE EGRESS DOOR AT PIVOT JAMB
DESIGNER SERIES FRAME



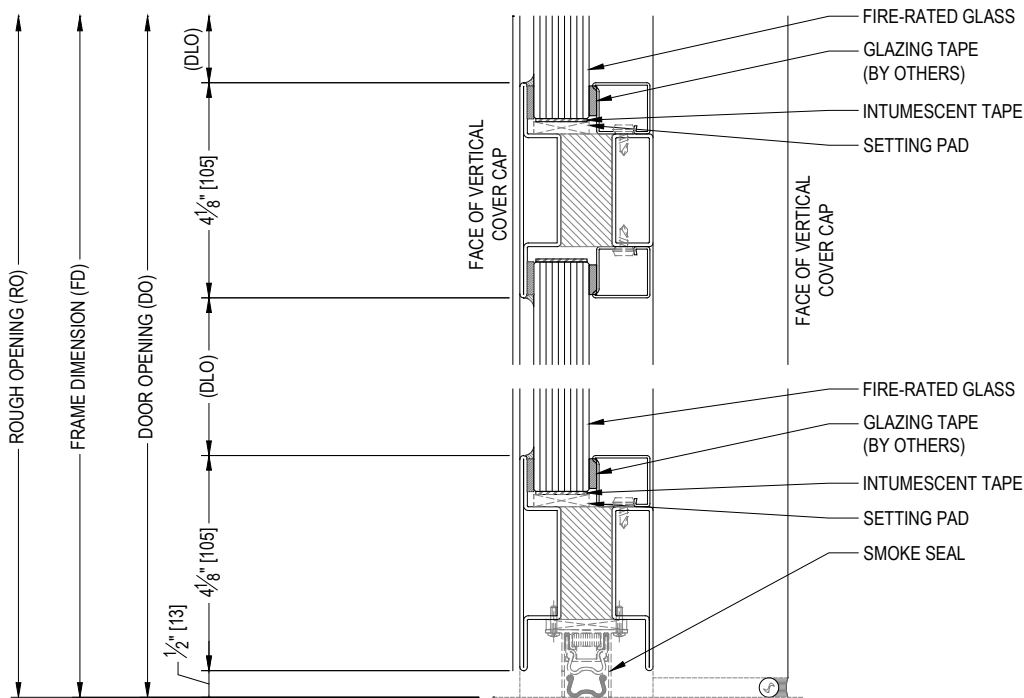
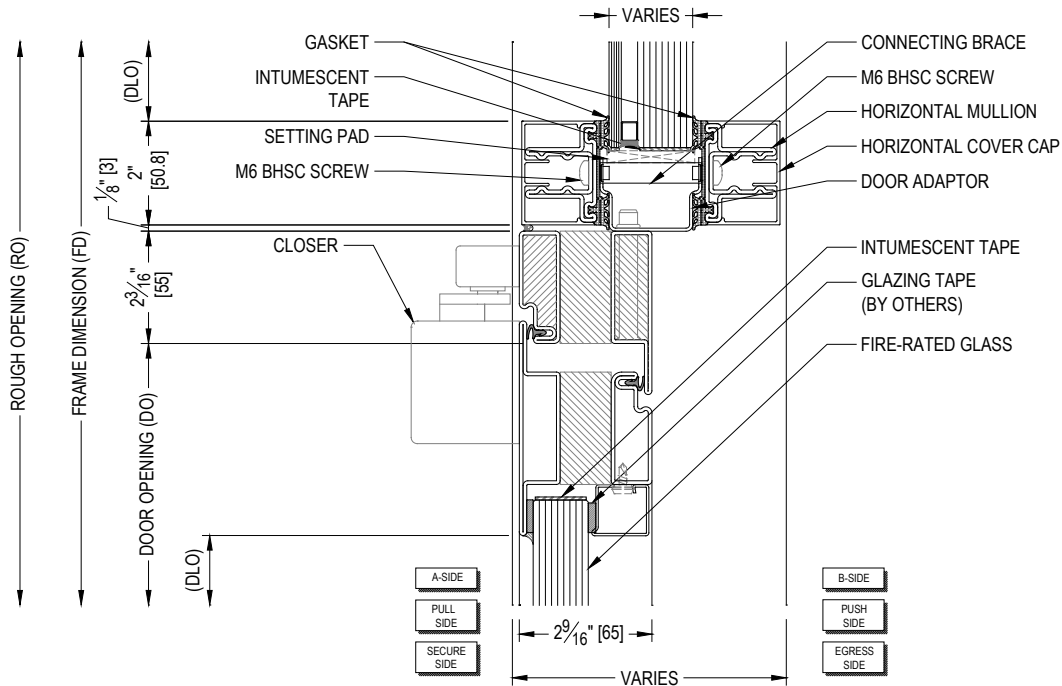
67 DOUBLE EGRESS MEETING STILE
DESIGNER SERIES FRAME

60 and 120 Minute – Fireframes Heat Barrier Series Door Details Exterior Application



NOTE: 1. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

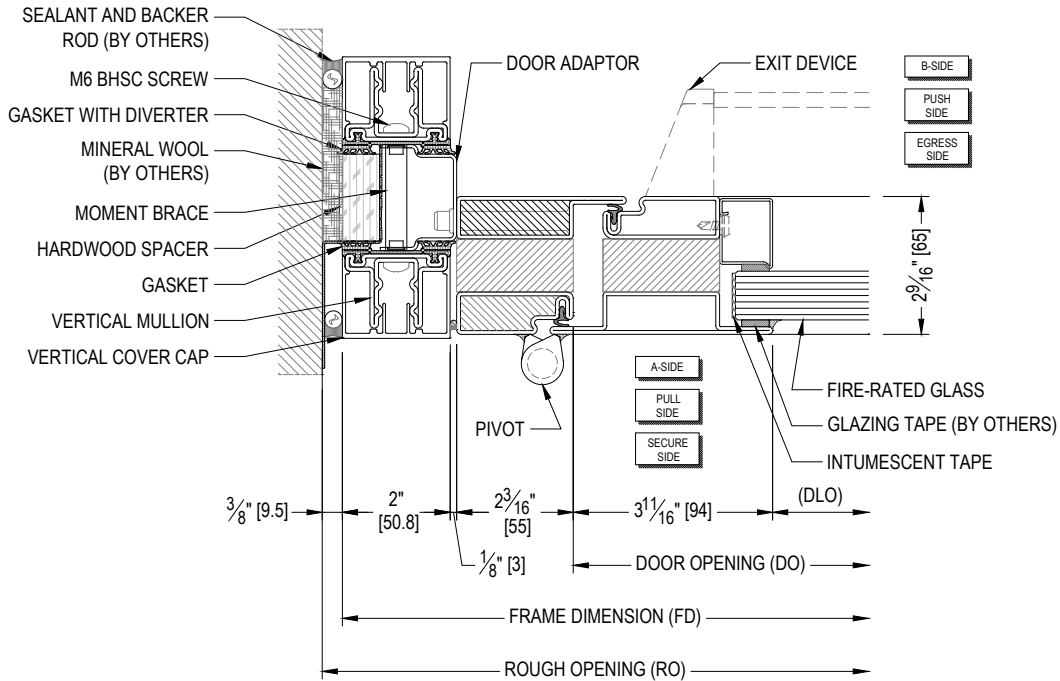
60 and 120 Minute – Fireframes Heat Barrier Series Door Details Exterior Application



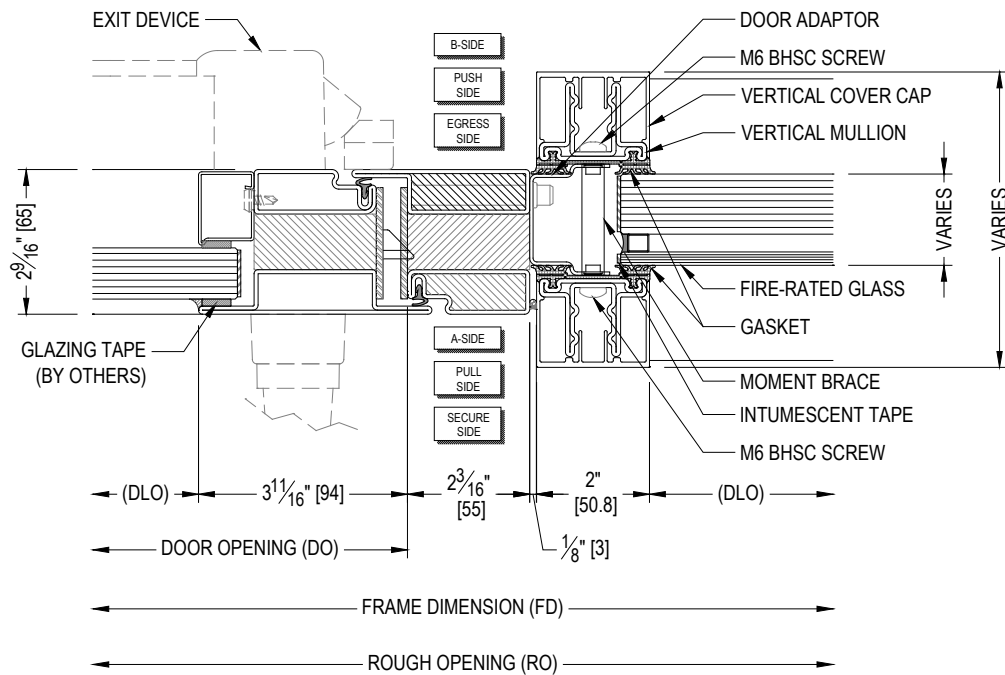
69 DOOR HEADER WITH TRANSOM, DOOR MID RAIL, AND BOTTOM RAIL
HEAT BARRIER SERIES FRAME

NOTE: 1. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

60 and 120 Minute – Fireframes Heat Barrier Series Door Details Exterior Application



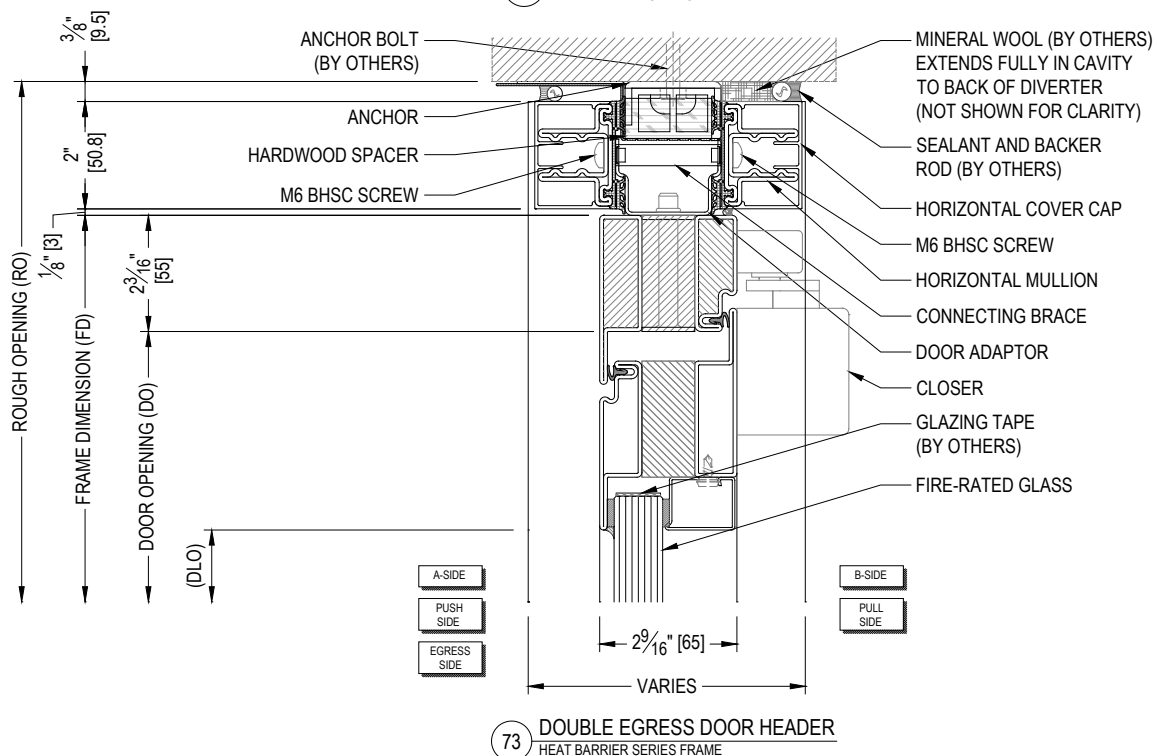
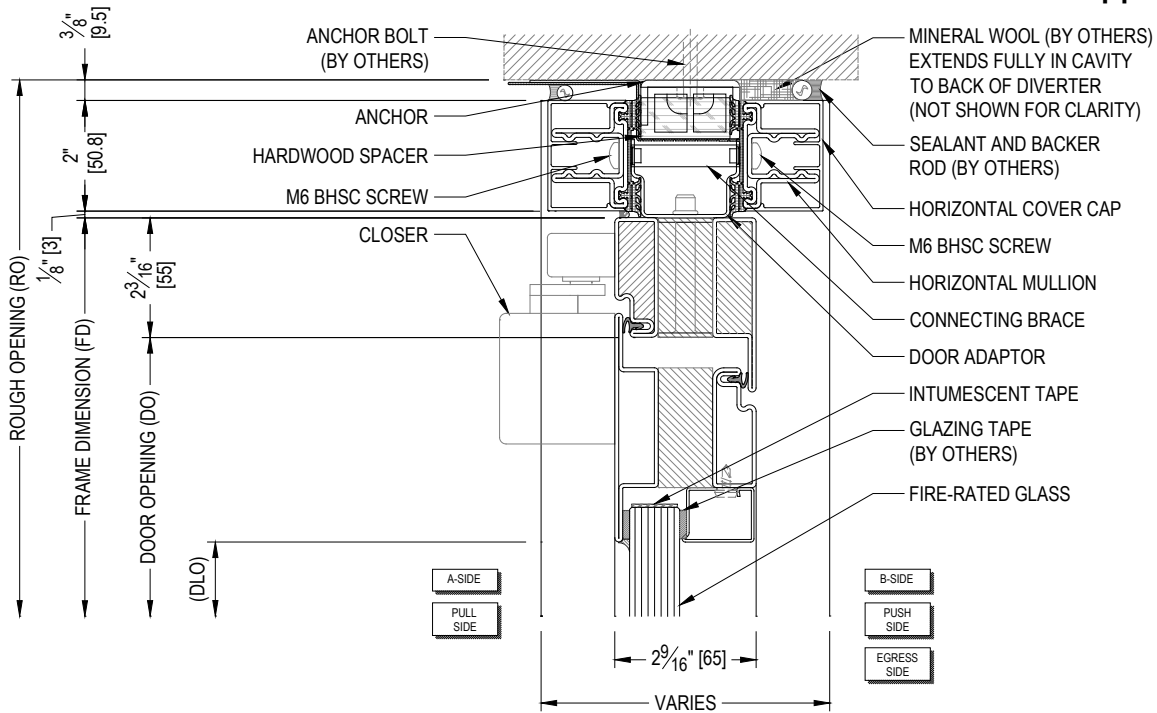
70 VERTICAL MULLION WITH OUTSWING DOOR AT PIVOT JAMB
HEAT BARRIER SERIES FRAME



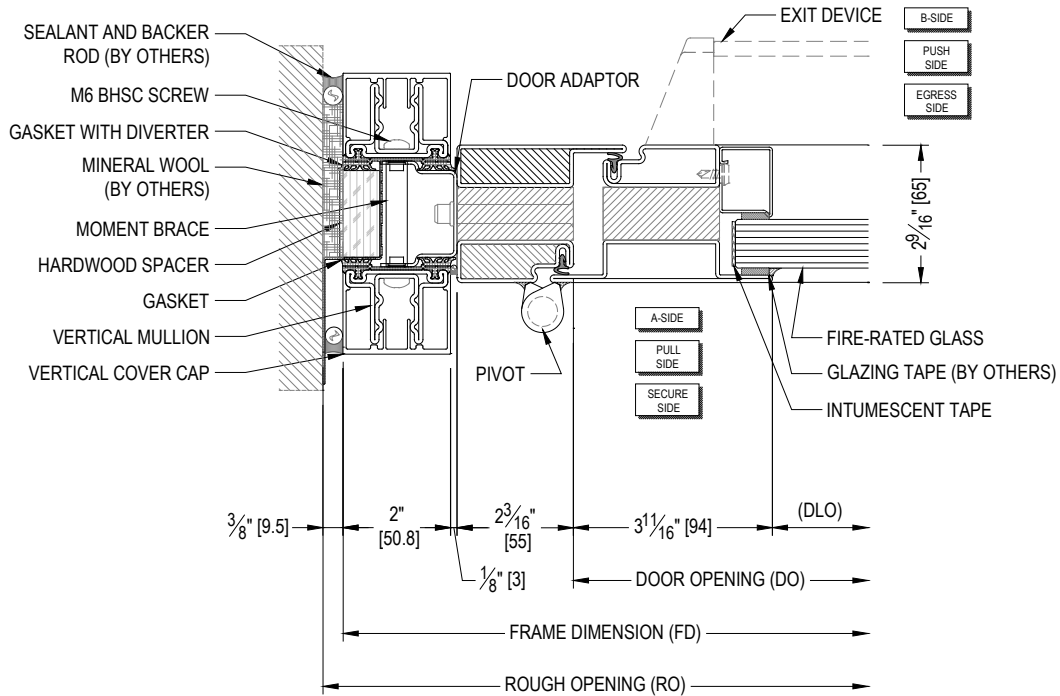
71 VERTICAL MULLION WITH OUTSWING DOOR AT LOCKING JAMB
HEAT BARRIER SERIES FRAME

NOTE: 1. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

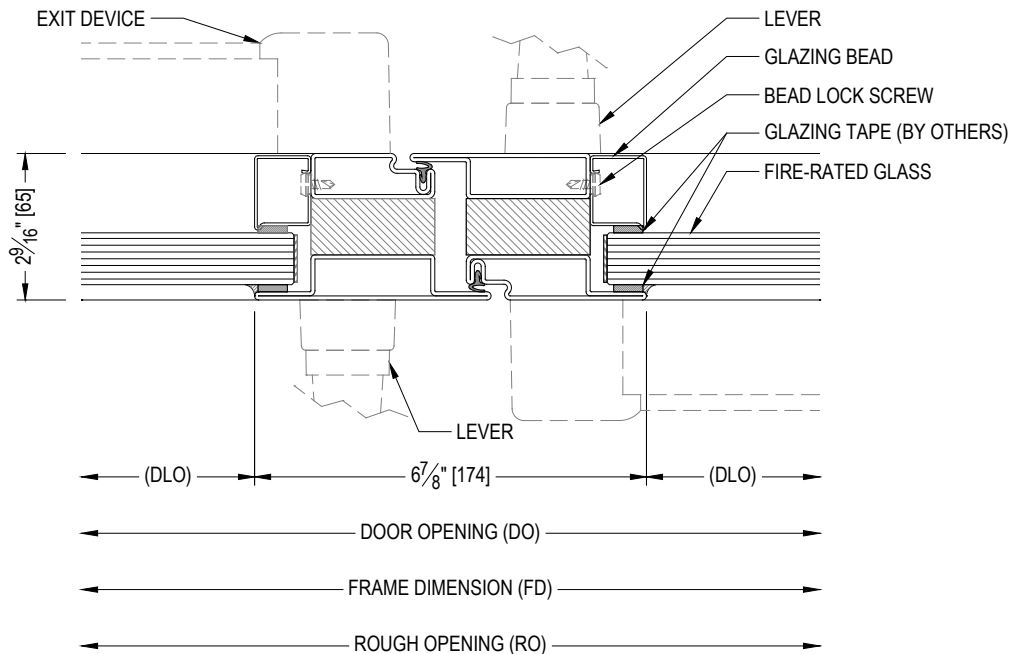
60 and 120 Minute – Fireframes Heat Barrier Series Door Details Exterior Application



60 and 120 Minute – Fireframes Heat Barrier Series Door Details Exterior Application

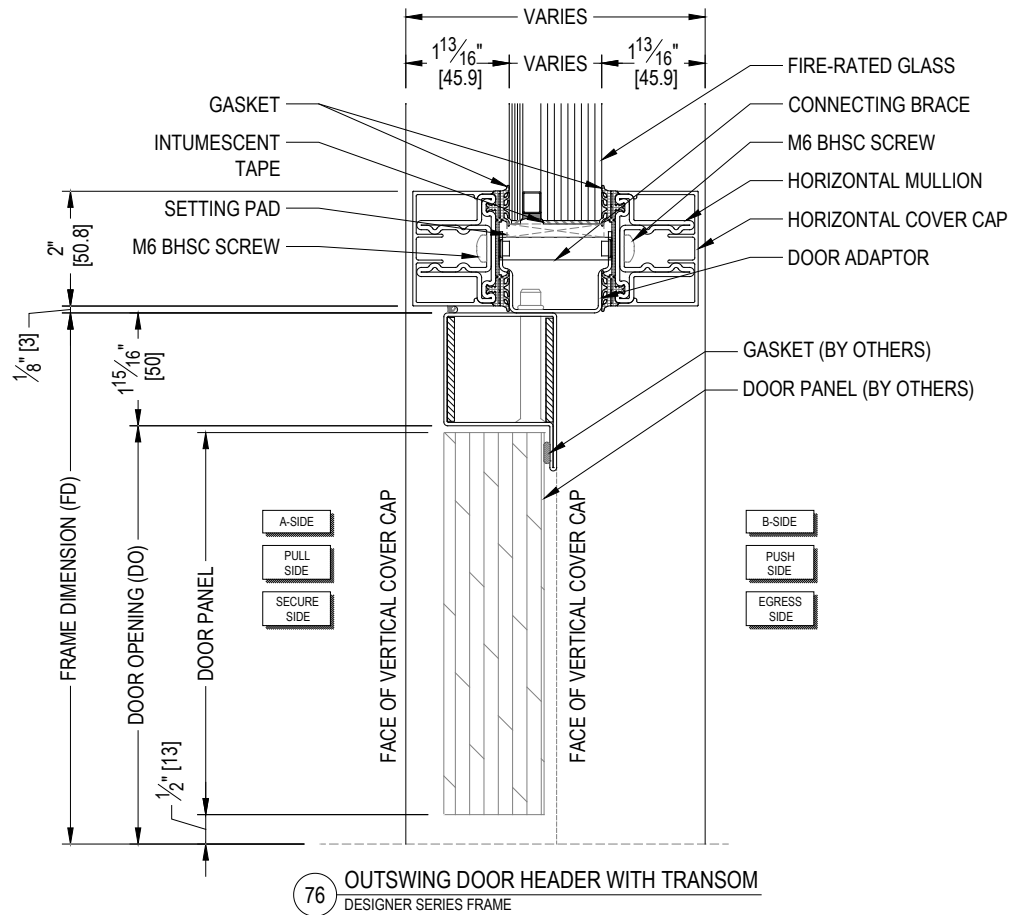


74 VERTICAL MULLION WITH OUTSWING DOUBLE EGRESS DOOR AT PIVOT JAMB
HEAT BARRIER SERIES FRAME



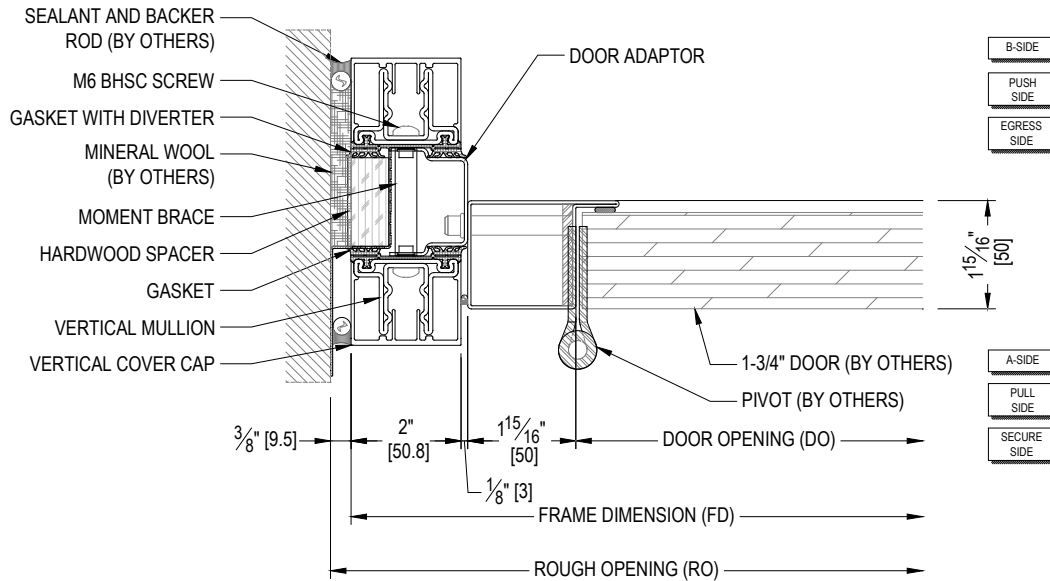
75 DOUBLE EGRESS MEETING STILE
HEAT BARRIER SERIES FRAME

60 and 120 Minute – Fireframes Designer Series Frame with Door By Others Exterior Application

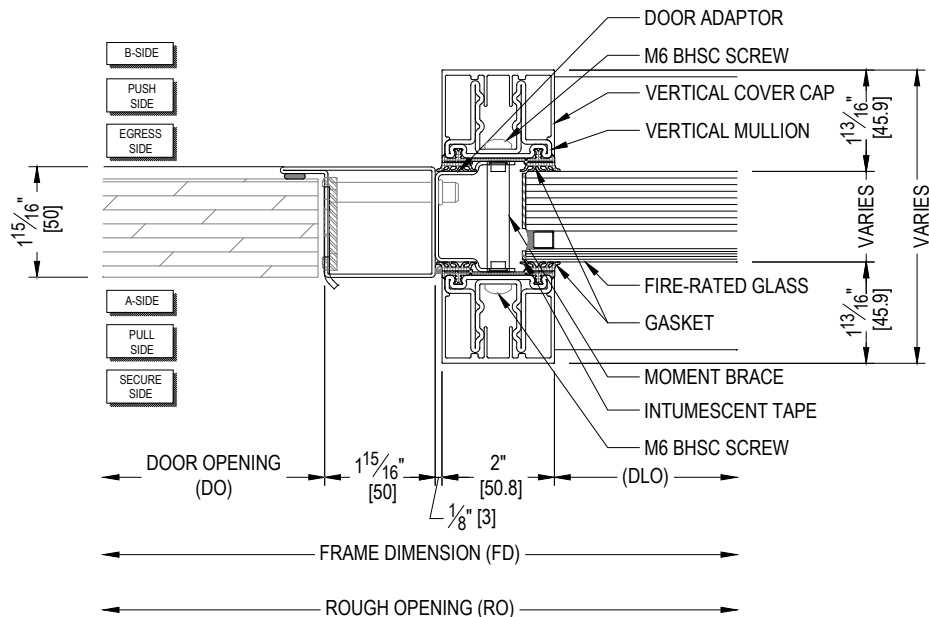


NOTE: 1. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.

60 and 120 Minute – Fireframes Designer Series Frame with Door By Others Exterior Application



77 VERTICAL MULLION WITH OUTSWING DOOR BY OTHERS AT PIVOT JAMB
DESIGNER SERIES FRAME



78 VERTICAL MULLION WITH OUTSWING DOOR BY OTHERS AT LOCKING JAMB
DESIGNER SERIES FRAME

NOTE: 1. Door adaptor is centered for 19-40 mm glass sizes. Door adaptor is offset for 41-71 mm glass sizes.