



Technical Glass Products Architectural Specification Manual

FIREFRAMES® HEAT BARRIER SERIES

The Fireframes® Heat Barrier Series frames system provides a sleek, modern alternative to traditional hollow metal steel frames. Using narrow steel profiles, the Fireframes Heat Barrier Series frame system can incorporate a wide range of fire-rated glazing materials with glass sizes that surpass traditional fire-rated frame systems in aesthetics and performance. When combined with Pilkington Pyrostop® glass, the Fireframes Heat Barrier Series frame system doors and frames provide a barrier to radiant and conductive heat transfer.

Leveraging precise roll-forming technology, the system also allows full-lite doors for aesthetic or security reasons. Now fabricated in the United States, Fireframes Heat Barrier Series doors (with ratings of 60 and 90 minutes) and frames (with ratings of 60 minutes to 120 minutes) are classified and labeled with Underwriters Laboratories (UL) and Underwriters Laboratories Canada (ULC).

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System Exploded Assembly

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	PROFILE	6	FIRE-RATED GLASS	11	-
2	BEAD STUD	7	PROFILE, DOOR JAMB	12	PIVOT ASSEMBLY
3	PROFILE, DOOR JAMB "Z"	8	INTUMESCENT TAPE	13	GLAZING TAPE
4	-	9	GLAZING BEAD		
5	SETTING BLOCK	10	GASKET, NEOPRENE DOOR STOP		

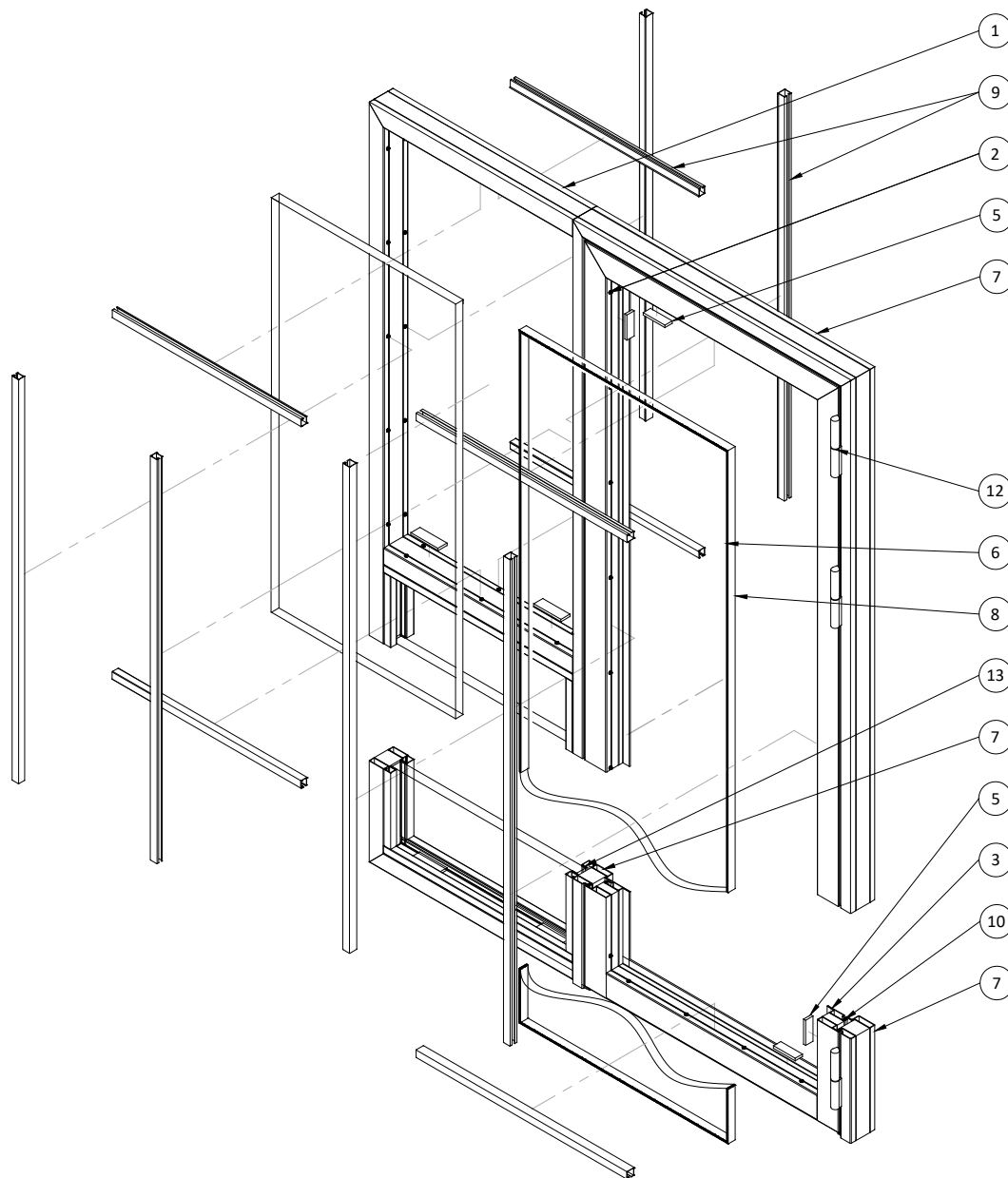


Figure 1 - System Exploded View

Material Key Chart

Material	Required Material NOT PROVIDED With Fireframes Heat Barrier Series
ANCHOR FASTENER	As wall constructions vary widely in design, TGP does not provide perimeter fasteners (anchors). All frames are factory drilled to receive #12 flat head perimeter screws at approximately 18" on center.
CAP SEAL	REQUIRED on all exterior applications, use a continuous silicone sealant. Select color to match frame.
DOOR STOPS	If elevation includes a door, a door stop is recommended to prevent damage to door and surrounding conditions.
FINISH SEALANT	Sealant installed into the interior and exterior perimeter cavity. Select color for sealant to match frame or as directed by project architect.
FIRESAFING	Intumescent sealant or firmly packed mineral wool must be installed in a continuous fashion between frame assembly and wall construction, being interrupted only by the perimeter anchor shims. Sealant manufacturers such as Tremco, Pemko and many others supply intumescent sealants.
GLAZING TAPE	Single or double sided adhesive, closed cell PVC glazing tape of any common brand available from your local glazing supply house. Refer to Glazing Specifications for glazing tape sizes, and Glazing Installation Instructions.
HEEL BEAD	REQUIRED in exterior applications: apply a continuous bead of silicone sealant at all horizontal to vertical intersections in the glazing pocket, and a heel bead along the sill and 4" vertically up each jamb. Sealant must be installed between the glass edge and frame profile.
SHIMS	Perimeter shims at anchor locations are to be of hardwood (oak) or non-combustible (steel) materials. Plastic shims may not be used. TGP recommends a 3/8" (9.5 mm) caulk joint between frame and all wall conditions.
WALL CONDITION	Rated wall construction by other trades.
Material	Fasteners Provided With Fireframes Heat Barrier Series
BEAD STUD	Glazing beads snap onto factory installed, steel bead studs at approximately 12" on center.
Material	Components Provided With Fireframes Heat Barrier Series
SETTING BLOCKS	6 mm calcium silicate, or hardwood, setting blocks shipped loose for field installation. Refer to Glazing Installation Instructions.
FIRE-RATED GLAZING MATERIAL	Refer to the Fire-Rated Glazing Options and Specifications, and Glazing Installation Instructions.
INTUMESCENT TAPE	Fire Rated Intumescent tape as supplied must be installed on the glass, or in the glazing pocket on the framing prior to glazing each opening.
MECHANICAL JOINT CONNECTOR	In the event of a mechanically joined frame, this clip inserts into the receiving end of the frame to be joined and fastens with provided screws. (Not used with exterior applications).
GLAZING BEAD	Snap-on glazing bead to hold glass in system.
WEATHER-STRIPPING SEAL	Pemko S773D Adhesive Gasket. Used on Fireframes Heat Barrier Series Doors.

Figure 2 - 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

- Fabricated in the U.S.A.
- Narrow steel profiles
- Easy installation similar to typical storefront systems
- Frames supplied welded or “K-D” (knock-down) ready for installation
- Surface powder coated at the factory to match the desired color scheme
- Can incorporate large individual panes of Pilkington Pyrostop®
- Passes positive pressure test standards **UL 10C**.
- Variety of hardware available
- Listed as a transparent firewall

LISTINGS

- Classified and labeled by Underwriters Laboratories, Inc.® (UL) and Underwriters Laboratories of Canada (ULC)
- Test report number for labeled 60/90/120 minute fire-rated frame assemblies is **UL File No. R-19207 design U533**
- Frame tested in accordance with **ASTM E-119, NFPA 251, UL 263, and UL 9**.
- Approved for use in New York City, **MEA# 242-00-M**

General Information

SIZING GUIDELINES

GLASS SIZES

Product Pilkington Pyrostop®	Application	Rating Minutes	Max. Exposed Area		Max. Exposed Width		Max. Exposed Height	
			Square Inches	Square Meters	Inches	Millimeters	Inches	Millimeters
45-200 (19 mm)	Transom/Windows/Sidelites	45	4,500	2.90	95-1/4	2,419	95-1/4	2,419
60-101 (23 mm) or thicker	Doors	60	4,357	2.81	41-7/8	1,063	104-1/16	2,643
	Doors - Dbl. Egress	60	3,584	2.31	40-7/8	1,038	87-11/16	2,227
	Transoms	60	5,616	3.62	96	2,438	96	2,438
	Windows/Sidelites	60	5,616	3.62	104-1/16	2,643	104-1/16	2,643
60-201 (27 mm)	Walls	60	7,442	4.80	96	2,438	118-1/8	3,000
90-102 (37 mm)	Doors	90	4,357	2.81	41-7/8	1,063	104-1/16	2,643
	Doors - Dbl. Egress	90	3,584	2.31	40-7/8	1,038	87-11/16	2,227
	Transoms	90	3,724	2.40	96	2,438	96	2,438
	Windows/Sidelites	90	4,162	2.68	104-1/16	2,643	104-1/16	2,643
120-202 (40 mm)	Doors	90	4,357	2.81	41-7/8	1,063	104-1/16	2,643
	Doors - Dbl. Egress	90	3,584	2.31	40-7/8	1,038	87-11/16	2,227
	Transoms	90	3,724	2.40	111	2,819	111	2,819
	Windows/Sidelites	90	4,162	2.68	111	2,819	111	2,819
	Walls	120	3,730	2.41	111	2,819	111	2,819

Note: IGUs consisting of the same monolithic Pilkington Pyrostop are limited by the same parameters.

Fireframes ClearView® System									
Product Pilkington Pyrostop®	Rating Minutes	Max. Exposed Glass Area Per Piece		Max. Glass Width		Max. Glass Height		Min. Glass Width	
		Square Inches	Square Meters	Inches	Millimeters	Inches	Millimeters	Inches	Millimeters
60-201 (27 mm)	60	7,442	4.80	63	1,600	118 - 1/8	3,000	31 - 5/8	803
120-108 (47 mm)	120	7,442	4.80	63	1,600	118 - 1/8	3,000	39 - 3/8	1,000

CONVENTIONAL WOOD OR HOLLOW METAL DOORS IN FIREFRAMES HEAT BARRIER SERIES FRAMES

Conventional fire-rated wood or hollow metal doors can also be installed into TGP's narrow profiled Fireframes Heat Barrier 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.

General Information

ASSEMBLY AND DOOR SIZES

DOORS: Singles and AA/AF	Rating (Minutes)	Max. Width (Inches)	Max. Width (Millimeters)	Max. Height (Inches)	Max. Height (Millimeters)	Max. Area (Sq. Feet)	Max. Area (Sq. Meters)
Max DLO glass:	60 / 90	41-7/8	1,063	104-1/16	2,643	-	-
Max door leaf size:	60 / 90	49-1/4	1,251	112-7/16	2,855	-	-
Max DO size (AA pair):	60 / 90	98-1/8	2,492	112-7/16	2,855	-	-
Max DO size (AF pair):	60 / 90	97-15/16	2,488	112-7/16	2,855	-	-
DOORS: Double Egress							
Max DLO glass (leaf):	60 / 90	40-7/8	1,038	87-11/16	2,227	-	-
Max FD size (pair):	60 / 90	100-3/8	2,549	98-3/16	2,494	-	-
Max DO size (pair):	60 / 90	96	2,439	96	2,461	-	-
Max single door leaf size:	60 / 90	49-1/8	1,248	95-15/16	2,437	-	-
Max single leaf opening:	60 / 90	48-5/16	1,226	96	2,439	-	-
FRAME ASSEMBLY							
Max. Wall size:	120	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited	Unlimited
Max. Window size:	45	162	4,115	162	4,115	152	14.12

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 flames 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.

DOOR WEIGHT

Fire Protection Doors may be heavier than Non-Rated Doors. Fire-rated doors prevent the spread of flames and smoke during a fire. To perform this function, they are typically heavier than non-rated doors, and may require greater force to open and close. The greater the level of fire protection the doors offer, the greater the operating forces can become. TGP fire “resistive” steel doors carry ratings of 60 and 90 minutes with temperature rise protection. This product acts as a barrier to heat transfer, i.e. like a cement block barrier wall. To accomplish this rating, the glass is rather thick (up to 1.5” thick) and the framing is insulated. Accordingly, the doors are heavy. Typical 60 or 90-minute rated doors are 310 and 425 pounds respectively. Issues such as HVAC and wind pressure loads effectively add to the weight. Therefore it is HIGHLY recommended that these doors use an electric power assist.

General Information

FIRE-RATED GLAZING OPTIONS

Technical Glass Products provides a complete line of Pilkington Pyrostop® fire-rated glazing options to complement the Fireframes Heat Barrier Series Frame System. Refer to 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.

Pilkington Pyrostop® fire resistant glass, with fire-ratings up to 2 hours, offers up to a Level III bullet resistance rating. It can also be combined with other glazing products to achieve nearly any level of security protection. Fireframes Heat Barrier Framing system when combined with Pilkington Pyrostop® is classified and labeled by UL as a transparent wall; a fire resistive assembly that blocks the transfer of radiant heat during a fire.

Manufacturer's Designation	Glazing Type	Application	Fire Rating (minutes)	Nominal Thickness	Weight - Pounds per Square Foot (approx.)	Daylight Transmission (approx.)	STC Rating (dB) (approx.)	UL-752 Bullet Resistance Rating
60-101	Single	Interior	60	7/8" (23 mm)	10.86	87%	41	
90-102	Single	Interior Doors Only	90	1-7/16" (37 mm)	17.61	84%	45	
120-104	IGU	Interior	120	2-1/8" (54 mm) [with 8 mm spacer, or 2-3/8" (60 mm) with 14 mm spacer]	21.71	75%	46	
120-108	Single	Interior	120	1-7/8" (47 mm)	21.92	81%	46	
60-201	Single	Exterior	60	1-1/16" (27 mm)	12.90	86%	44	***Level I
60-261 or 60-361*	IGU	Exterior	60	1-5/8" (41 mm)	15.98	77%	44	
120-201	Single	Exterior	120	2-7/16" (62 mm)	25.81	73%	46	***Level III
120-202	Single	Exterior	90** or 120	1-9/16" (40 mm)	18.64	86%	46	***Level II
120-262 or 120-362*	IGU	Exterior	90** or 120	2-3/8" (60 mm) [with 14 mm spacer, or 2-1/8" (54 mm) with 8 mm spacer]	21.71	74%	46	

Note: * Exterior IGU is available with Low E or Solar Control coating.

** Doors Only.

*** With Film. For filmed products, one dimension of the glass cannot exceed 60" (1.52m).

General Information

GLAZING SPECIFICATIONS

Closed cell 1/2" wide single or double sided adhesive PVC glazing tape of any common brand (available from your local glazing supply house) is recommended. See "Glazing Tape" on the Material Key Chart. Refer to tables below for glazing tape thickness required for specific glazing products.

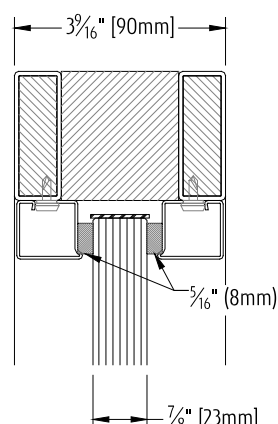
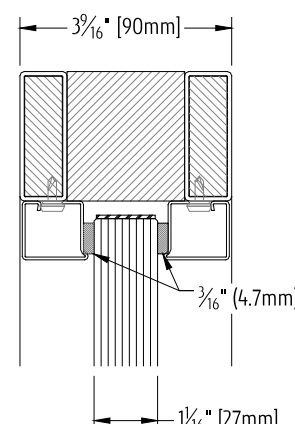
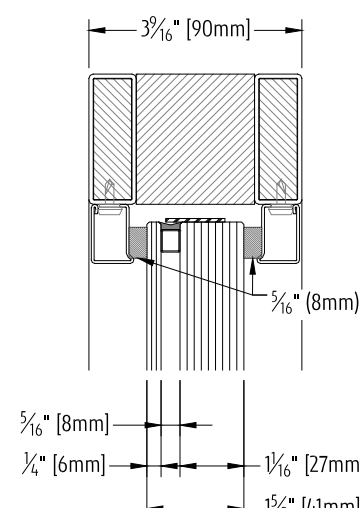
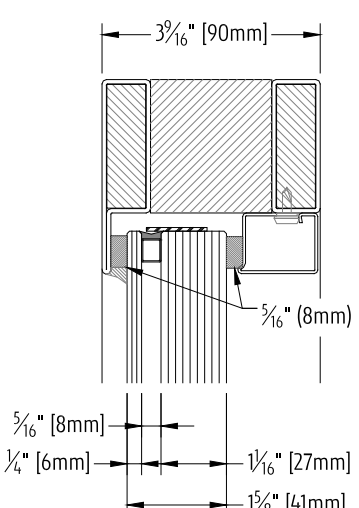
60-101 - 60 Minute Interior Window	60-201 - 60 Minute Interior Window	60-261 - 60 Minute Interior Window
		
60-261 or 60-361 (Low-E) - 60 Minute Exterior Window		
		

Figure 3a - 60 Minute Window Glazing Options

General Information

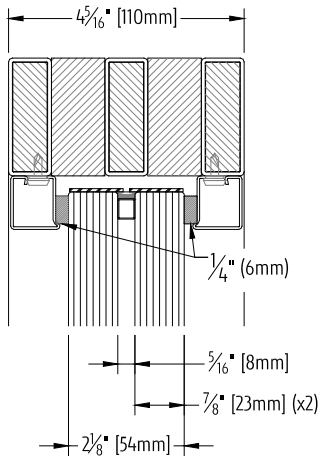
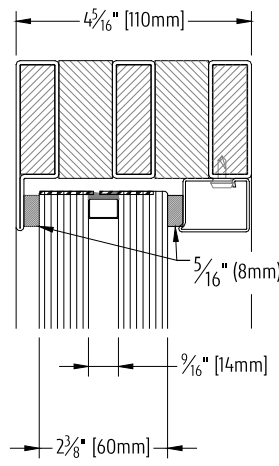
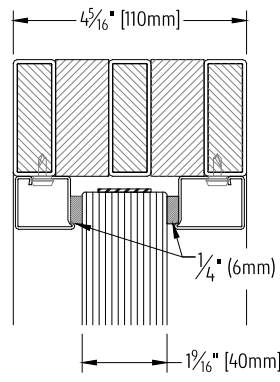
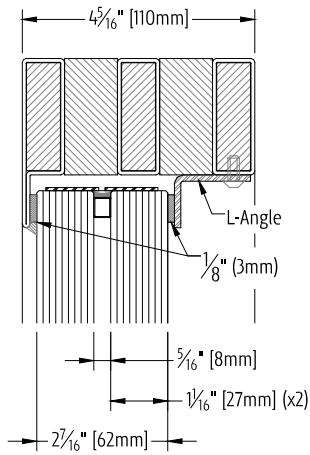
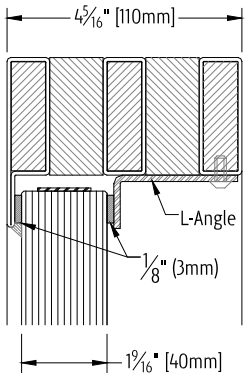
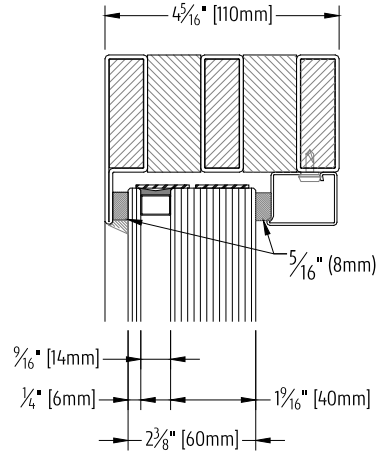
120-104 - 120 Minute Interior Window	120-104 - 120 Minute Interior Use Window, Single Side Glazing Bead	120-202 - 120 Minute Interior Window
		
120-201 - 120 Minute Exterior Window Bullet Resistant Level III	120-202 - 120 Minute Exterior Window Bullet Resistant Level II	120-262 or 120-362 (Low-E) 120 Minute Exterior Window
		

Figure 3b - 120 Minute Window Glazing Options

General Information

60-101 - 60 Minute Door Leaf	60-201 - 60 Minute Door Leaf
<p>2 9/16" [65mm] 1/8" (3mm) 7/8" [23mm]</p>	<p>2 9/16" [65mm] 3/16" (3.7mm) 1 1/16" [27mm]</p>
90-102 - 90 Minute Door Leaf Interior doors only	120-202 - 90 Minute Door Leaf with 120 minute exterior windows
<p>2 9/16" [65mm] 3/16" (4.7mm) 1 7/16" [37mm]</p>	<p>2 9/16" [65mm] 1/8" (3mm) 1 1/16" [40mm]</p>

Figure 3c - Door Glazing Options

General Information

ARCHED TOP (RADIUS) FRAMES

Fireframes Heat Barrier Series window frames can be bent to custom requirements. Refer to Figures 4 and 5 for minimum bend radius for each frame profile.

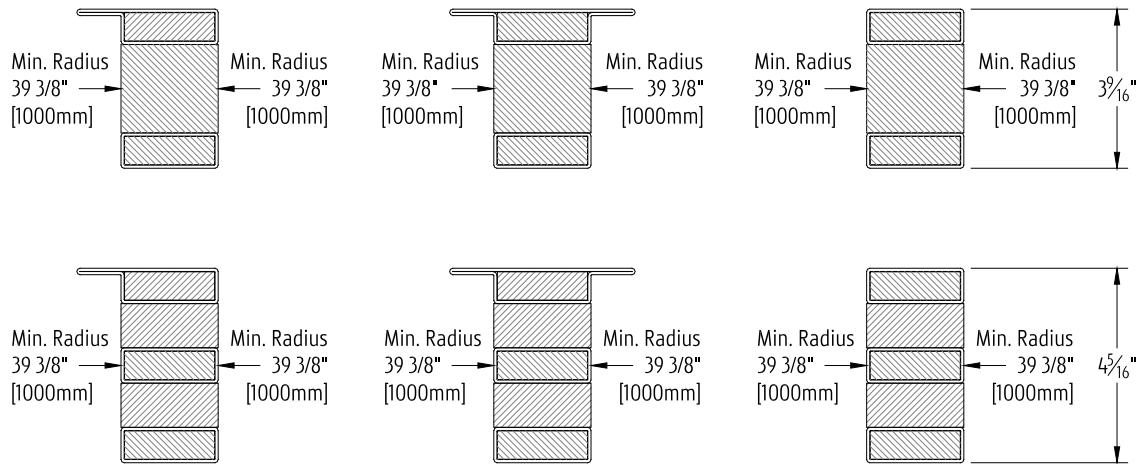


Figure 4 Profiles

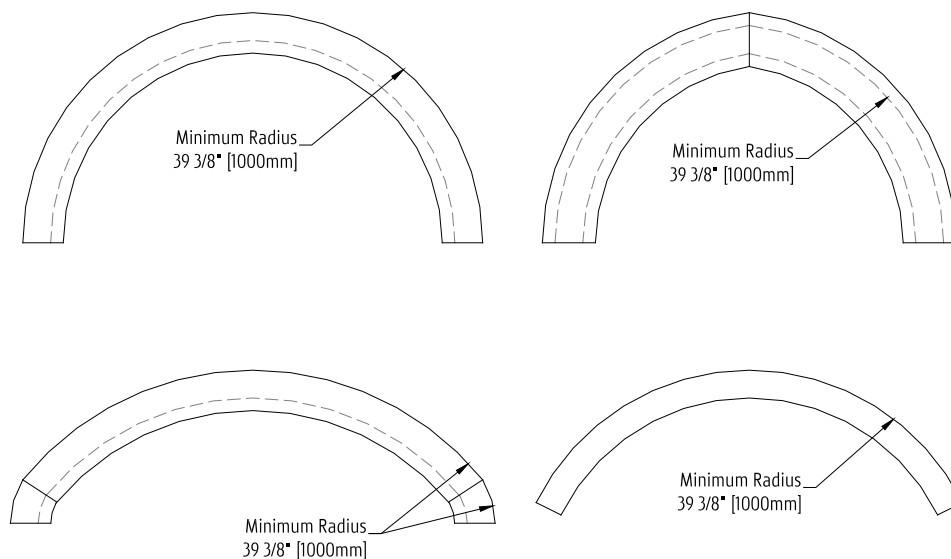


Figure 5 Arched Top Examples

General Information

SEGMENTED (ANGLED) FRAMES

For interior application, horizontals and glass may be angled up to a maximum of two degrees (2°) on either side of the shared vertical mullion.

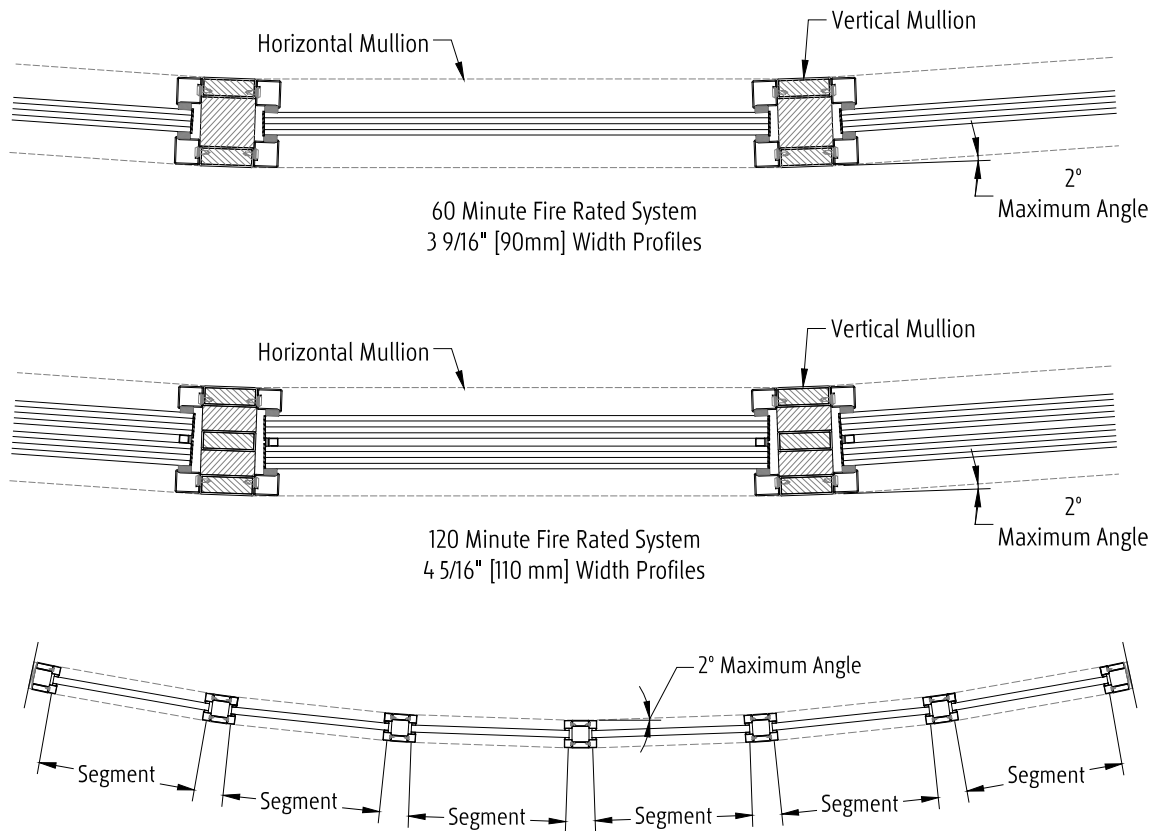


Figure 6 - Segmented Frames

General Information

HOW TO DETERMINE DOOR HANDING

Doors are always viewed and identified by the secure (lockable) side of the door (except for double egress). The non-lockable side is not secured and always available for emergency egress (panic exit).

- NOTE:** *
- * The fixed leaf in a pair can be outfitted with either a manual or automatic flushbolt.
 - ** Active/Active pairs of doors require exit devices be installed on both leaves.
 - *** Double egress pair of doors are unsecured and require exit devices be installed on both leaves.

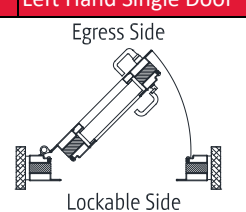
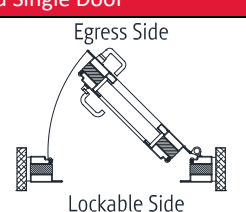
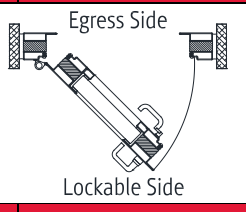
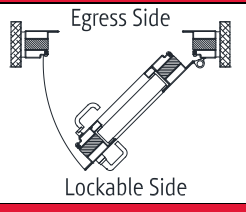
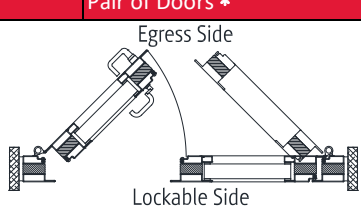
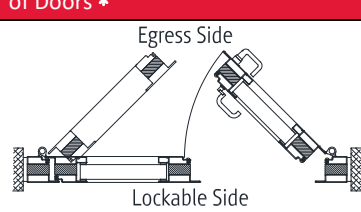
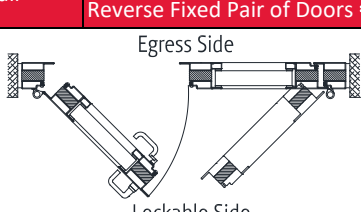
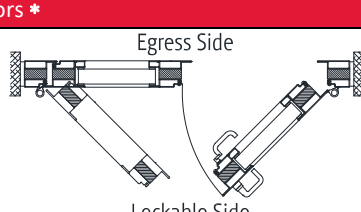
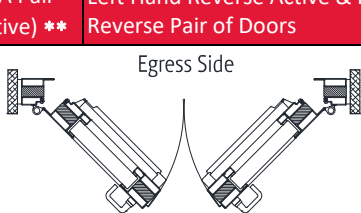
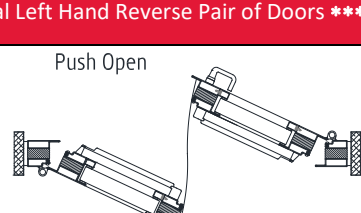
LH	Left Hand Single Door	RH	Right Hand Single Door
			
LHR	Left Hand Reverse Single Door	RHR	Right Hand Reverse Single Door
			
LHA Pair	Left Hand Active & Right Hand Fixed Pair of Doors *	RHA Pair	Right Hand Active & Left Hand Fixed Pair of Doors *
			
LHRA Pair	Left Hand Reverse Active & Right Hand Reverse Fixed Pair of Doors *	RHRA Pair	Right Hand Reverse Active & Left Hand Reverse Fixed Pair of Doors *
			
LHRA/RHRA Pair (Active / Active) **	Left Hand Reverse Active & Right Hand Reverse Pair of Doors	Double Egress	Dual Left Hand Reverse Pair of Doors ***
			

Figure 7 - Door Handing Chart

General Information

DOOR HARDWARE CONFIGURATIONS AND HARDWARE OPTIONS

The Fireframes® Heat Barrier Series has been developed with narrow steel profiles which exceed traditional fire-rated frame systems in aesthetics and performance. TGP offers a complete line of select hardware options which have been fit- and function-tested for use with these profiles. Not all fire-rated hardware components available are compatible with TGP's narrow profile systems. Should you request an item of hardware not standardly supplied by TGP, please forward all relevant information (manufacturer, model number, fabrication template and if required physical sample) to TGP for evaluation by our engineering staff, to determine if it can be supplied by TGP for use. Use of non-standard hardware may incur additional cost and lead time.

Compare door swing types (LH, RH, LHR, etc.) from the Door Hanging Chart (in this manual) to the chart's types to see available hardware standards and options for each door swing combination. For detailed hardware information refer to individual cut sheets available from Technical Glass Products.

Required: ● Required Option: ⊙ Optional: ○ Not Available: Blank

Door Swing Type	LH	RH	LHR	RHR	LHRA/ RHRA (PAIR)	LHA (PAIR)	RHA (PAIR)	LHRA (PAIR)	RHRA (PAIR)	Manufacturer - Notes
Door Bottom Smoke Seal	●	●	●	●	●	●	●	●	●	Pemko – Automatically seals to floor when door is closed.
Perimeter Gaskets	●	●	●	●	●	●	●	●	●	TGP – Double overlapping seal system provide effective seal against weather and smoke.
Weld-On Pivot	●	●	●	●	●	●	●	●	●	TGP – Three pivots standard.
Closer	⊙	⊙	⊙	⊙	⊙					Dorma – TS9315 Surface Mounted, Pull Side standard.
	⊙	⊙	⊙	⊙	⊙					LCN – 4040XP Surface Mounted, Pull Side standard.
						⊙	⊙	⊙	⊙	Dorma – TS9315GSR, with integrated coordinator.
						⊙	⊙	⊙	⊙	LCN – 4040XP, with Trimco 3092 coordinator.
Flushbolt						⊙	⊙	⊙	⊙	Trimco – Automatic. Latches fixed door leaf.
						⊙	⊙	⊙	⊙	Trimco – Semi-Automatic. Latches fixed door leaf.
Exit Device and Latching	●	●	⊙	⊙		●	●	⊙	⊙	TGP – Mortise Lock and Lever Handle Trim. With panic function for emergency egress.
			⊙	⊙				⊙	⊙	Dorma – Rim Exit Device.
			⊙	⊙	⊙			⊙	⊙	Dorma – Surface Vertical Rod.
			⊙	⊙	⊙			⊙	⊙	Von Duprin – Surface Vertical Rod.
			⊙	⊙						Von Duprin – Rim Exit Device.
Electric Strike	○	○	○	○		○	○	○	○	RCI – With mortise lock only, not for use with exit devices.
Profile Lock Cylinder	○	○	○	○		○	○	○	○	TGP –Schlage C Keyway (with mortise locks only).
Magnetic Shear Lock	○	○	○	○	○	○	○	○	○	Securitron – SAM2-24 concealed mounting.
Concealed Power Transfer	○	○	○	○	○	○	○	○	○	Securitron – For use with electric options.
Power Supply	○	○	○	○	○	○	○	○	○	Dorma or Von Duprin – Power for electric exit devices.

Figure 8 Hardware Configuration Chart

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 assure 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

Unless specifically contracted to do so, TGP does not draw or detail the project specific surrounding conditions. (The area of the building that surrounds the TGP framing) Coordination of adjacent material and construction tolerances to TGP's systems must be facilitated by the installer. TGP recommends that a professional engineer review the project drawings to verify the structural integrity of the installation. Please contact TGP if you would like a quote for fully detailed project drawings including surrounding details and or Professional Engineering (PE) services.

- 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® system 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.

Typical Elevations – Windows

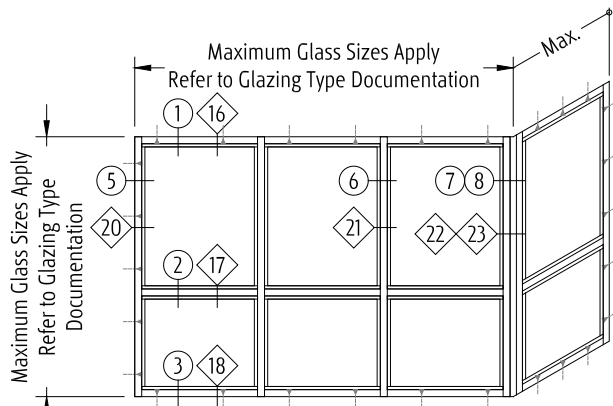
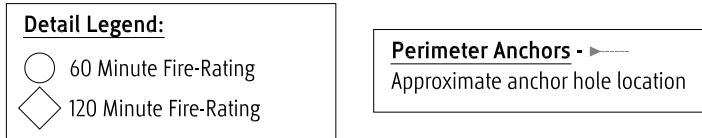


Figure 9 Window and Corner Condition (Welded Joinery)
INTERIOR Application

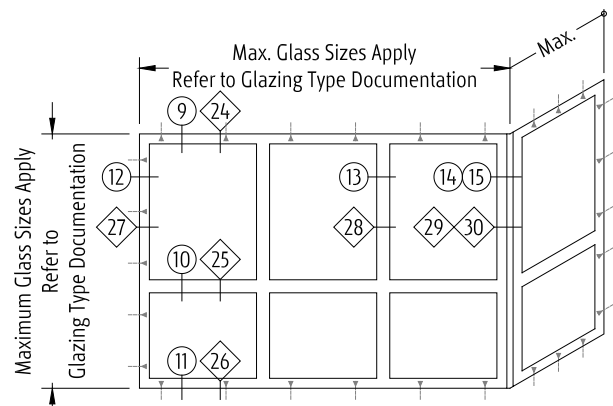


Figure 10 Window and Corner Condition (Welded Joinery)
EXTERIOR Application

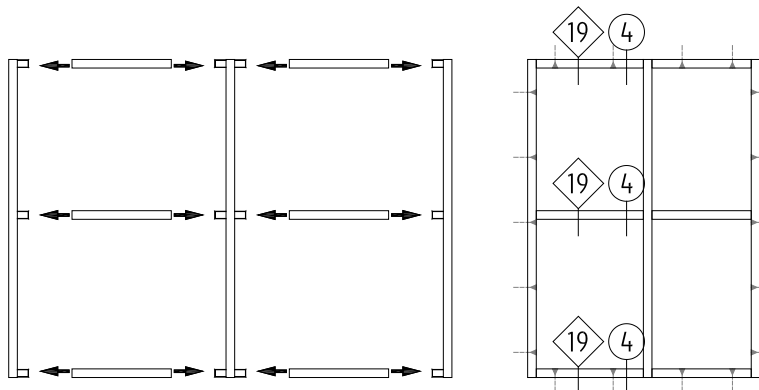


Figure 11 Mechanical Joinery Example
INTERIOR Application

Typical Section Details – Windows

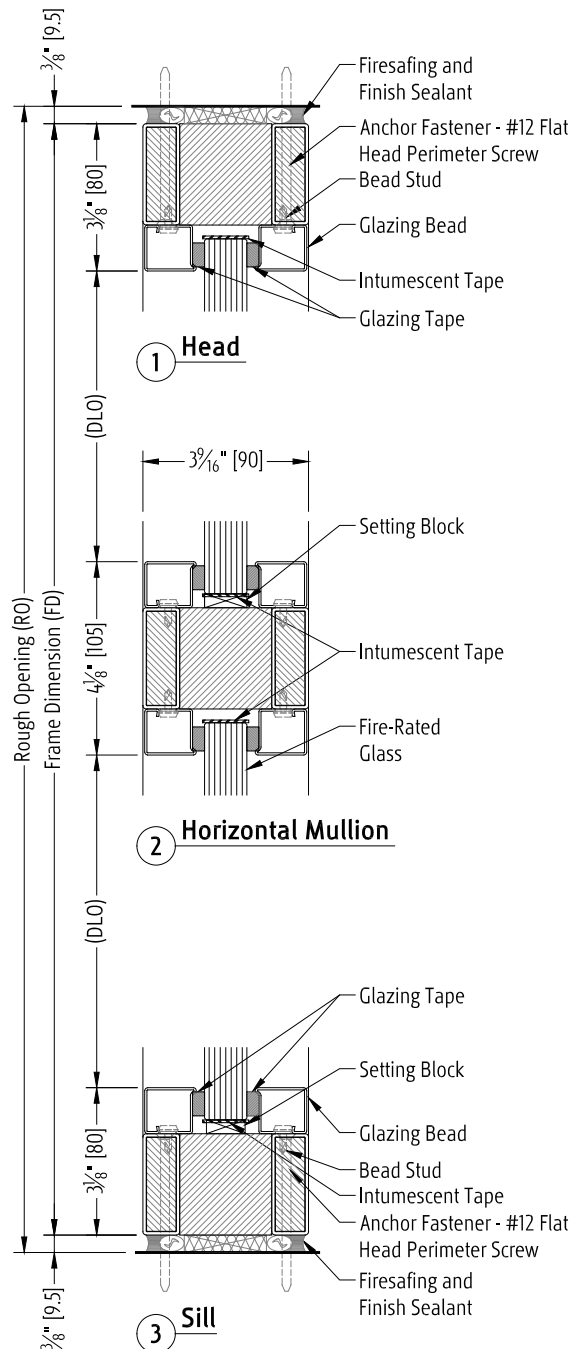


Figure 12 INTERIOR 60 Minute Application

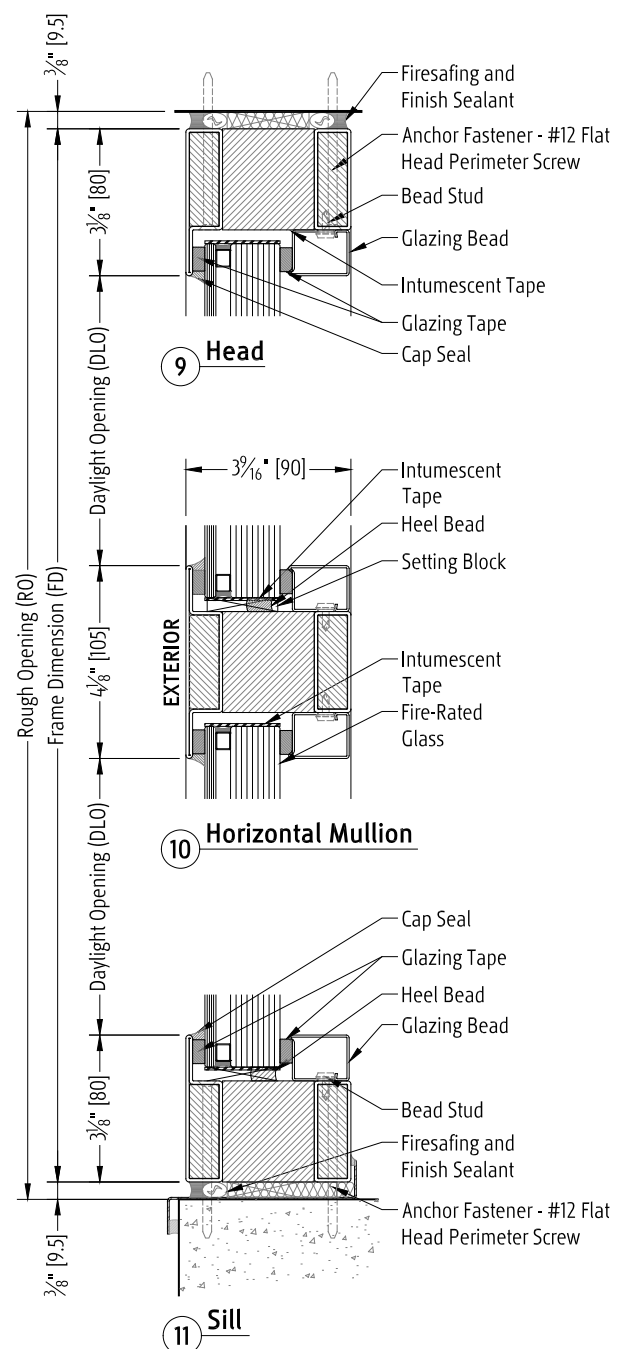


Figure 13 EXTERIOR 60 Minute Application

NOTE: Install Frame Flange on the EXTERIOR of opening. Typical IGU shown.

Typical Section Details – Windows

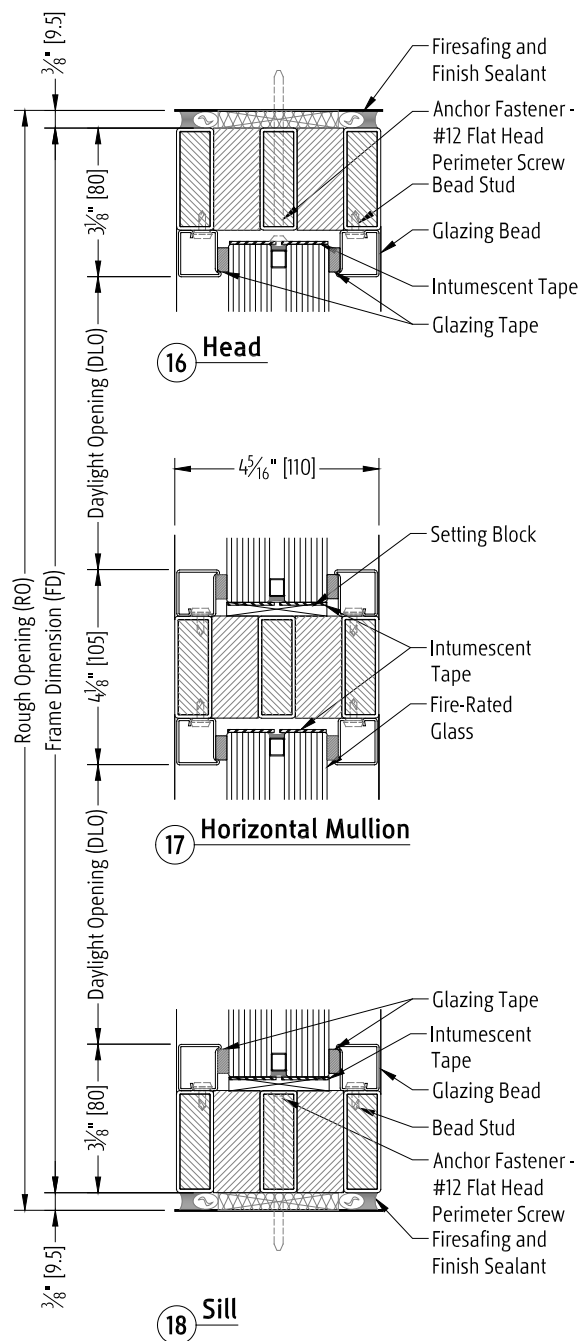


Figure 14 - INTERIOR - 120 Minute Application

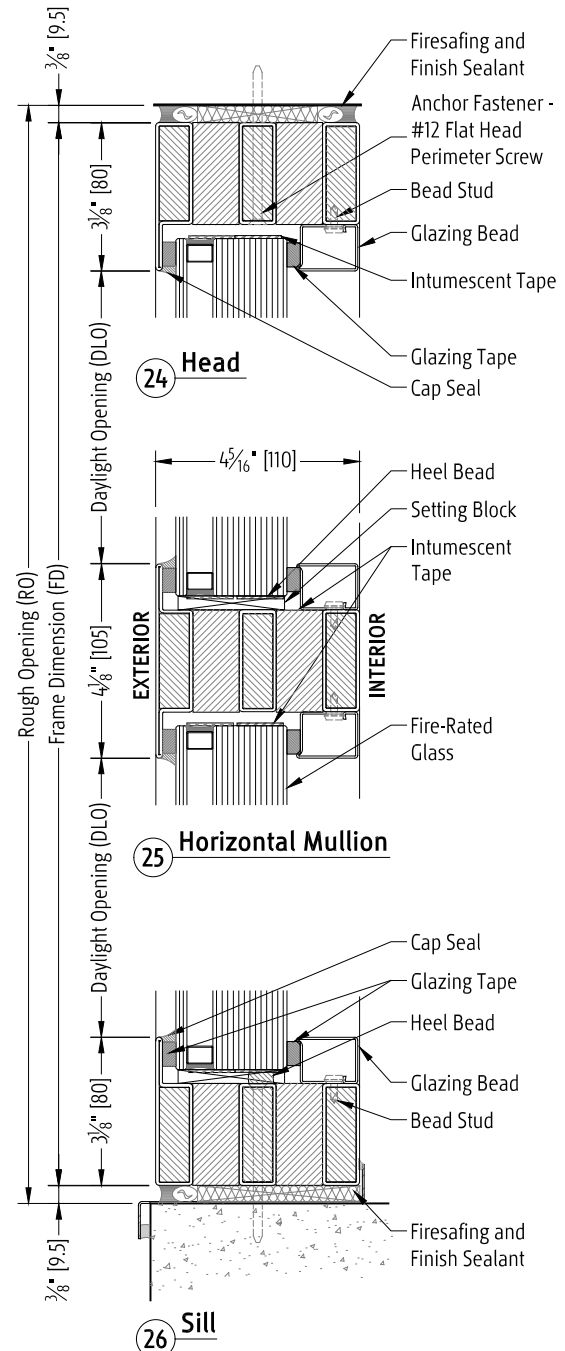


Figure 15 EXTERIOR 120 Minute Application
NOTE: Install Frame Flange on the EXTERIOR of opening.
Typical IGU shown.

Typical Section Details – Windows

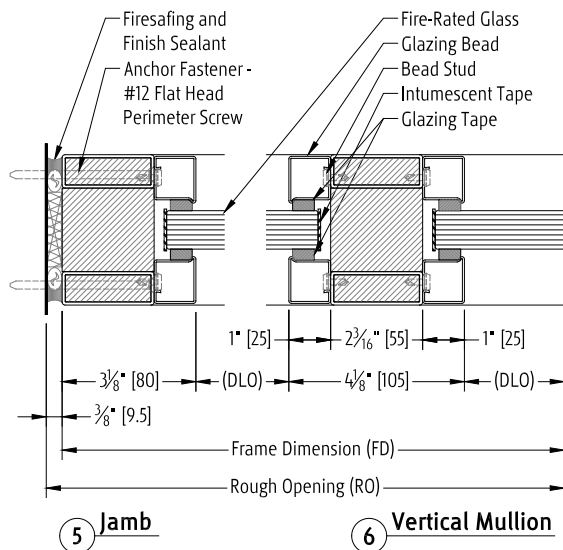


Figure 16 - INTERIOR 60 Minute Application

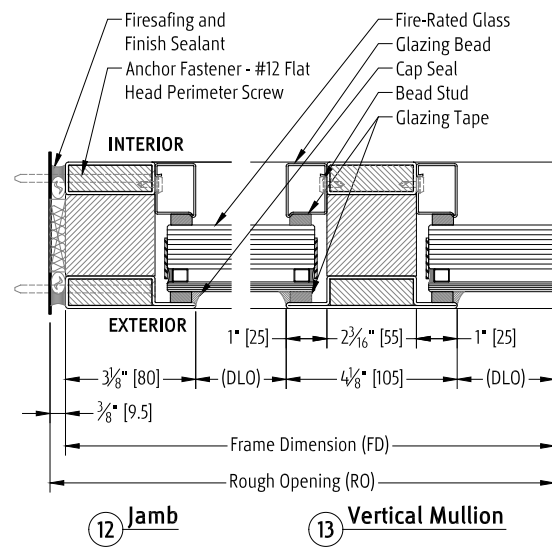


Figure 17 - EXTERIOR 60 Minute Application

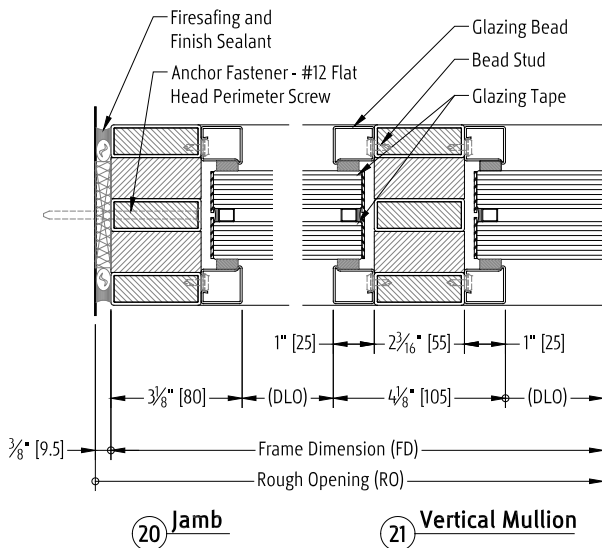


Figure 18 - INTERIOR 120 Minute Application

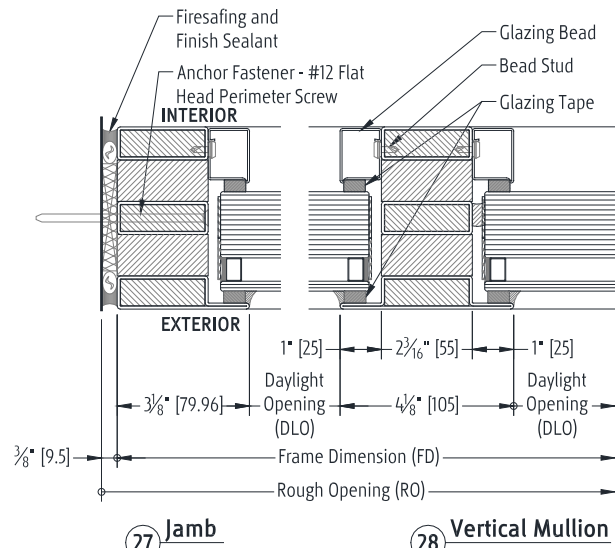


Figure 19 - EXTERIOR 120 Minute Application

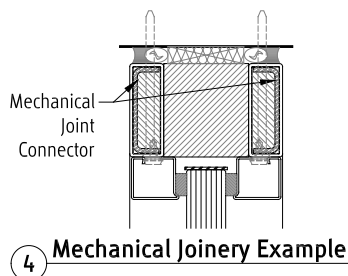


Figure 20 - 60 Minute Mechanical Joinery

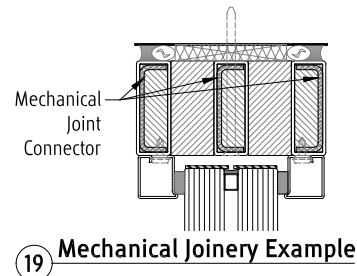
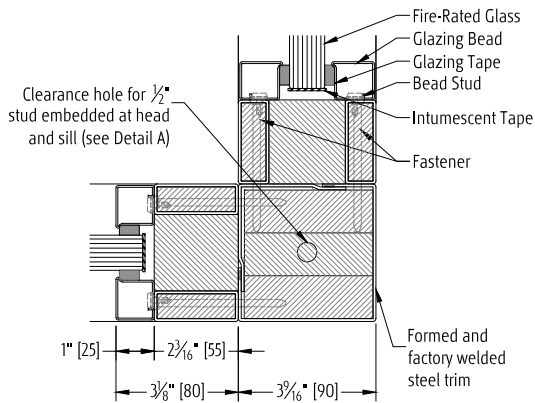
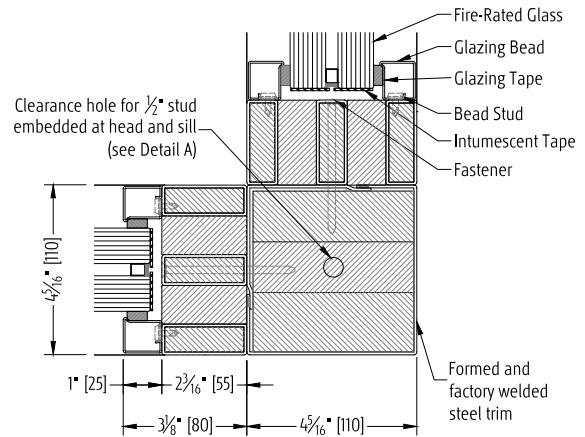
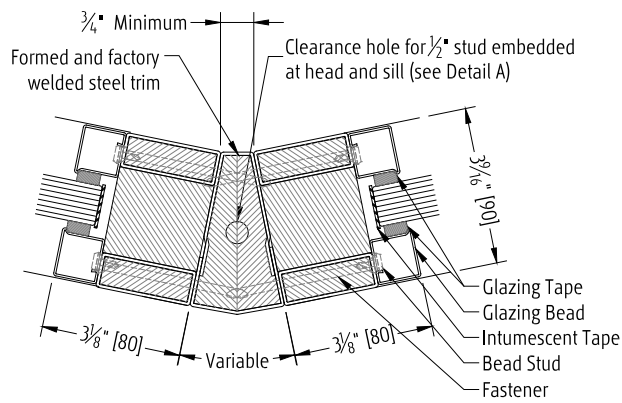


Figure 21 - 120 Minute Mechanical Joinery

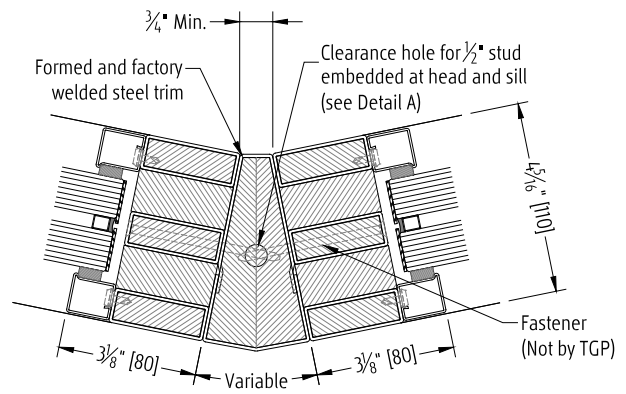
Typical Section Details – Corners



7 **INTERIOR - 90° Corner**
60 Minute

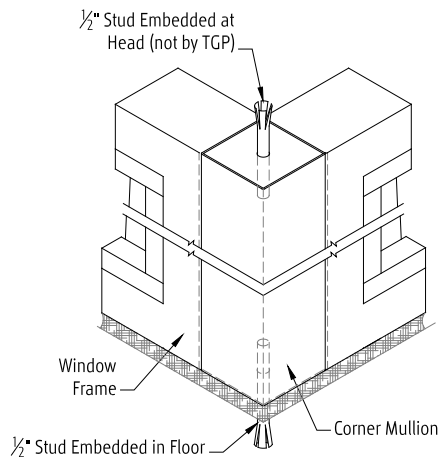


22 **INTERIOR - 90° Corner**
120 Minute



8 **INTERIOR - Segmented Corner (Variable Angle)**
60 Minute

23 **INTERIOR - Segmented Corner (Variable Angle)**
120 Minute



A **Corner Mullion Detail**
Typical at Head and Sill

Figure 22 - Corner Details

Typical Elevations – Single Doors

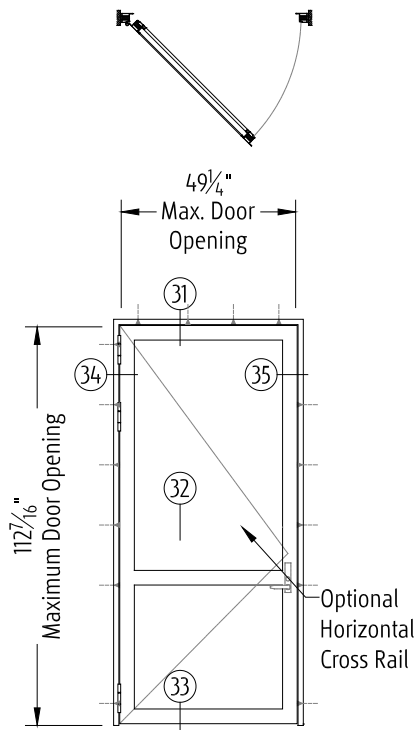


Figure 23 Standalone Door

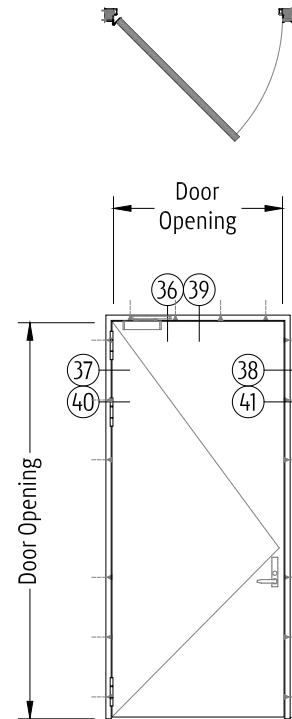


Figure 24 Standalone Door By Others (DBO)

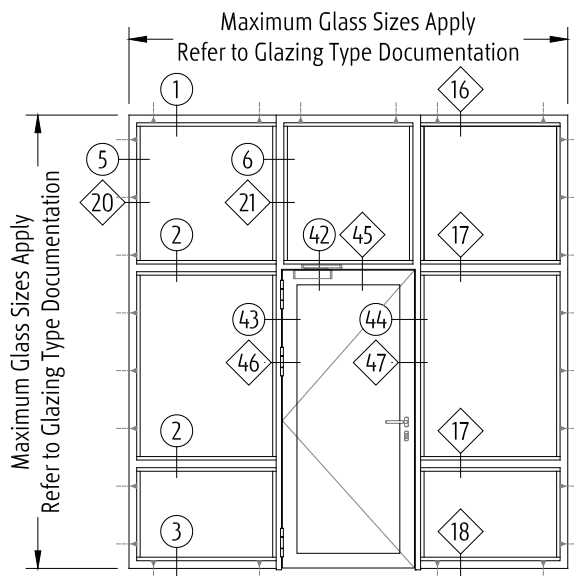
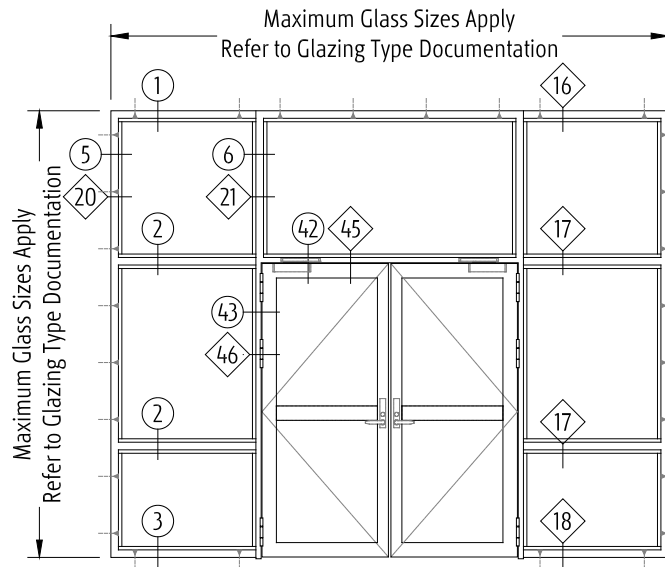


Figure 25 Single Door with Sidelite and Transom
INTERIOR Application Shown

Typical Elevations – Door Pairs



**Figure 26 Pair of Doors with Sidelite and Transom
INTERIOR Application Shown**

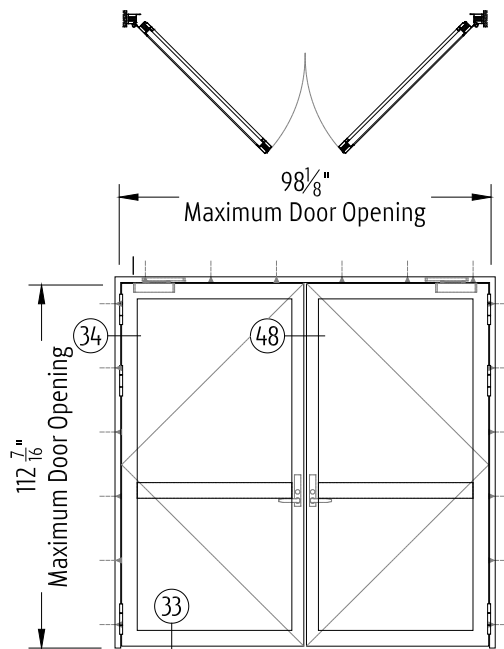


Figure 27 Active/Active Pair

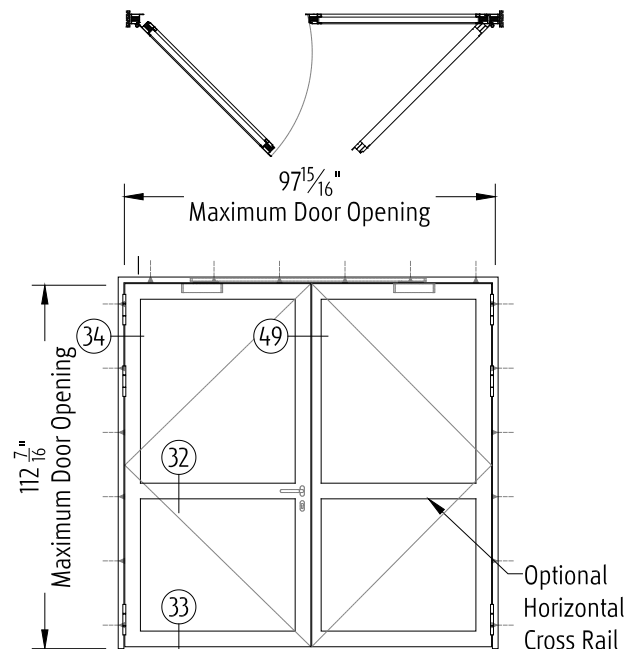
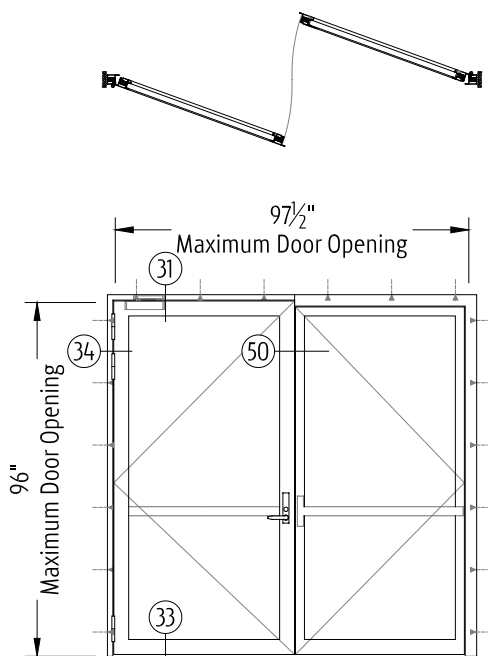
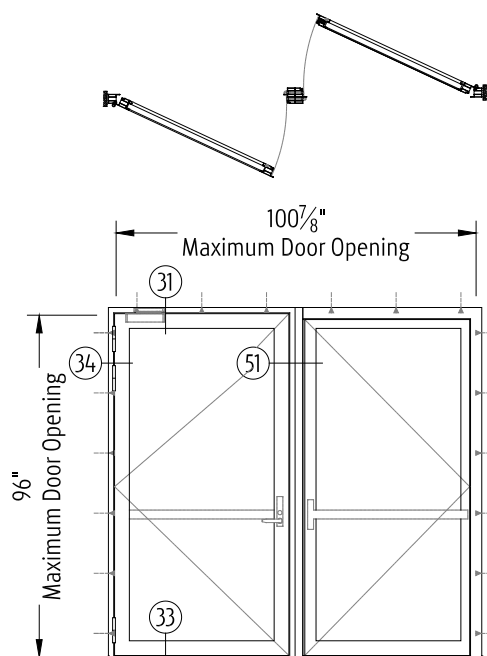


Figure 28 Active / Fixed Pair

Typical Elevations – Door Pairs



**Figure 29 Double Egress Pair
with Meeting Stile**



**Figure 30 Double Egress Pair
with Center Mullion**

Typical Section Details – Doors

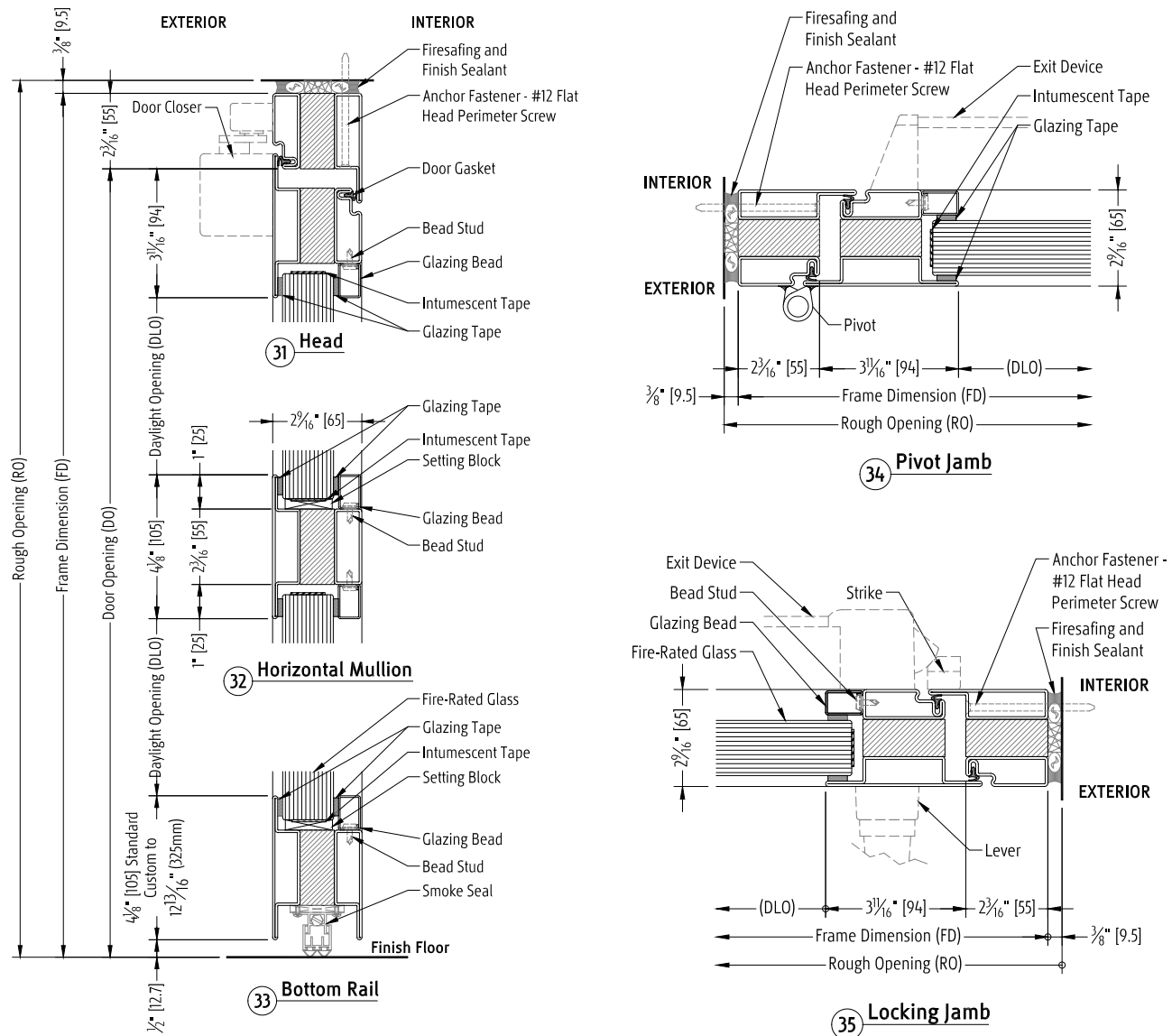


Figure 31 - Standalone 60/90 Minute Door

Typical Section Details – Doors

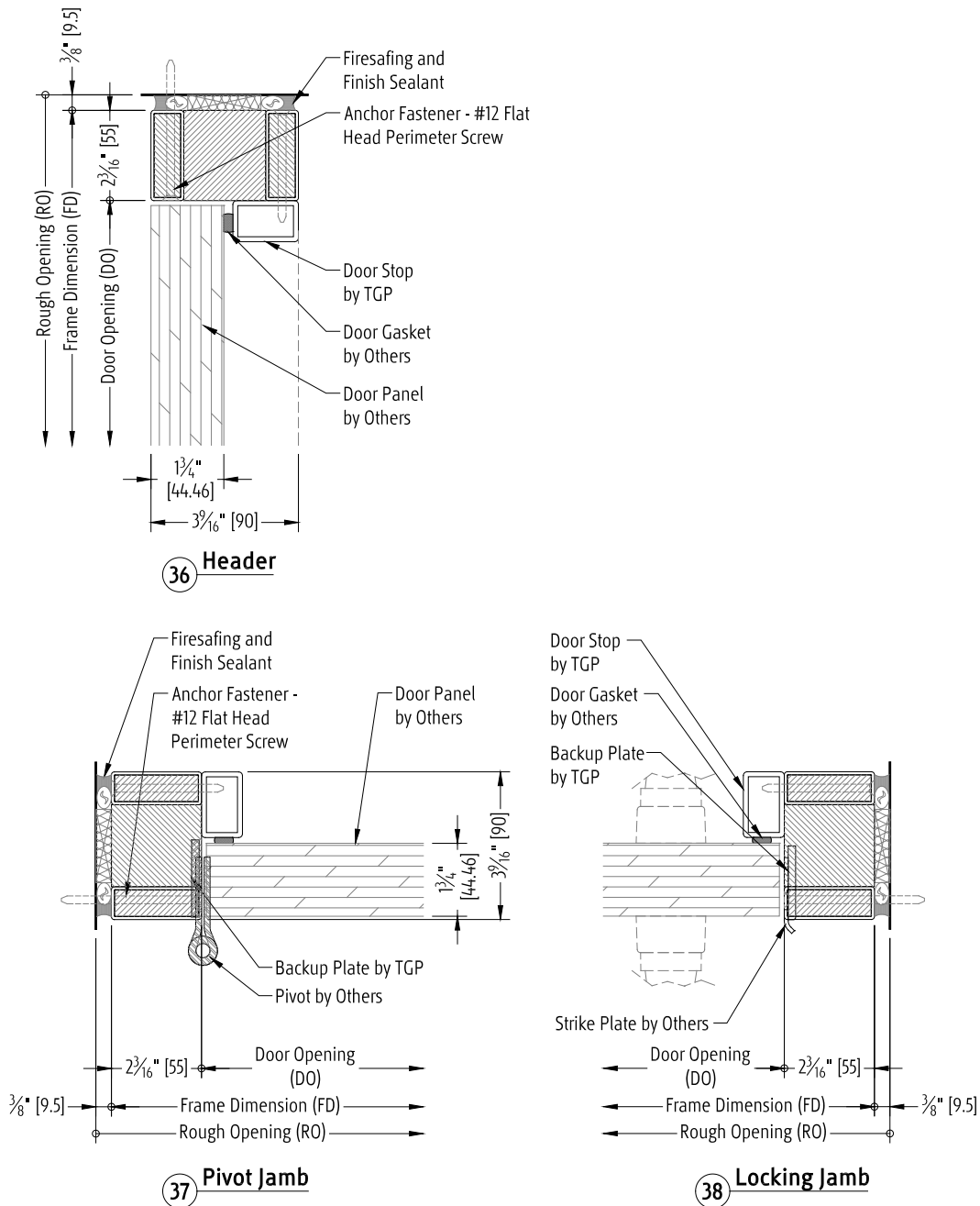


Figure 32 - Door By Others in 90 mm Frame

Typical Section Details – Doors

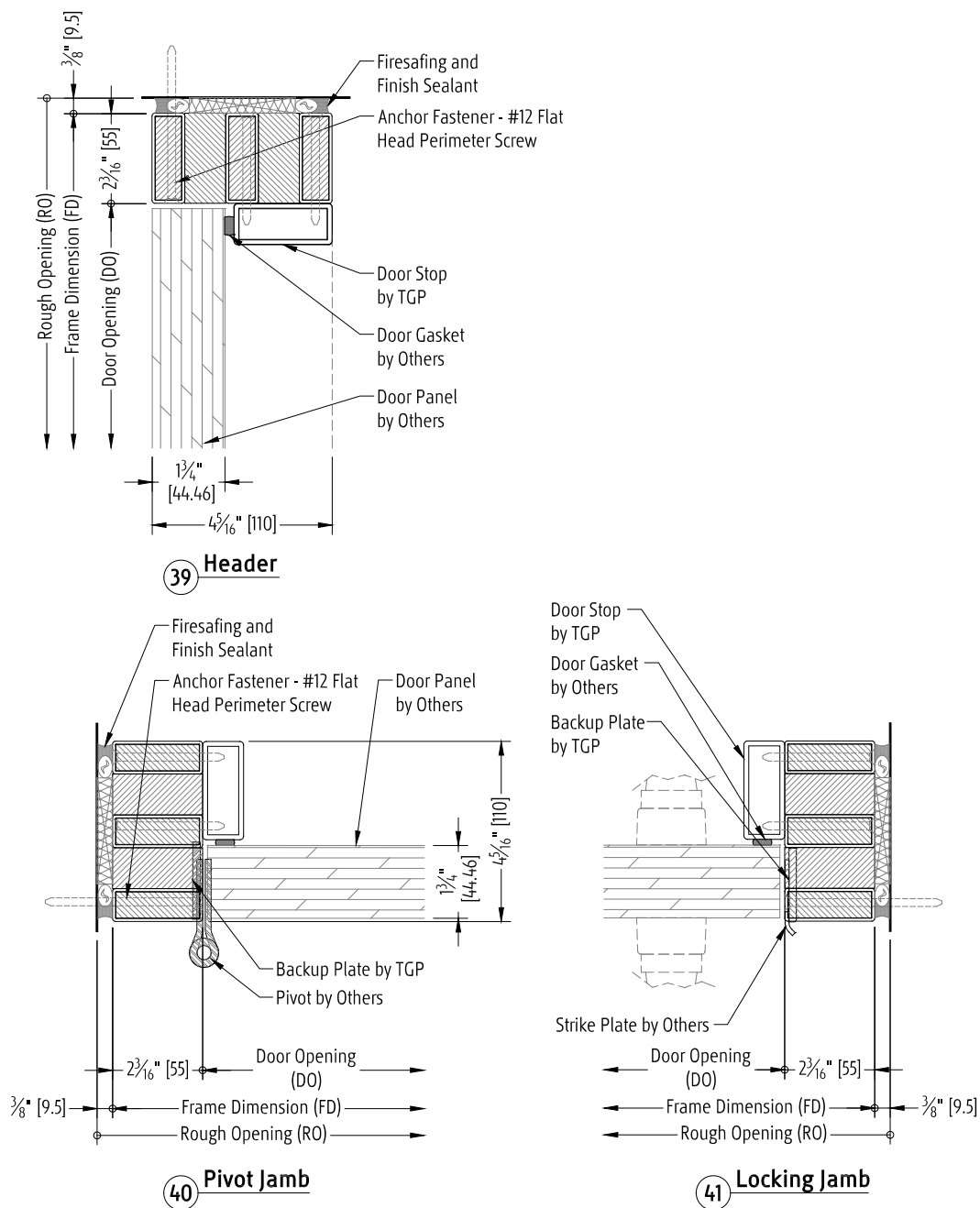


Figure 33 - Door By Others in 100 mm Frame

Typical Section Details – Doors

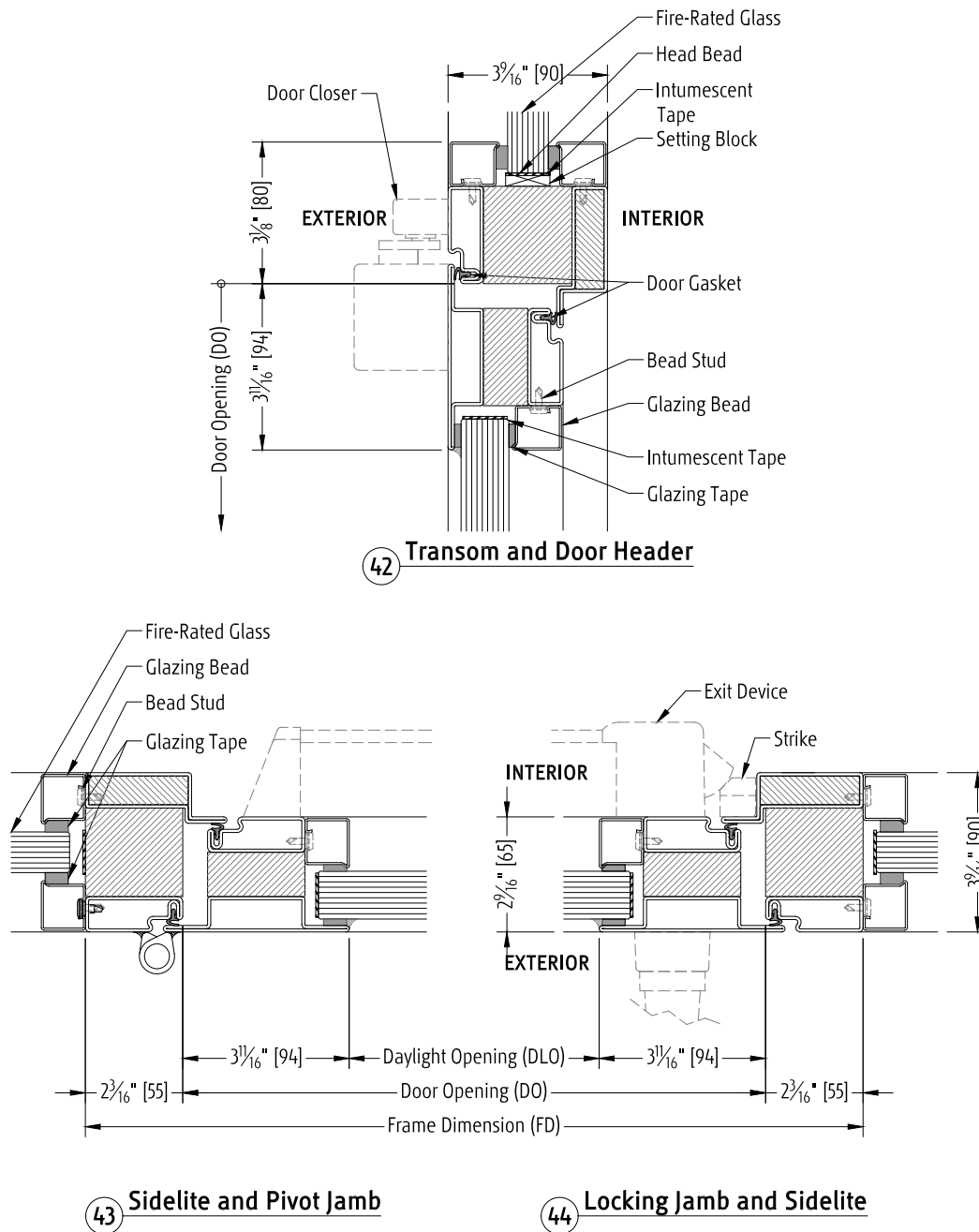


Figure 34 - 60 Minute Frame Assembly with 60 Minute Door

Typical Section Details – Doors

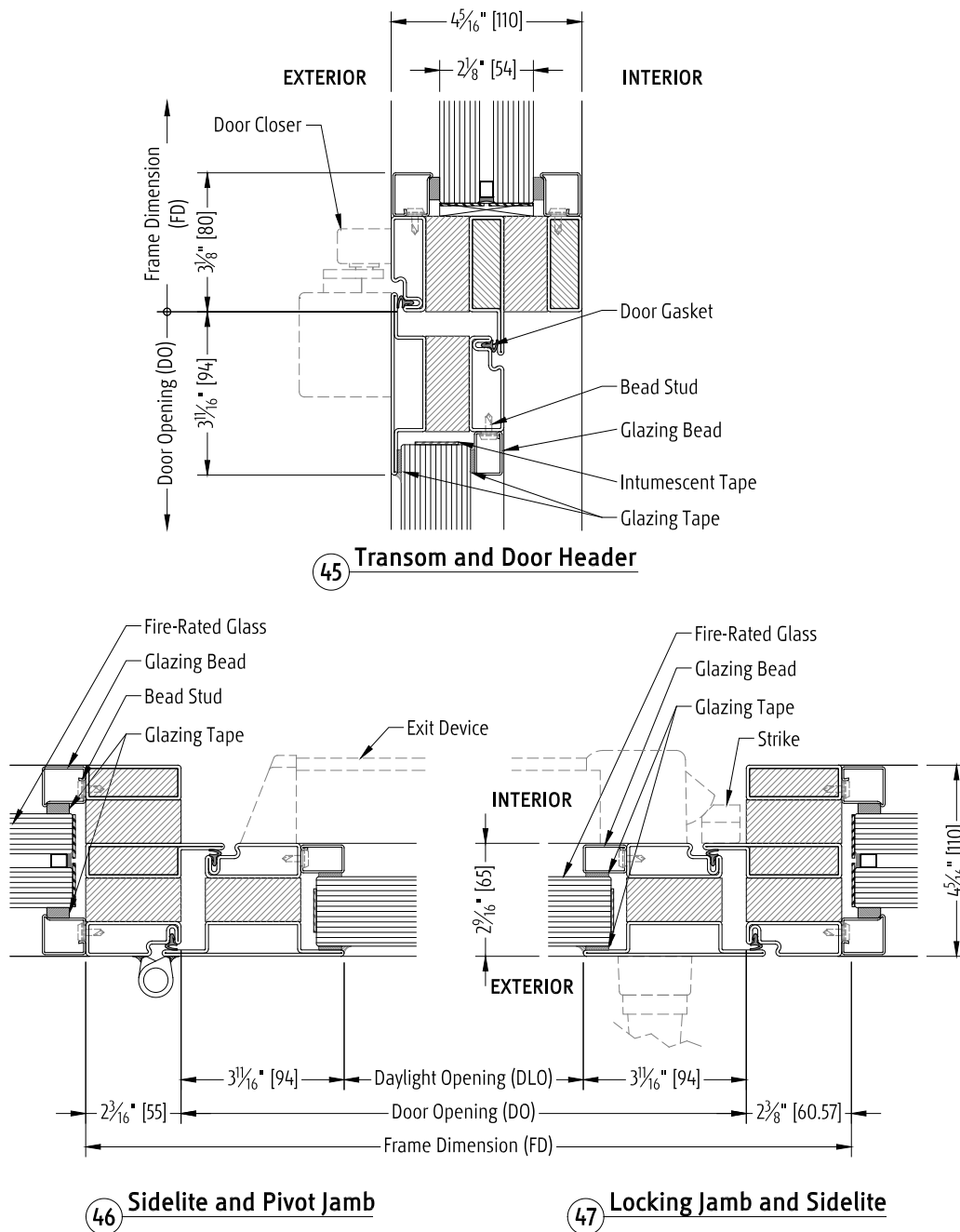


Figure 35 - 120 Minute Frame Assembly with 90 Minute Door

Typical Section Details – Doors

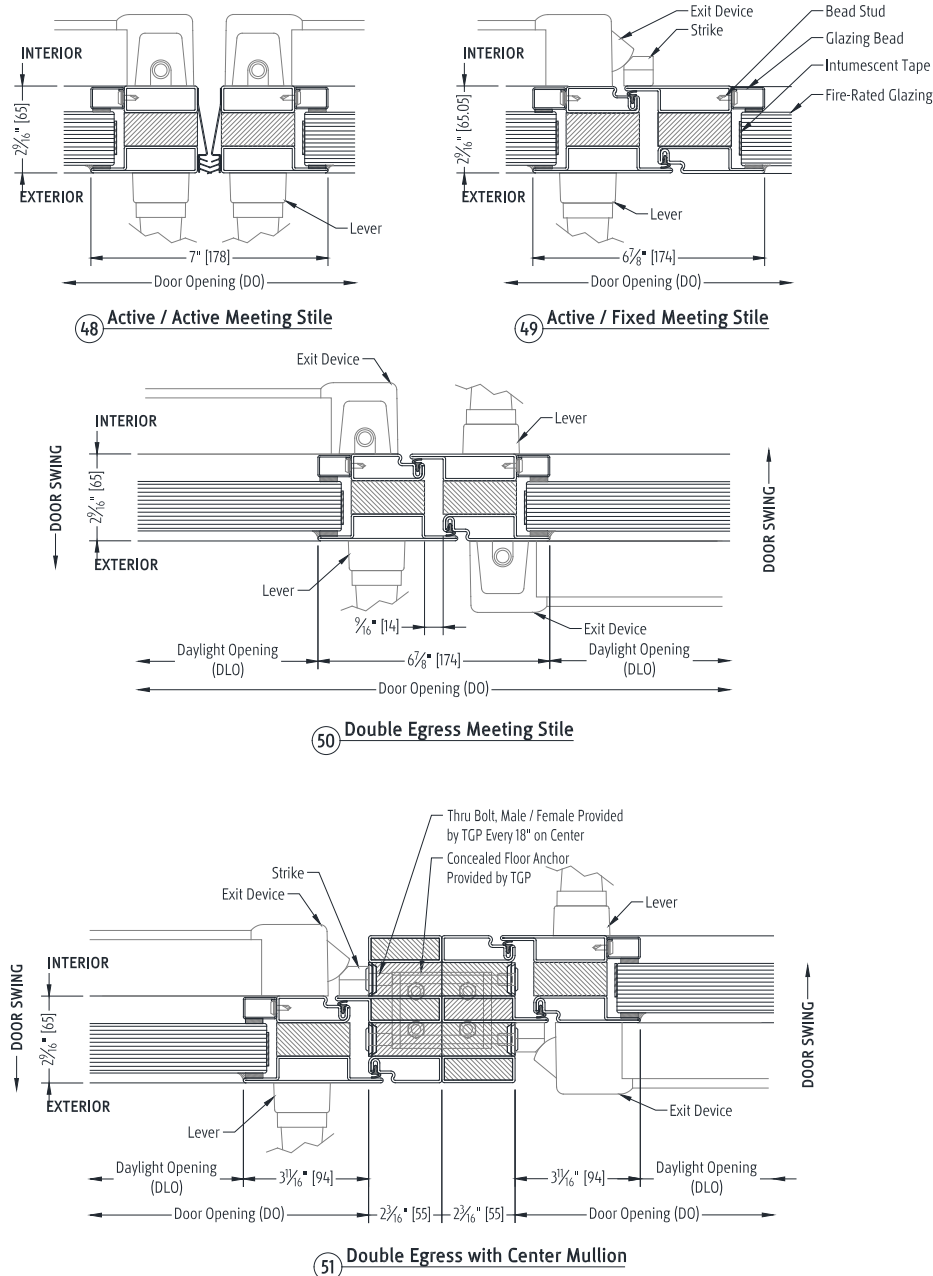


Figure 36 - Door Meeting Stiles

In accordance with California Prop 65, products received from TGP may contain the required warning label (below) indicating that they may contain door hardware or other components known to cause cancer and reproductive harm. For more information, go to www.P65Warnings.ca.gov.

In accordance with California PROP65 -
⚠ WARNING: Cancer and Reproductive Harm-www.P65Warnings.ca.gov
⚠ ADVERTENCIA: Cáncer y Daño Reproductivo-www.P65Warnings.ca.gov
⚠ AVERTISSEMENT: Cancer et Troubles de l'appareil reproducteur-
www.P65Warnings.ca.gov P518-742