

Metal Panel & Spandrel Glass Design Guidelines

STARLINE
WINDOWS



Quality, Comfort & Peace of Mind



Foreword

This Design Guide provides specifications on metal panels and spandrel glass used alongside aluminum windows and doors.

This document is intended to provide information on our standard products. Non-standard designs and applications can be reviewed to determine the feasibility on a project-specific basis.

Please email any project specific enquiries to architectural@starlinewindows.com or technical@starlinewindows.com.

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Exterior and Interior Material for Bypass and Other Opaque Areas

The following options are available for the bypass and other opaque areas:

- Single lite spandrel glass¹ on the exterior with either an aluminum or galvanized panel on the interior.
- Aluminum panel on the exterior with either an aluminum or galvanized panel on the interior.
- Top hat on the exterior with either an aluminum or galvanized panel on the interior.
- Corrugated metal panel² is available in three different options:
 - Rectangular 1" x 2" extrusion on the exterior with either an aluminum or galvanized panel on the interior.
 - Rectangular 1" x 4" extrusion on the exterior with either an aluminum or galvanized panel on the interior.
 - Curved sheet panel extrusion on the exterior with either an aluminum or galvanized panel on the interior. The flutes are 7/8" deep and are spaced 2 11/16" center to center.
- 2" raised aluminum panel on the exterior with either an aluminum or galvanized panel on the interior³.
- Spandrel IGU^{1, 4, 5} on the exterior with either an aluminum or galvanized panel on the interior.
- Sandwich panel is available for opaque areas, other than bypass locations^{6, 7}.

Note: More options may be available and can be reviewed on a project-specific basis.

¹ The minimum size for a spandrel glass lite at a bypass condition is 13" x 14", 11 3/4" x 14" for in-slab duct, and that is the lite itself, not including framing members. The minimum size for a spandrel glass lite at locations other than the bypass is 9" x 14" and that is the lite itself, not including framing members. Tempering is required for spandrel glass. Refer to the section titled [Spandrel Glass Minimum Size](#) for image and further clarity.

² Corrugated panels are available for the series 9000 only. Refer to [Corrugated Metal Panel](#) for information regarding tolerances and reveals

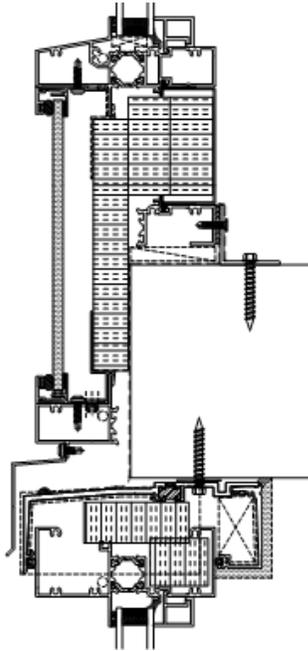
³ The 2" raised aluminum panel is available for the series 9000, 9000SSG and 9003 only. Refer to [2" Raised Metal Panel](#) for information regarding tolerances and reveals.

⁴ When a spandrel IGU is selected an alternative bypass detail (DC7) is used instead of Starline's standard bypass detail (DC6). Refer to the section titled [Spandrel IGU](#) for image and further clarity.

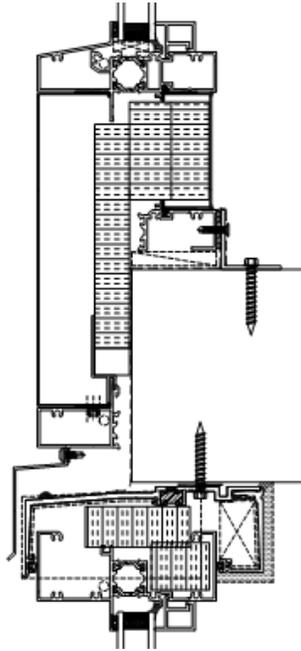
⁵ The spandrel IGU at bypass locations is available for the series 9000, 9003, and 9000SSG only.

⁶ The only panel option available for Unitized Curtain Wall is sandwich panels.

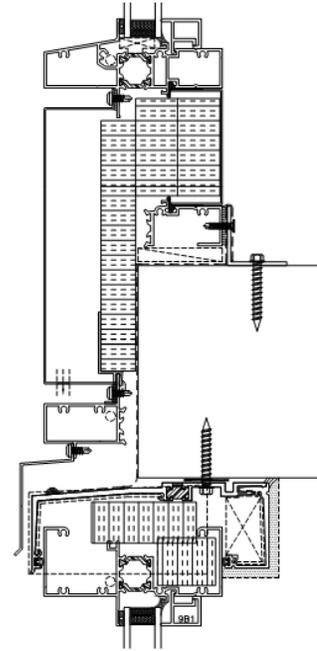
⁷ Sandwich panels are available at the bypass for the series 9000SSG if there is vision glass above.



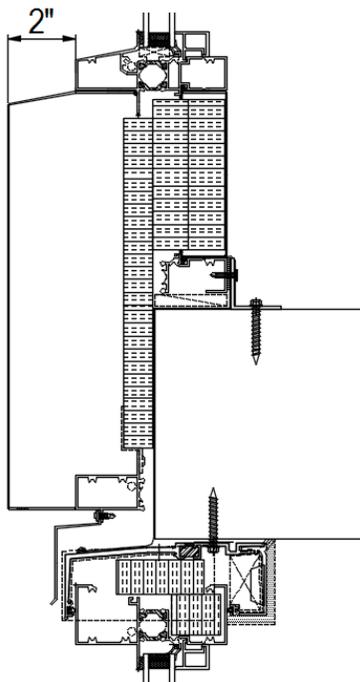
Exterior: Spandrel Glass
Interior: Aluminum Back Pan,
Also available with galvanized back pan



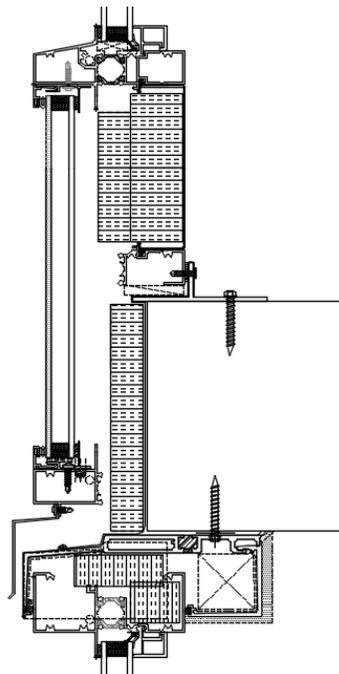
Exterior: Aluminum Panel
Interior: Galvanized Back Pan
Also available with aluminum back pan



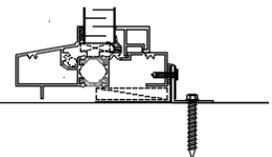
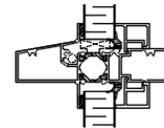
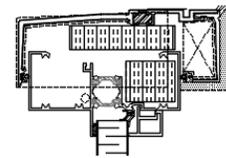
Exterior: Top Hat Panel
Interior: Aluminum Back Pan
Also available with galvanized back pan



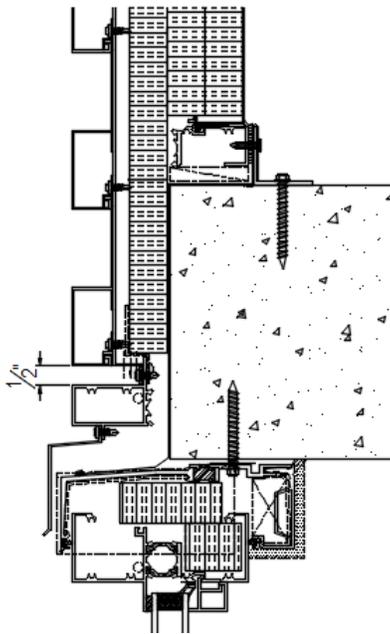
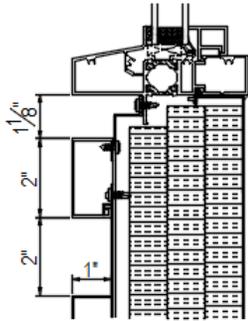
Exterior: 2" Raised Aluminum Panel
Interior: Aluminum Back Pan,
Also available with galvanized back pan



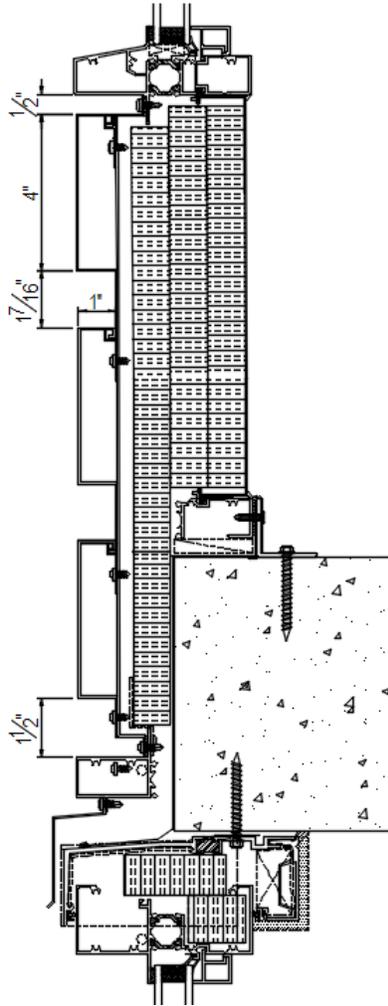
Exterior: Spandrel IGU
Interior: Galvanized Back Pan
Also available with aluminum back pan



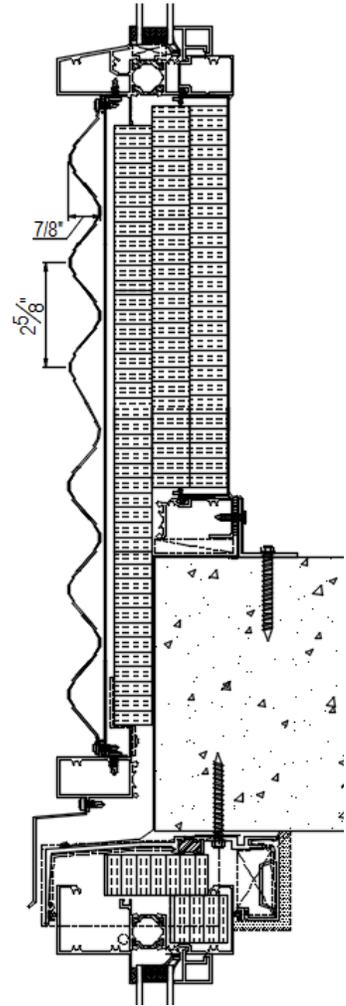
Exterior: 16 gauge aluminum
Middle: Polyisocyanurate
Interior: 16 gauge aluminum



Exterior: 1" x 2" Corrugated Panel
 Interior: Galvanized Back Pan
 Also available with galvanized back pan



Exterior: 1" x 4" Corrugated Panel
 Interior: Galvanized Back Pan
 Also available with galvanized back pan



Exterior: Curved Corrugated Pan
 Interior: Galvanized Back Pan
 Also available with galvanized back pan

Spandrel Glass Guidelines

General Information and Recommended Size Guidelines

Starline offers spandrel glass which is available in ceramic frit and opaci-coat. There is a wide range of patterns and colours available which can be reviewed on a project specific basis.

Starline's spandrel glass manufacturer, Vitrum, offers 3 different opaci-coat options with respects to pricing: Standard, Select, and Custom opaci-coat spandrel glass. Choosing from the standard line is most cost effective, followed by the select line and then the custom colours, which comes at a cost premium.

To view Vitrum's standard and select opaci-coat colour options refer to the following link:

<https://www.vitrum.ca/glass-products/spandrel-glass/color-selection/>

Note:

- Metallic spandrel glass is not available as there are occasions where a characteristic of metallic spandrel will create dark spots in the glazing. There are options available which provides a similar look to metallic spandrel glass (ex. Reflective glass with solid spandrel).
- When spandrel glass is used in any SSG application the use of ceramic frit is required. SSG applications do not allow the use of opaci-coated spandrel glass.
- Electrical, mechanical and other cut-outs cannot be made in spandrel glass. If cut-outs are required refer to the section titled [Electrical, Mechanical & Other Penetrations](#) for image and further clarity.
- Starline's spandrel glass products are intended to be glazed against a uniform, opaque background. We do not recommend that spandrel glass be used in any application where glass can be viewed with daylight or artificial light on the opposite side. There are options for vision applications that allow varying degrees of color, light transmission and pattern to be used. These options include silkscreen ceramic frit, digital printing, colored or diffused laminated PVB or SGP or acid etched glass.

Maximum Area For Spandrel

GLASS LITE THICKNESS	MAXIMUM IGU AREA		WIDTH		HEIGHT ¹			
	DOUBLE GLAZED	TRIPLE GLAZED	MIN.	MAX.	MIN.	MIN. AT BYPASS	MIN. AT IN-SLAB DUCT	MAX.
4mm	30 sq. ft.	30 sq. ft.	14"	72"	9"	13"	11 3/4"	84"
5mm	40 sq. ft.	35 sq. ft.	14"	72"	9"	13"	11 3/4"	84"
6mm	40 sq. ft.	35 sq. ft.	14"	72"	9"	13"	11 3/4"	84"

¹ Minimum size for a spandrel glass lite at a bypass condition is 13" x 14", 11 3/4" x 14" for in-slab duct, and that is the lite itself, not including framing members. Minimum size for a spandrel glass lite at locations other than the bypass is 9" x 14" and that is the lite itself, not including framing members. Both single lite and IGU, must be tempered. Refer to the following section [Spandrel Glass Minimum Size](#) for image and further clarity.

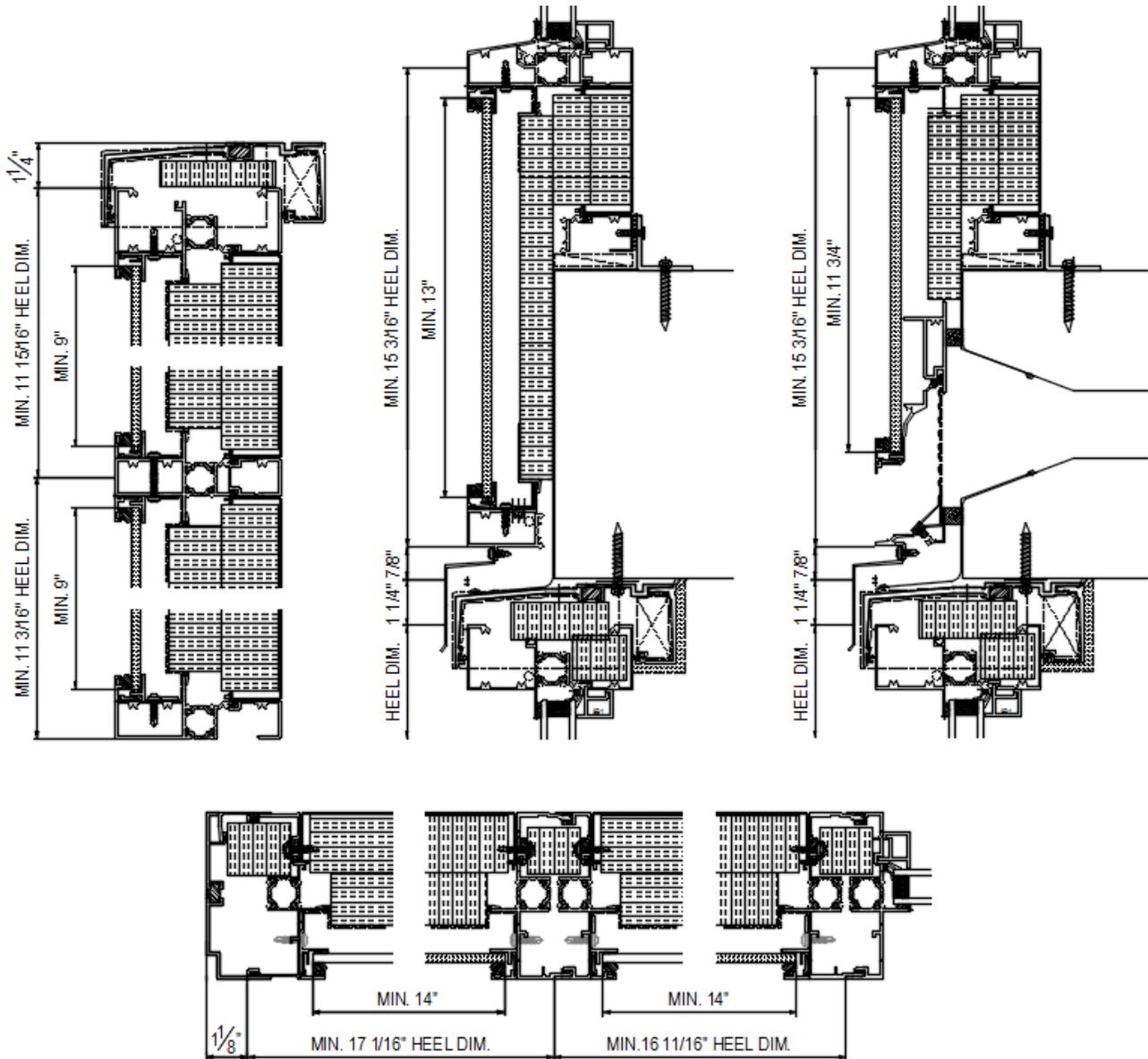
Spandrel Glass Minimum Size

The minimum size for a spandrel glass lite at a bypass condition is 13" x 14", 11 3/4" x 14" for in-slab duct, and that is the lite itself, not including framing members.

The minimum size for a spandrel glass lite at locations other than the bypass is 9" x 14" and that is the lite itself, not including framing members.

Images below are the series 9000 and provides the minimum heel dimension required when utilizing spandrel glass with dimensions of 14" wide x 13" tall at the bypass and 14" wide x 9" tall at locations other than the bypass. Other series minimum heel dimensions will vary.

Note: Width and height dimensions are interchangeable.



Spandrel IGU

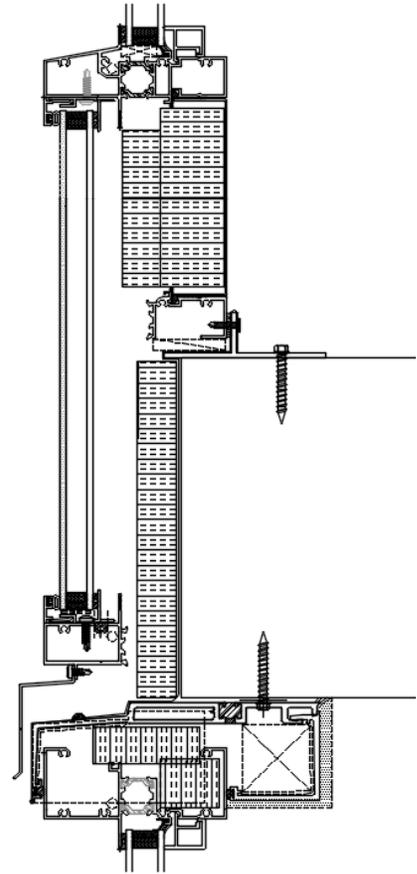
Spandrel IGUs are available for all series at opaque areas other than the bypass.

Spandrel IGUs at the bypass are available in series 9000, 9003 and 9000SSSG only.

When using a Spandrel IGU at bypass locations, the DC7 detail is required. Using the DC7 detail involves some specific detailing including:

- upgrading to a 7" head deflector (standard is 6")
- using a T-angle for the installation sill angle (standard is an L-angle)

This DC7 detail is required to provide an adequate airspace between the IGU and the insulation. This detail will provide 1" of continuous insulation at the slab edge.



Metal Panel Guidelines

Starline offers flush metal panels, top hat panels and sandwich panels for all window wall series.

A 2" raised metal panel is available for the Series 9000, 9003 and 9000SSG.

Corrugated metal panels are available for the Series 9000 only.

Starline's unitized curtain wall is only available with sandwich panels.

For the series 9000SSG, if vision glass or spandrel glass (single lite or IGU) is used for the "Vision" section of the window module, spandrel glass (single lite or IGU) or sandwich panels are the only option at the bypass locations. If a flush or 2" raised metal is desired, the entire window module is required to be that option. The Top Hat panel is not an option.

Note:

The metal panels manufactured by Starline are not CNC machined composite material like Alucobond or Reyobond; rather they are monolithic aluminum sheet, sheared, formed to shape and powder coated. Monolithic aluminum panels are typically a lower cost alternate to composite metal panels and they do not provide the same aesthetics. Monolithic aluminum panels typically have more variance in dimension and flatness.

The Starline monolithic metal panels are produced to a tolerance of +/- 0.25% of the required dimension and panel bow is to be a maximum of 0.5% of the panel dimension width and length.

They are installed into the window wall module frame centered. This results in a potential total width variation of 1/4" in contiguous 50" wide panels which would create a maximum vertical plane variance of 1/8". Further, the horizontal reveals on contiguous 25" tall panels could potentially vary by up to 1/8" over the width of the panels.

The window wall modules are installed at site with a maximum variance to plumb of +/- 0.25%. (+/- 1/4" / 96"). This can result in adjacent panel reveals varying by up to 1/2" over a 96" height.

The table below outlines the sizing parameters for the different panel options.

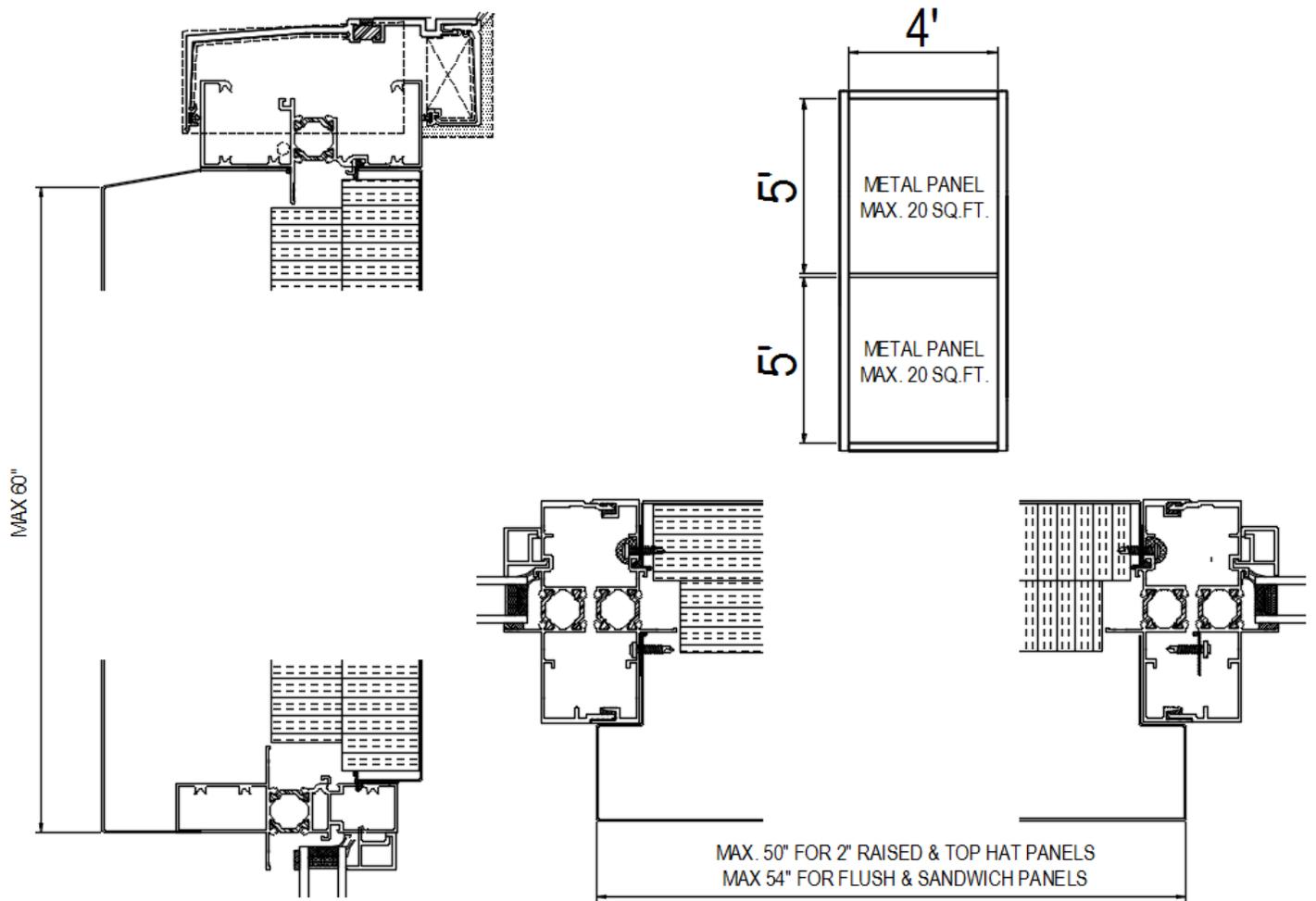
Metal Panel Sizing Guidelines

PANEL TYPE	MAXIMUM SURFACE AREA	WIDTH		HEIGHT	
		MINIMUM	MAXIMUM	MINIMUM	MAXIMUM
Flush Metal Panel	20 sq. ft.	15 3/8"	54"	8 9/16"	60"
Top Hat Panel	20 sq. ft.	16 7/16"	50"	8 5/8"	60"
2" Raised Metal Panel	20 sq. ft.	19 1/4"	50"	9 1/4"	60"
Sandwich Panel	20 sq. ft.	10"	54"	5"	60"

The minimum and maximum sizes noted above refers to the surface of the panel. The dimensions and area of the panel once it bends back to attach to the frame does not need to be included. The metal panel dimensions are interchangeable.

- A flush panel could be 60" wide x 54" tall.
- A 2" raised metal panel could be 60" wide x 50" tall.

Note: Smaller dimensions may be available on a project specific basis and for an additional cost.



The dimensions and area of the panel once it bends back to attach to the frame does not need to be included. The metal panel dimensions are interchangeable.

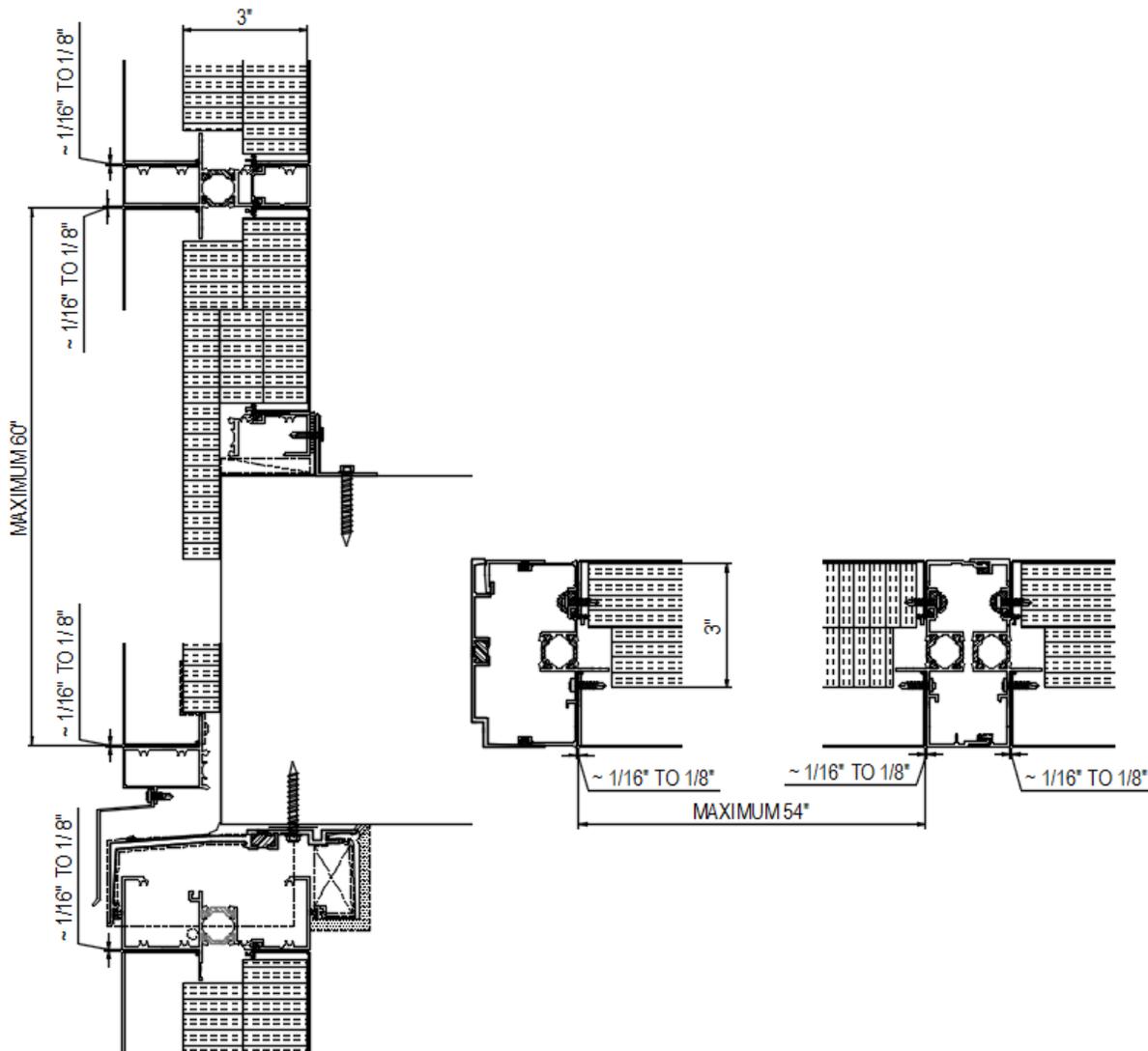
Flush Metal Panels

Flush metal panels are available for all of Starline’s window wall series. There is a small reveal of 1/16” to 1/8” between the framing members and the flush panel.

The exterior metal panel is made from 14 or 16 gauge aluminum and is powder coated to match the exterior frame colour. The interior back pan can be either- 14 or 16 gauge aluminum or 20 gauge galvanized sheet metal. If the interior will be exposed the material will be aluminum and is painted to match the interior frame colour. If the interior will be covered (ex. by a wall) the interior material will be galvanized sheet metal. If galvanized it will be recessed ~ 1/8” into the frame. Thickness (gauge) of the material will be determined on a project specific basis.

Flush metal panels contain 3” of mineral wool at ~R4 per inch.

The flush panel dimensions are interchangeable. Refer to [Metal Panel Sizing Guidelines](#) for the minimum and maximum dimensions of a flush metal panel.



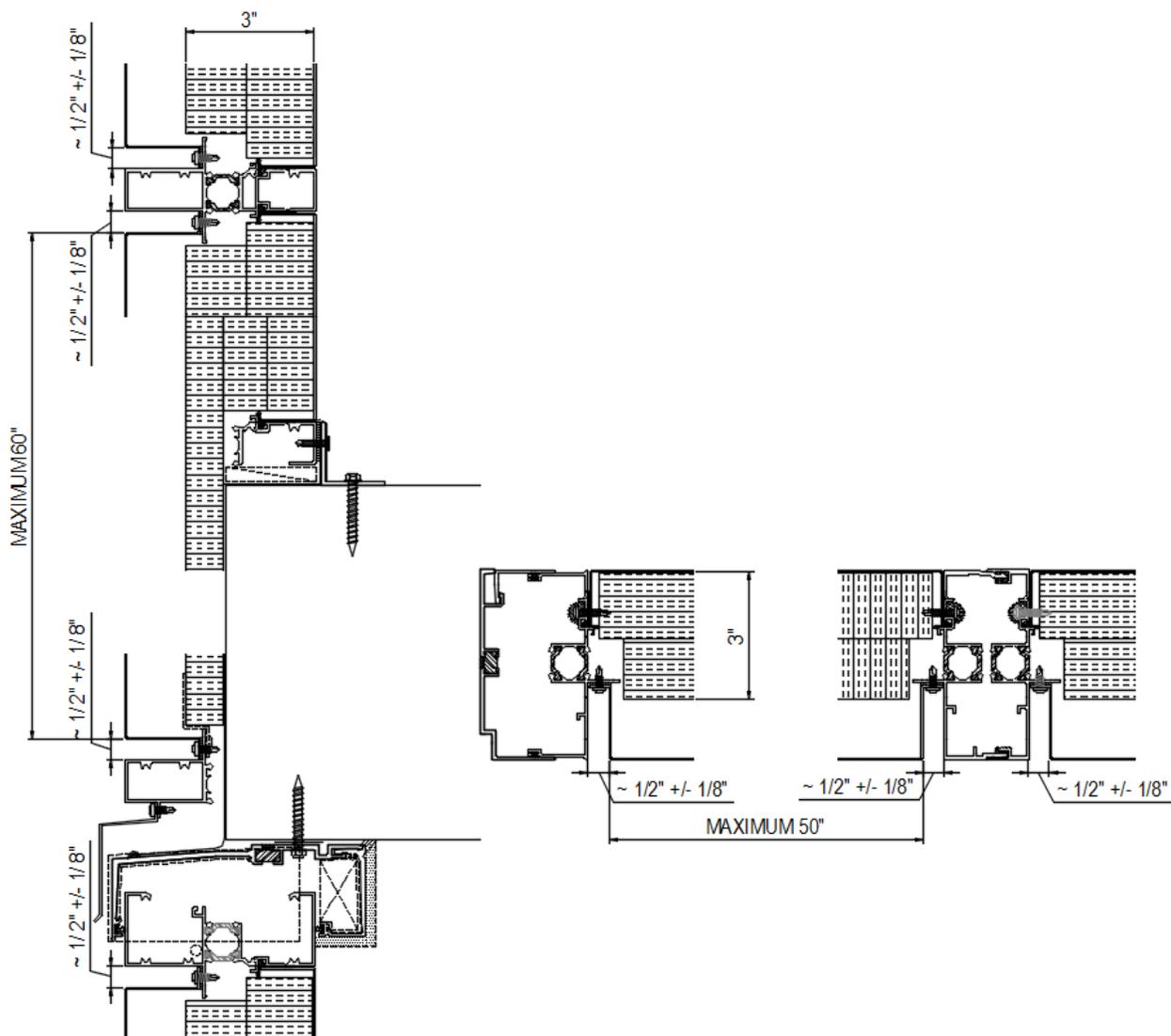
Top Hat Panels

Top hat panels are available for all of Starline's window wall series. The reveal between the framing member and the face of the top hat panel is $\sim 1/2'' \pm 1/8''$.

The exterior top hat panel is made from 14 or 16 gauge aluminum and is powder coated to match the exterior frame colour. The interior back pan can be either 14 or 16 gauge aluminum or 20 gauge galvanized sheet metal. If the interior will be exposed the material will be aluminum and is painted to match the interior frame colour. If the interior will be covered (ex. by a wall) the interior material will be galvanized sheet metal. If galvanized it will be recessed $\sim 1/8''$ into the frame. Thickness (gauge) of the material will be determined on a project specific basis.

Top hat panels contain 3" of mineral wool at $\sim R4$ per inch.

The top hat panel dimensions are interchangeable. Refer to [Metal Panel Sizing Guidelines](#) for the minimum and maximum dimensions of a top hat panel.



Corrugated Metal Panel

Corrugated panels are available for the series 9000 only.

Corrugated metal panel is available in three different options:

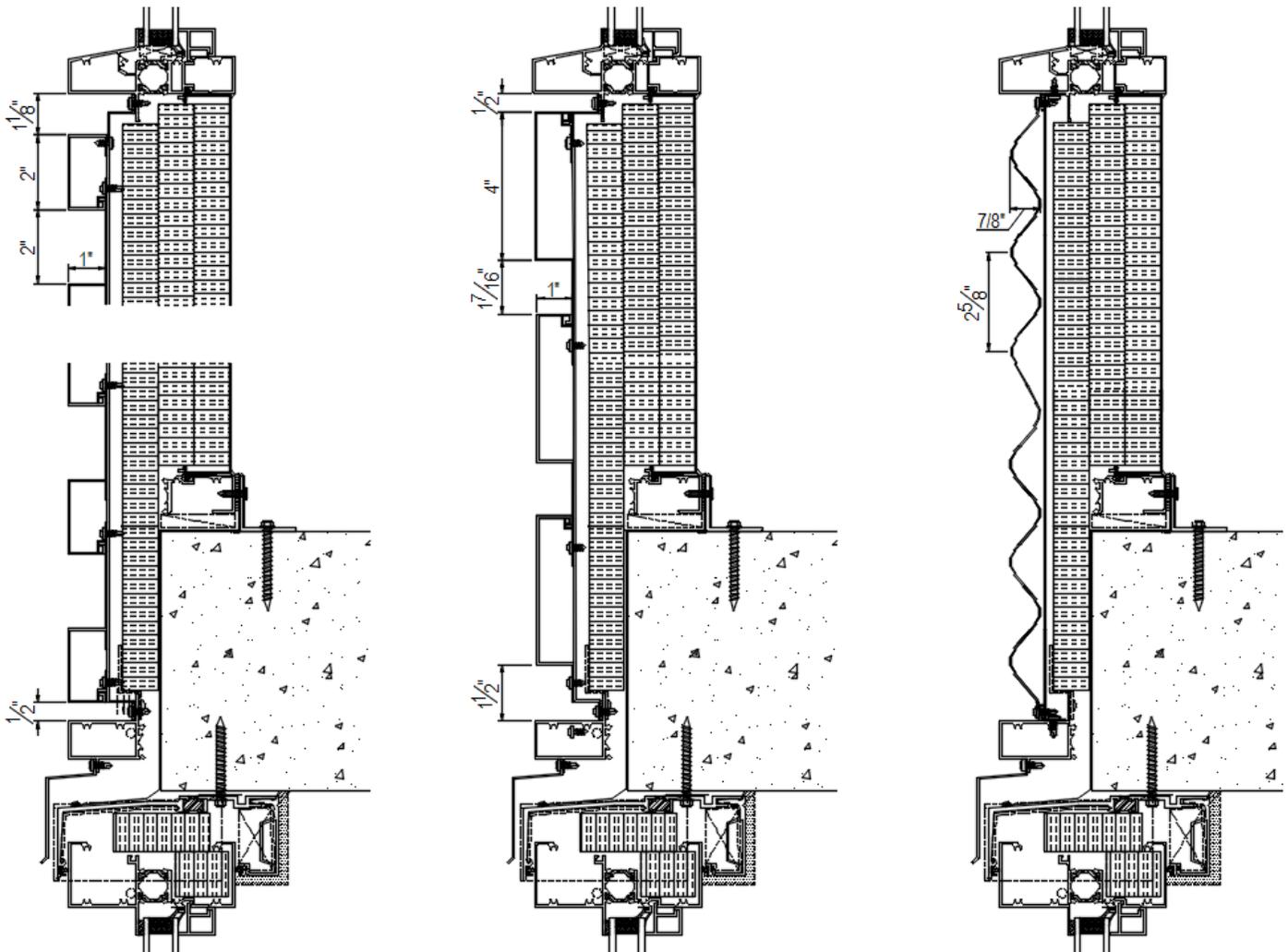
- Rectangular 1" x 2" extrusion on the exterior with either an aluminum or galvanized panel on the interior.
- Rectangular 1" x 4" extrusion on the exterior with either an aluminum or galvanized panel on the interior.
- Curved sheet panel extrusion on the exterior with either an aluminum or galvanized panel on the interior. The flutes are 7/8" deep and are spaced 2 11/16" center to center.

The interior back pan can be either 14 or 16 gauge aluminum or 20 gauge galvanized sheet metal. If the interior will be exposed the material will be aluminum and is painted to match the interior frame colour. If the interior will be covered (ex. by a wall) the interior material will be galvanized sheet metal. If galvanized it will be recessed ~ 1/8" into the frame. Thickness (gauge) of the material will be determined on a project specific basis.

The corrugated metal panels contain 3" of mineral wool at ~R4 per inch

The corrugated metal panels can be run either vertically or horizontally.

Refer to the following image for the dimensions for the corrugated metal panels.



2" Raised Metal Panel

9000 & 9003

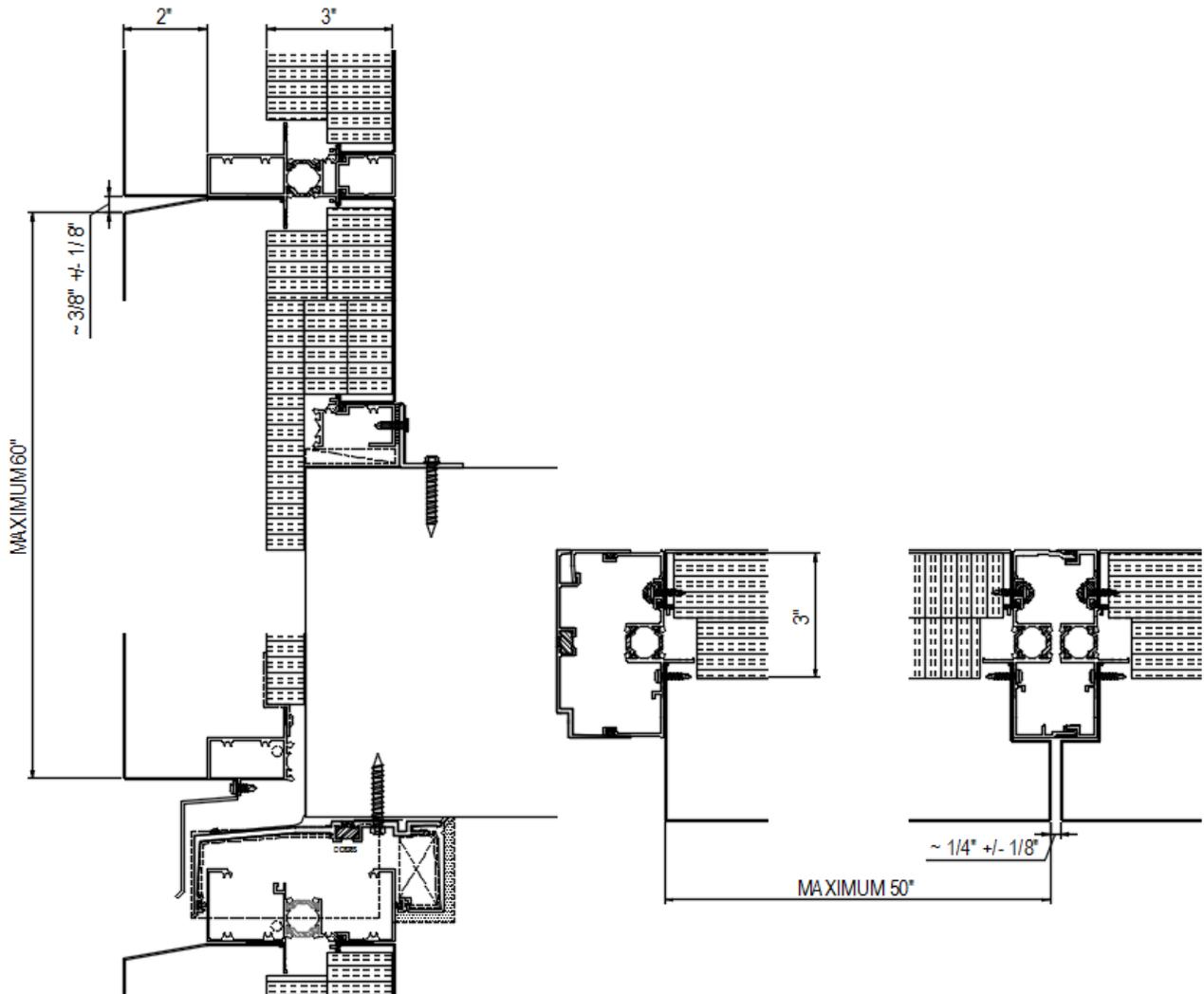
The horizontal reveal between 2" raised metal panels within same window frame is $\sim 3/8"$ $\pm 1/8"$ degrees. The vertical reveal between 2" raised metal panels between 2 different window modules coupled together is $\sim 1/4"$ $\pm 1/8"$.

The exterior 2" raised metal panel is made from 14 or 16 gauge aluminum and is powder coated to match the exterior frame colour. Option to have metal panel be a different colour than the exterior frame for an additional cost.

The interior back pan can be either 14 or 16 gauge aluminum or 20 gauge galvanized sheet metal. If the interior will be exposed the material will be aluminum and is painted to match the interior frame colour. If the interior will be covered (ex. by a wall) the interior material will be galvanized sheet metal. If galvanized it will be recessed $\sim 1/8"$ into the frame. Thickness (gauge) of the material will be determined on a project specific basis.

2" raised metal panels contain 3" of mineral wool at $\sim R4$ per inch

The 2" raised metal panel dimensions are interchangeable. Refer to [Metal Panel Sizing Guidelines](#) for the minimum and maximum dimensions for the 2" raised metal panel.



9000SSG

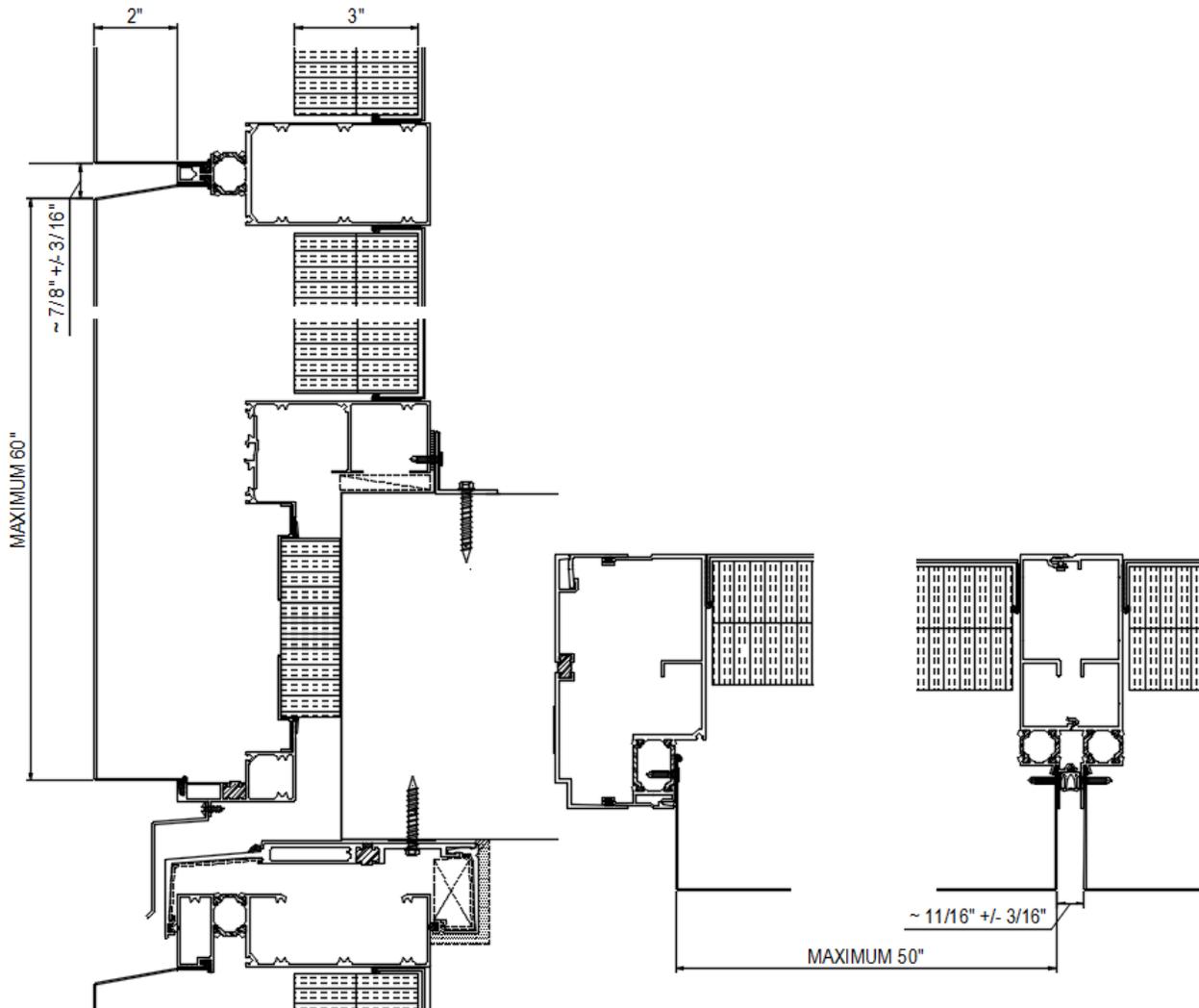
The horizontal reveal between 2" raised metal panels within same window frame is $\sim 7/8"$ $\pm 3/16"$ degrees. The vertical reveal between 2" raised metal panels between 2 different window modules coupled together is $\sim 11/16"$ $\pm 3/16"$.

The exterior 2" raised metal panel is made from 14 or 16 gauge aluminum and is powder coated to match the exterior frame colour. Option to have metal panel be a different colour than the exterior frame for an additional cost.

The interior back pan can be either 14 or 16 gauge aluminum or 20 gauge galvanized sheet metal. If the interior will be exposed the material will be aluminum and is painted to match the interior frame colour. If the interior will be covered (ex. by a wall) the interior material will be galvanized sheet metal. If galvanized it will be recessed $\sim 1/8"$ into the frame. Thickness (gauge) of the material will be determined on a project specific basis.

2" raised metal panels contain 3" of mineral wool at $\sim R4$ per inch

The 2" raised metal panel dimensions are interchangeable. Refer to [Metal Panel Sizing Guidelines](#) for the minimum and maximum dimensions for the 2" raised metal panel.

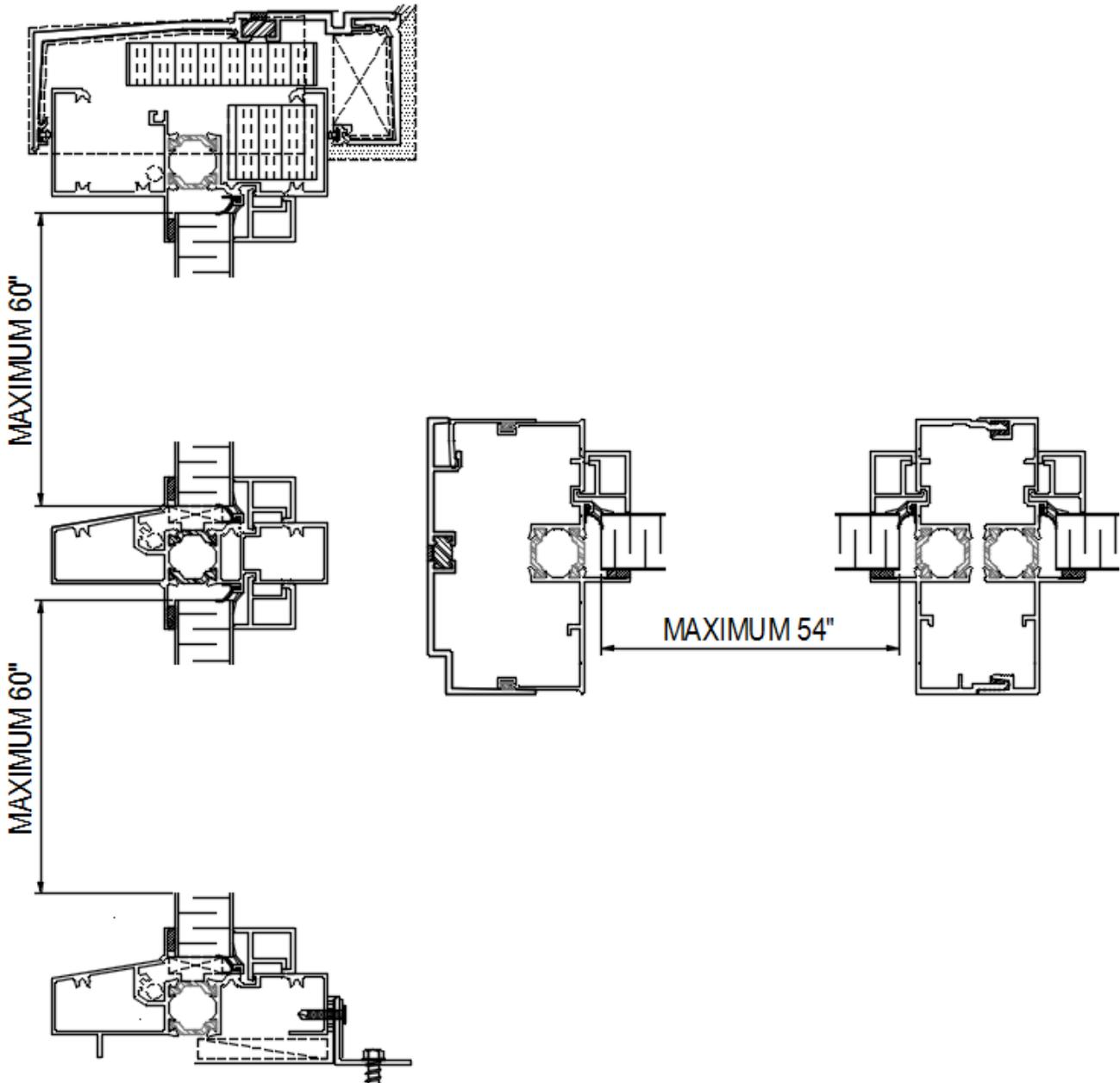


Sandwich Panels

Sandwich panels consist of 16 gauge aluminum on the exterior, polyisocyanurate in the middle and 16 gauge aluminum on the interior. The thickness of the polyisocyanurate varies depending on the window series.

The 16 gauge aluminum will be painted to match the exterior and interior of the frame.

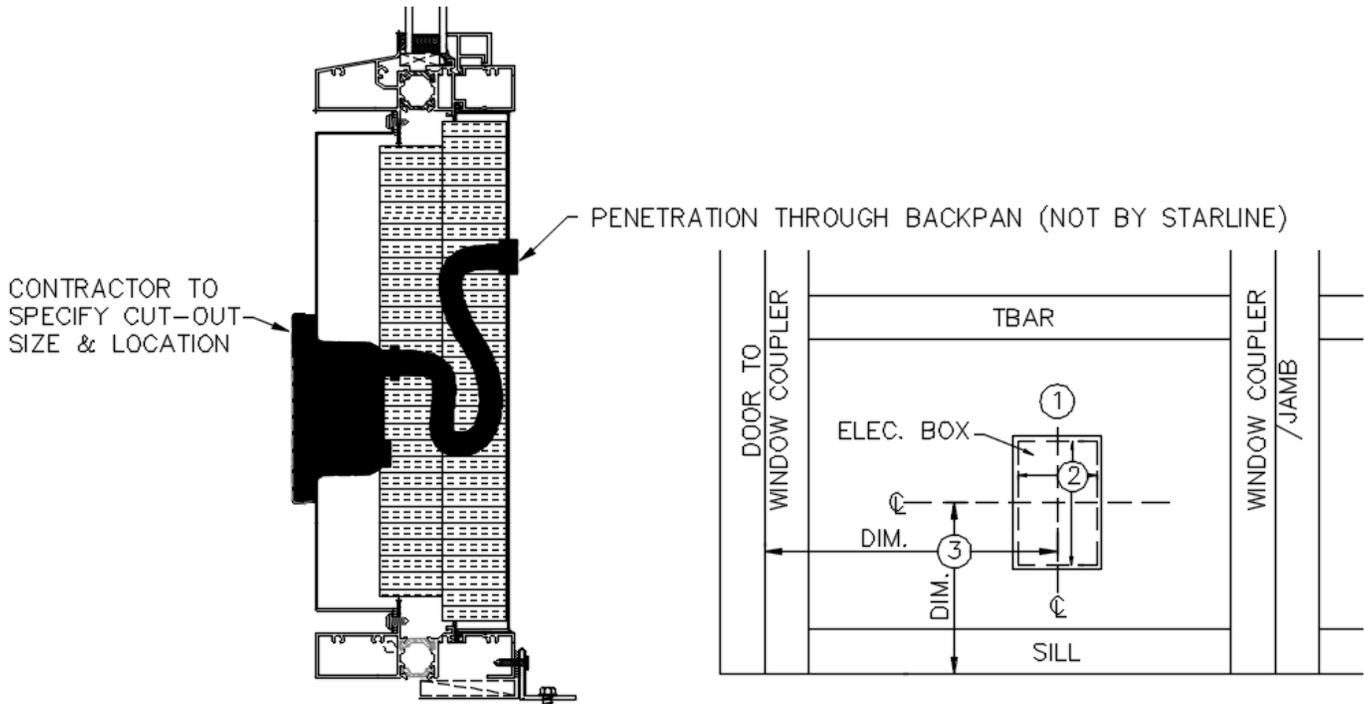
The sandwich panel dimensions are interchangeable. Refer to [Metal Panel Sizing Guidelines](#) for the minimum and maximum dimensions for the sandwich panel.



Electrical, Mechanical, and Other Penetrations

Electrical, mechanical and other cut-outs can be made in top hat, aluminum, or sandwich panels. Cut-outs cannot be made into spandrel glass. Starline recommends that a top hat panel is used for all penetrations where possible.

If the cut outs are shown on Starline's approved shop drawings, Starline will manufacturer the cut outs in the factory. If the cut outs are not shown on the shop drawings, the specific trade will be required to make the cut-out in the field (on site). The trade which requires the cut out will be responsible for making the cut-out air and water tight (collars, fittings, sealant, etc.) and are to provide a localized warranty at the cut-out.



NOTE TO CONTRACTOR:

PLEASE CONFIRM THE FOLLOWING:

- 1 - ORIENTATION OF ELECTRICAL BOX HORIZONTAL OR VERTICAL)
- 2 - SIZE OF CUT OUT REQUIRED IN METAL PANEL (WIDTH x HEIGHT)
- 3 - CENTER LOCATION OF CUT OUT FROM BOTTOM OF FRAME & VERTICAL COUPLER OR SPECIFY TO BE CENTERED ON PANEL. (HORIZONTAL & VERTICAL)