HISTORIC AND DESIGN REVIEW COMMISSION
April 21, 2021

HDRC CASE NO:	**2021-187**
ADDRESS:	2318 W GRAMERCY PLACE
LEGAL DESCRIPTION:	NCB 9075 BLK LOT E 25 FT OF 11 & W 65 FT OF 12
ZONING:	R-6, H
CITY COUNCIL DIST.:	7
DISTRICT:	Monticello Park Historic District
APPLICANT:	Steven & Lauren Salazar/SALAZAR STEVEN L & LAUREN R
OWNER:	Steven & Lauren Salazar/SALAZAR STEVEN L & LAUREN R
TYPE OF WORK:	Window replacement
APPLICATION RECEIVED:	March 11, 2021
60-DAY REVIEW:	Not applicable due to City Council Emergency Orders
CASE MANAGER:	Huy Pham

REQUEST:

The applicant has proposed to replace 10 divided-lite steel casement windows with matching size and divided lite configuration with sliding Fibrex windows by Renewal by Andersen

APPLICABLE CITATIONS:
2. Guidelines for Exterior Maintenance and Alterations
6. Architectural Features: Doors, Windows, and Screens
B. ALTERATIONS (REHABILITATION, RESTORATION, AND RECONSTRUCTION)
iii. *Glazed area*—Avoid installing interior floors or suspended ceilings that block the glazed area of historic windows.
iv. *Window design*—Install new windows to match the historic or existing windows in terms of size, type, configuration, material, form, appearance, and detail when original windows are deteriorated beyond repair.
v. Muntins—Use the exterior muntin pattern, profile, and size appropriate for the historic building when replacement windows are necessary. Do not use internal muntins sandwiched between layers of glass.
vi. Replacement glass—Use clear glass when replacement glass is necessary. Do not use tinted glass, reflective glass, opaque glass, and other non-traditional glass types unless it was used historically. When established by the architectural style of the building, patterned, leaded, or colored glass can be used.
vii. Non-historic windows—Replace non-historic incompatible windows with windows that are typical of the architectural style of the building.
viii. Security bars—Install security bars only on the interior of windows and doors.
ix. Screens—Utilize wood screen window frames matching in profile, size, and design of those historically found when the existing screens are deteriorated beyond repair. Ensure that the tint of replacement screens closely matches the original screens or those used historically.
x. Shutters—Incorporate shutters only where they existed historically and where appropriate to the architectural style of the house. Shutters should match the height and width of the opening and be mounted to be operational or appear to be operational. Do not mount shutters directly onto any historic wall material.

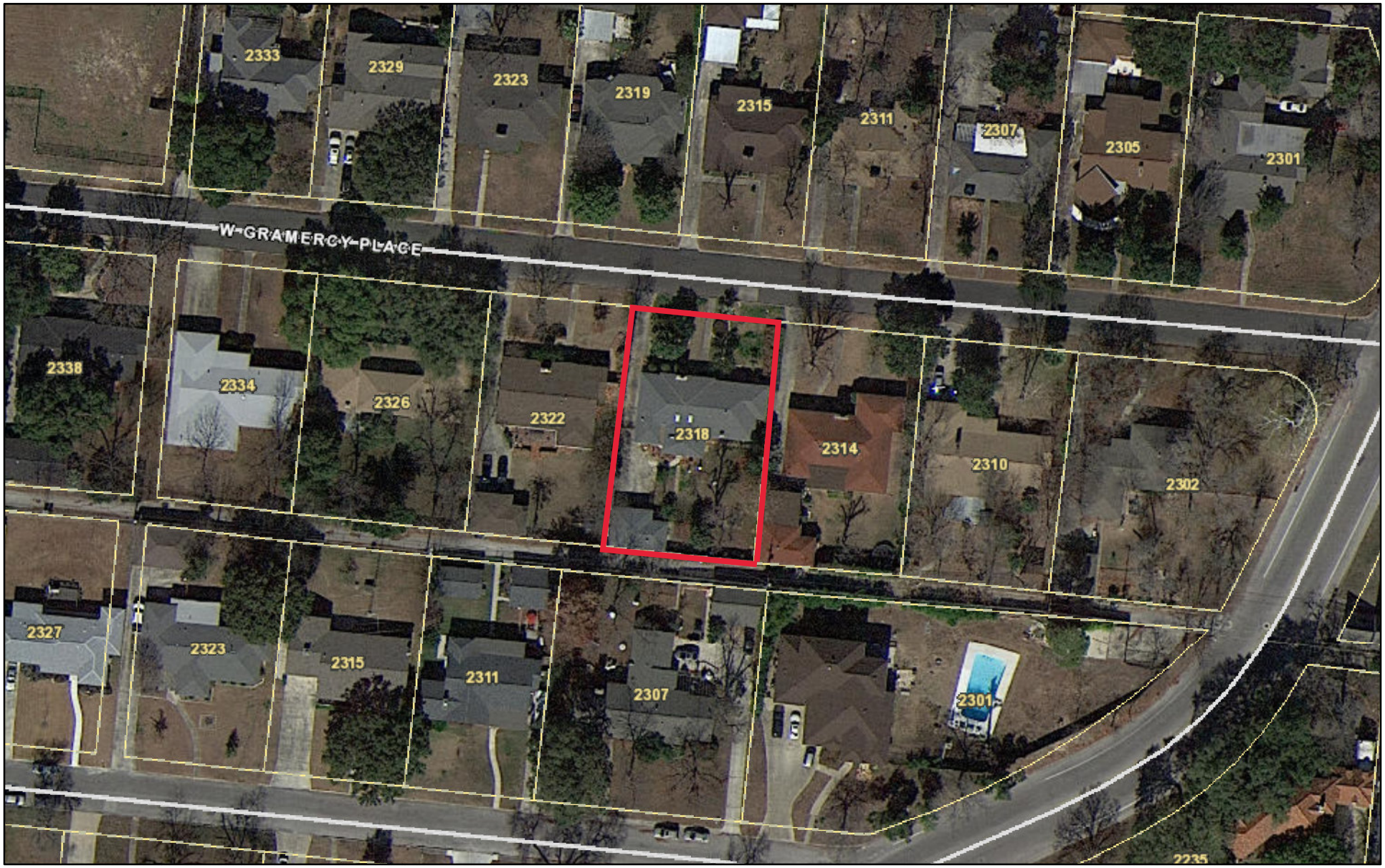
FINDINGS:
a. The primary historic structure at 2318 W Gramercy features a wide front façade configuration with low sloping hipped roofs and steel casement windows found on midcentury structures and flagstone-clad façade. The one-story single-family structure contributes to the Monticello Park Historic District.
b. EXISTING WINDOWS - The applicant has proposed to replace 10 divided-lite steel casement windows that are each likely to be original to the structure, if not replaced in-kind. Per the Guidelines for Exterior Maintenance and Alterations 6.B.iv. applicants should install new windows to match the historic or existing windows in terms of size, type, configuration, material, form, appearance, and detail when original windows are deteriorated beyond repair. Per the *Standard Specifications for Original Wood Window Replacement*: when individual elements such as sills, muntins, rails, sashes, or glazing has deteriorated, every effort should be made to repair or reconstruct that individual element prior to consideration of wholesale replacement. Throughout the submitted application photos, staff finds no instances of window system deterioration beyond repair. Staff finds that all 10 windows are wholly intact and should be repaired in-place where specific areas begin to deteriorate.
c. PROPOSED WINDOWS – The applicant has proposed to replace the steel casement windows with windows with

matching size and divided lite configuration with sliding Fibrex windows by Renewal by Andersen. If the commission approves of window replacement, staff finds that the proposed window product Renewal by Andersen does not match the existing windows in steel material or casement style configuration.

RECOMMENDATION:
Staff does not recommend approval of window replacement based on the finding b regarding existing conditions. The windows should be repaired in-place.

If the commission approves of window replacement, staff finds that the proposed product Renewal by Andersen does not match the existing windows in steel material or casement style configuration and should not be used unless specifically approved by the commission.

2318 W Gramercy



April 13, 2021

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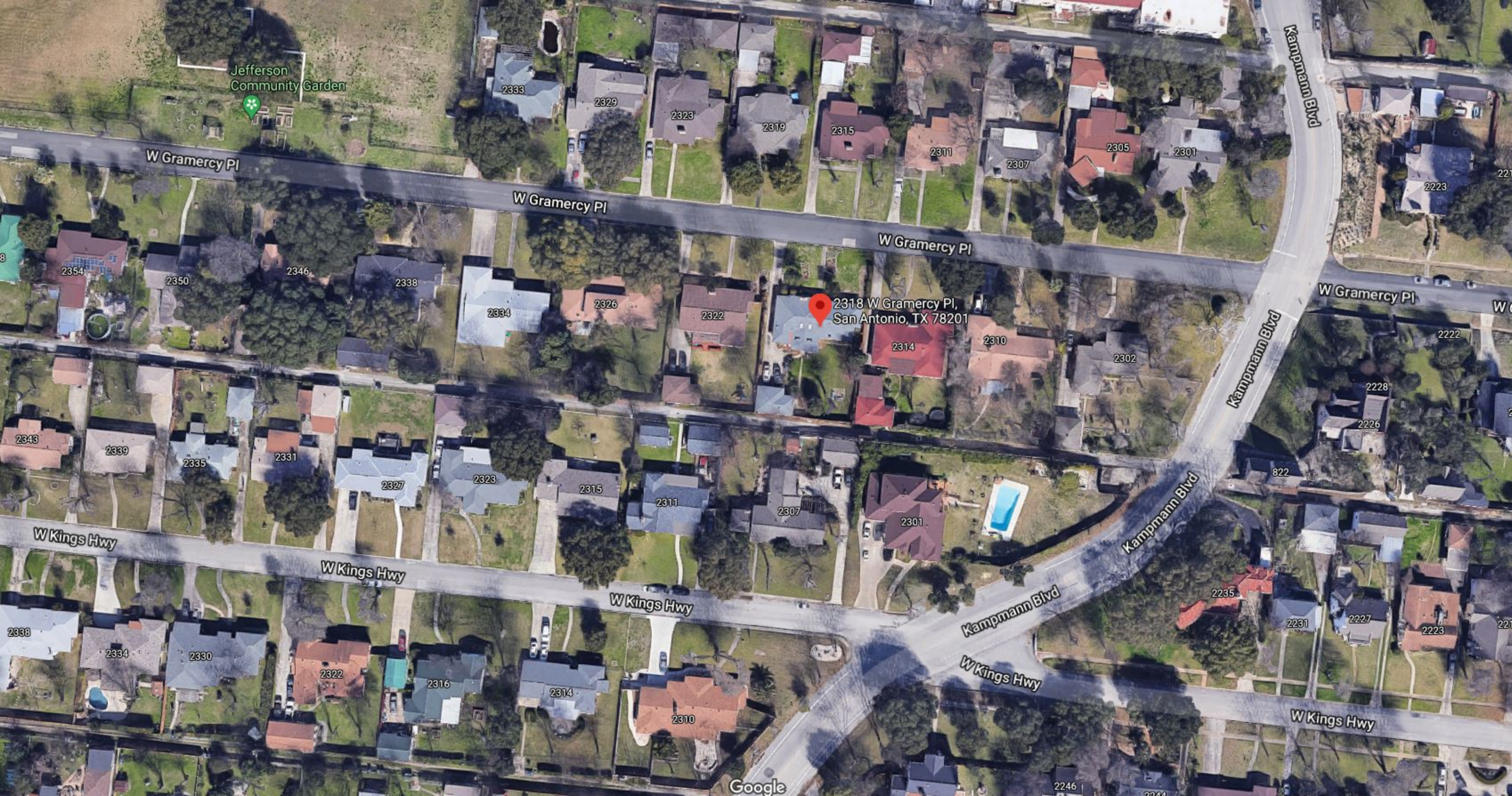
Jefferson Community Garden
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W Gramercy Pl
2318 W Gramercy Pl, San Antonio, TX 78201
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W Kings Hwy
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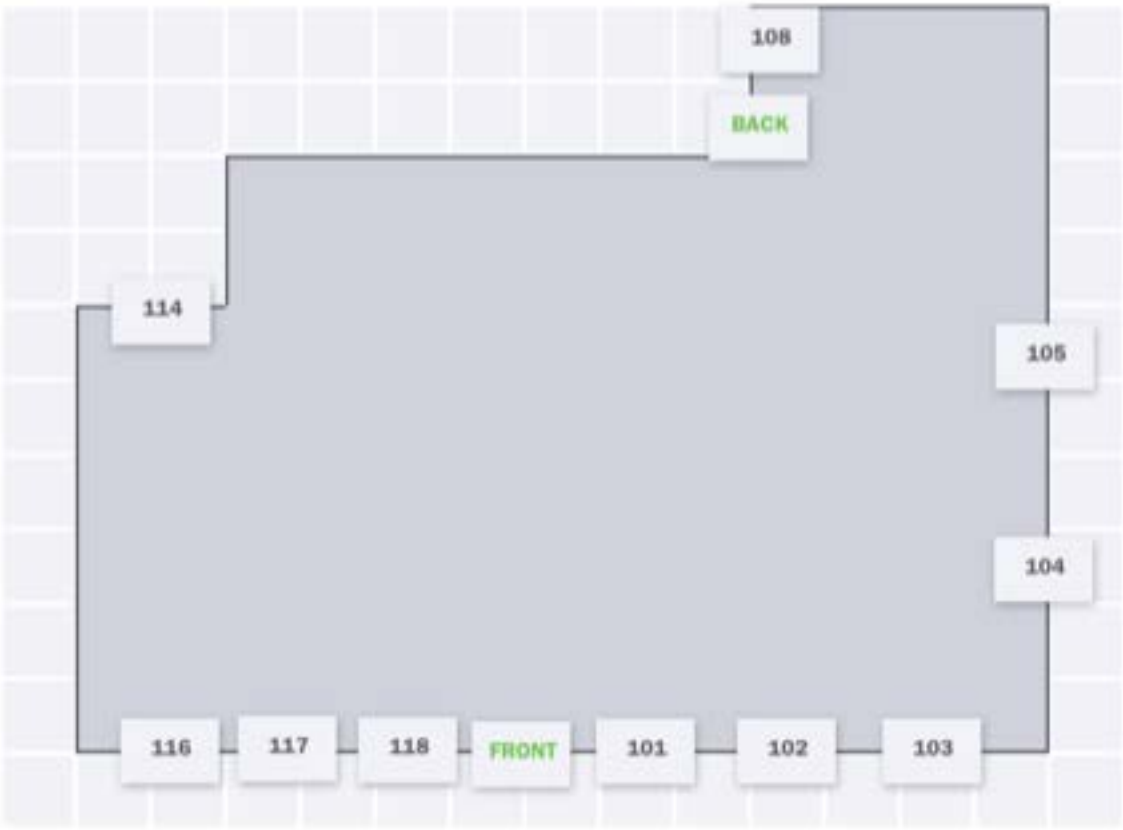
Floorplan

Windows: **10** Doors: **0** Specialty: **0**

EDIT FLOORPLAN

BASEMENT | 1st FLOOR | 2nd FLOOR



Tap any tile to go to that product's measurement page

Sold Unsold

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101	105
102	108
103	114
116	

FRONT	BACK
SIDE	SIDE


108


105

104


102


101


protected by
ADT


117
ADT


116


114


104
105


114

Renewal by Andersen
WINDOW REPLACEMENT
an Andersen Company

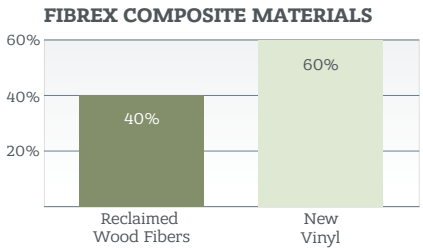
PRODUCT OVERVIEW

SPECIFICATION AND TECHNICAL MANUAL

PRODUCT OVERVIEW

FIBREX MATERIAL

Renewal by Andersen® windows are made of our exclusive Fibrex® material. Developed by Andersen, it is a composite blend of reclaimed (not recycled) and new vinyl and wood that provides excellent strength, durability and low maintenance. Window materials are exposed to many atmospheric elements such as wind stress, moisture, and temperature extremes. The following data demonstrates how Fibrex material performs under these elements.

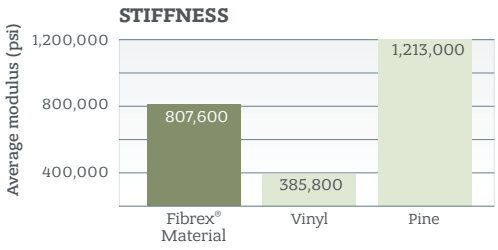


Fibrex material is a composite blend of reclaimed (not recycled) and new vinyl and wood developed by Andersen that provides excellent strength, durability and low maintenance.

Stiffness

Modulus is the scientific term for a material's stiffness. The higher the number, the stiffer the material. The average modulus for Fibrex material is twice the average for vinyl, making it a far more stable and rigid material for windows. And though wood's average stiffness is higher, it is far less predictable than Fibrex material since wood possesses natural variations such as grain, knots, pitch pockets, and moisture content. All of which means we can make our window frames and sash narrower than competitive windows, gaining more glass area and light from the same size opening.

The graph below demonstrates the superiority of Fibrex material over other materials.

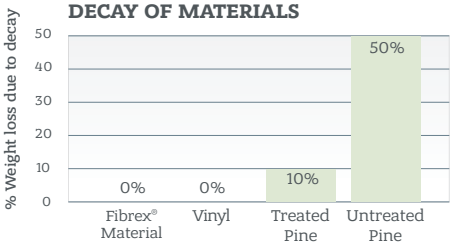


Material Strength. Fibrex material offers excellent long-term stability and durability. The Modulus far surpasses vinyl and approaches that of pine.

Decay Resistance

Eventually, without maintenance, even treated wood can be subject to decay. Fortunately, Fibrex material is not. Our special composite formulation surrounds and coats each wood fiber in the manufacturing process, providing resistance to rot. And windows made of Fibrex material are warranted not to flake, rust, blister, peel, crack, pit or corrode.*

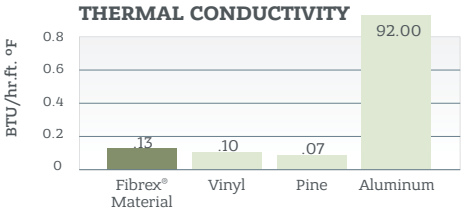
The change in the mass of material is measured according to ASTM D-1413, which demonstrates that Fibrex material is comparable to vinyl in resistance to decay.



Decay Resistance. Our special polymer formulation surrounds and coats each wood fiber in our Fibrex manufacturing process providing long-term resistance to rotting, chipping, peeling or blistering.

Thermal Conductivity

Fibrex material has a very low thermal conductivity ratio–or in other words, excellent insulating properties–that put it on a par with pine and vinyl. Unlike aluminum, windows made of Fibrex material will resist the effects of cold and heat. Insulating efficiency is measured by the amount of heat transferred or conducted through a material. A lower value means less transfer and greater insulating efficiency.



Thermal Conductivity. Fibrex material has a very low thermal conductivity ratio.

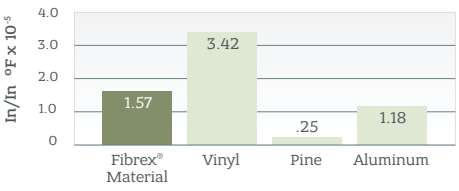
*See the Limited Warranty for Renewal by Andersen Products and Services.

FIBREX MATERIAL

Thermal Expansion

Thermal expansion is the degree to which a given material expands and contracts with changes in temperature. Pine has a very low thermal expansion rate. With a rate of 1.57, Fibrex material, like aluminum, expands and contracts very little. Vinyl, however, with a thermal expansion rate of 3.42, may expand and contract markedly which can result in bowing, cracking, air infiltration, and water leakage over time. Darkening the color of a material can also increase its surface temperature and make the material more likely to expand. The introduction of dark color can greatly affect vinyl. The unique capping materials used with Fibrex products limits thermal expansion, even for dark colors. In testing expansion rates, the smaller value indicates the least change to the material.

COEFFICIENT OF THERMAL EXPANSION (CTE)

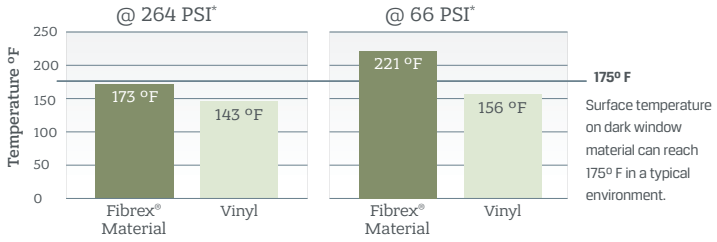


Thermal Expansion. Fibrex material has a very low rate of expansion due to temperature (1.57 x 10^{-5} In/In F°) similar to that of aluminum (1.18 x 10^{-5} In/In F°). Hollow vinyl however, (3.42 x 10^{-5} In/In F°) expands and contracts markedly which can result in bowing, cracking, air infiltration, and water leakage over time.

Heat Deflection –

In the full heat of summer, windows receiving direct afternoon sun can heat up to a surface temperature of 175°F or more. At these temperatures, the weight of the window components and glass can cause ordinary hollow vinyl frames to bow and sag. Fibrex material, however, remains rigid and stable to temperatures of over 200°F in tests–temperatures far greater than your window will ever experience. This performance compares favorably with that of ponderosa pine which has a heat deflection temperature of 288°F.

HEAT DEFLECTION TEMPERATURE



Surface temperature on dark window material can reach 175° F in a typical environment.

* Average test results conducted by an independent test lab.

Fibrex Material Colors & Capping Options

Andersen's Perma-Shield® coating is applied over the Fibrex material to provide a variety of colors in light and dark hues. These coatings consist of various materials and application processes to achieve durability and color retention characteristics.

PVC: Light colors (White, Sandtone, Canvas) are blended from a proprietary PVC polymer and applied in the Fibrex extrusion process, thermally bonding them to the Fibrex Material.

Acrylic: Dark colors (Terratone, Black, Dark Bronze, Red Rock, Forest Green & Cocoa Bean) are blended from a proprietary Acrylic polymer and applied in the Fibrex extrusion process, thermally bonding them to the Fibrex Material.

Wraps: This technology involves a micro-texture thermal polymer which is applied onto the interior of the window components. This thermal polymer has a satin, low-gloss finish that performs well, yet offers the elegance of a dark interior without high homeowner maintenance. The interior wraps are used for Dark Bronze and Black interiors.

Veneers: This technology involves a thin layer of real wood veneer which is applied onto the interior of the window components. Several species of interior wood veneers are available. They can be painted or stained to match existing décor. Painting and staining guidelines for wood interiors are available in the Product Installation Manual and Care and Maintenance Guide.

Painting and Staining

Painting guidelines for Fibrex material are available in the *Product Installation Manual* and *Care and Maintenance Guide*.

GLASS COMPONENTS

The way in which glass is made will affect its appearance, as well as the comfort and convenience of the home. The window, as a whole, is defined and tested based on the components and characteristics of glass.

"Slight optical variations in tempered glass should not be mistaken for low quality glass. Tempered glass will be labeled by law."

Glass Construction

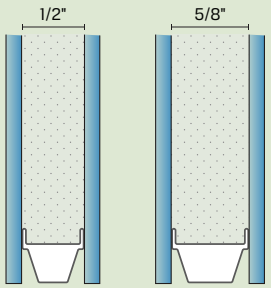
The glass used in windows today is manufactured from a process first created in England by the Pilkington brothers. Sand, soda ash cullet (reclaimed raw glass), and lime are blended and heated to a molten state in a large furnace. The mixture is then poured over molten tin, and because glass is lighter it floats above the tin, thus the name float glass. Float glass has a very high optical quality and can be made to varying thickness and strength to withstand stresses of wind, heat and cold.

Tempered safety glass is created in a process called tempering. The float glass sheet is heated to a soft but not molten state, then quickly and evenly cooled while retaining a smooth flat surface. Slight optical variations may occur during the cooling stage, but by using thicker glass, optic variations are minimized. Tempered safety glass is primarily used to meet safety building code requirements. When tempered glass is broken, it shatters into small pieces, reducing the chance of injury from large jagged shards.

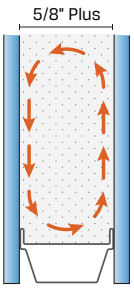
Another safety glass, laminated glass, is created by sandwiching a laminated interlayer between two pieces of annealed glass. Similar to the glass used in automobile windshields, tempered laminated glass remains intact when broken.

Insulated Glass

Insulated glass is two panes (lights) of glass separated by a space and assembled into one unit. A spacer separates the two lights of glass. It's a common misconception that the wider the insulating space, the better the insulating value. The key to an effective insulating space is to optimize the width of the space and minimize gas movement within the space. Wider spaces can create convection currents that allow heat transfer and lower insulating values. The optimum width to maximize insulating efficiency is between 13 and 16 millimeters (1/2" to 5/8" inch).



OPTIMUM WIDTHS



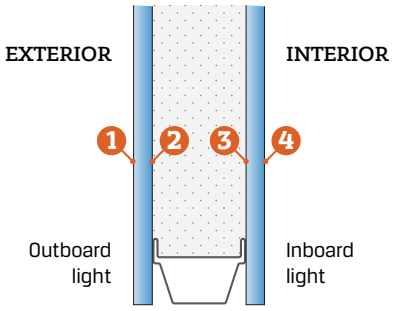
CONVECTION CURRENTS

Wider insulation spaces can create convection currents that allow heat transfer and lead to poorer insulating values.

Patterned Glass

Cascade Fern Obscure Reed

Patterned glass lets in light while obscuring vision and adds a unique, decorative touch. Several patterns are available and each is generated on the hot glass during the manufacturing process. These patterns have some size restrictions. Be sure to verify the window type and window size restrictions as shown in the appropriate Product Section of the Spec and Tech Manual before ordering. The options are illustrated below and the surface carrying the pattern is indicated in the Glass Surface chart. Note: Cascade and Reed patterns can be ordered with either a vertical or horizontal orientation.



PATTERNED GLASS SURFACE CHART

Pattern	Surface
Obscure	3
Fern	3
Reed	4
Cascade	4

GLASS COMPONENTS

Glass Spacer

Glass spacer technology (also called warm edge technology) has created materials and designs that are more energy efficient. Stainless steel, aluminum and plastics are often used today.

Historically, spacers have been made of aluminum because it is easy to manufacture and bend. Aluminum, however, can promote energy conductivity around the edge of the glass, creating heat loss and reducing the window's insulating capability.

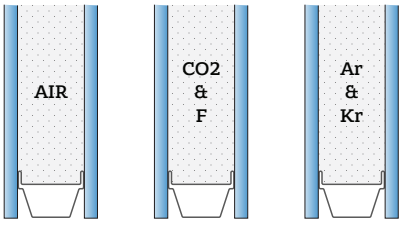
Plastic, although it provides excellent thermal performance, can eventually deteriorate from the heat generated in the insulating space, resulting in a seal failure. Plastic spacers, (commonly called swiggle strips), also emit gas when heated by the sun similar to the vinyl dashboard in an automobile. This gas deposits a film on the interior surface of glass contributing to optical distortion over time.

Our patented low-conductivity spacer is made of stainless steel, which is more durable and provides a more stable seal. Stainless steel is stronger than aluminum, requiring less material. It resists heat transfer four to five times better than aluminum spacers which are used by many other manufacturers. Additionally, stainless steel does not react to heat like plastic.

"Make sure the glass in a replacement window has a low conductivity spacer for increased energy efficiency. Stainless steel spacers are more durable than plastic. When selecting a window product, do not assume the wider insulating-spaces are better."

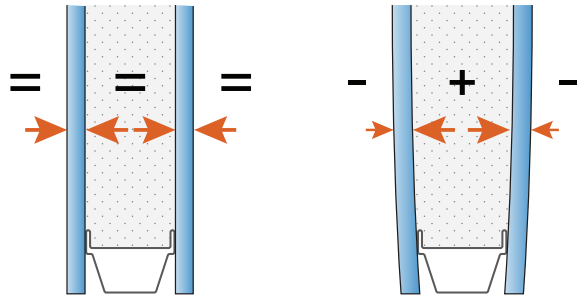
Argon Gas Fill

Air was used between two or more glass panes to insulate the glass space until the 1970s when carbon dioxide (CO2) and Freon (F) were introduced. Denser than air, they provided better insulation but were sensitive to seal failure. In the 1980s, Argon (Ar) and Krypton (Kr) were proven to provide more efficient insulation. Andersen High Performance glass options are filled with a minimum of 90% argon.



High-Altitude Considerations

The altitude at which a product will be installed and the size of the glass determine whether or not a unit will include a gas filled insulated light of glass. When insulating glass is filled with gas and sealed, it is sealed at the atmospheric level of the manufacturing facility. As the glass in the window is moved to higher altitudes, the pressure in the insulating space becomes greater than the outside pressure, bowing the glass outward. This can cause optical imperfections and, in severe cases, glass breakage. Tempered glass can add strength and reduce bowing. However, for some altitudes, a breather tube must be integrated into the window construction.



Capillary Breather Tubes

Capillary breather tubes are available for glass and may be required for high-altitude installations. Capillary breather tubes equalize the pressure between the insulating space and the outside surfaces of the glass. It is important to note that capillary breather tubes will decrease the thermal performance of the unit.

Please refer to the "Altitude Limits" charts in the Technical Data section to identify which glass sizes may retain a gas fill and which glass sizes will require capillary breather tubes.

GLASS COMPONENTS / GLASS CHARACTERISTICS

Low-Emissivity Coating

Also called "low-E" coatings, low emissivity coatings are microscopically thin layers of silver, oxide, and protective coatings that make the window glass more energy efficient by returning heat energy to its source. Low-E coatings are integrated into window glass in three ways:

"When buying windows with low emissivity glass, be sure to ask how the low-E coating is applied. Soft-coat or sputter coating is the best choice and most optically clear."

Suspended Systems

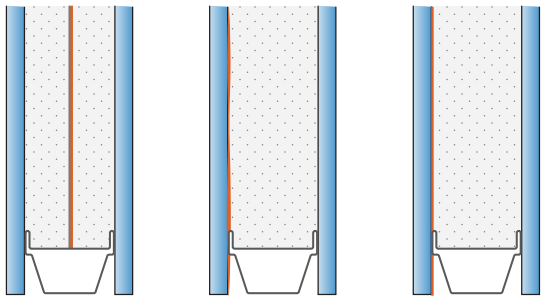
The first types of low-emissivity coating developed are still in use. The low-E coating is applied to a piece of acrylic which is then hung or suspended within the insulating space of the glass. Although the system appears acceptable, the two chambers caused by the suspended acrylic causes pressure differences that can make the acrylic stretch and bag, resulting in optical distortion. The acrylic itself causes visual clarity problems. And as with the swiggle strip, out-gassing (an emission of gas from its own material) occurs when the acrylic film is exposed to heat, creating a seal failure or haziness.

Hard-Coat Systems

Also called Pyrolytic, hard-coat systems are coatings that are sprayed onto hot glass. The resulting film offers moderate (not low) emissivity and is optically hazy because the coating pools unevenly.

Soft-Coat Systems

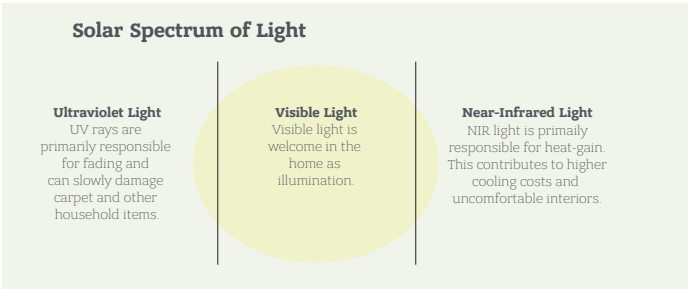
Also called sputter coating, this method is done by applying the emissivity coating to the glass in a vacuum chamber. This offers the highest controlled environment to obtain superior optical clarity. This system can also be easily tailored to meet special customer requirements, as well as providing multiple layers of the coating for superior insulating performance.



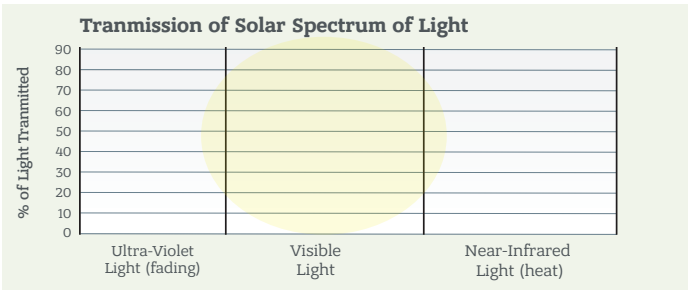
Suspended Hard-Coat Soft-Coat

Solar Spectrum – Understanding the Spectrum of Light

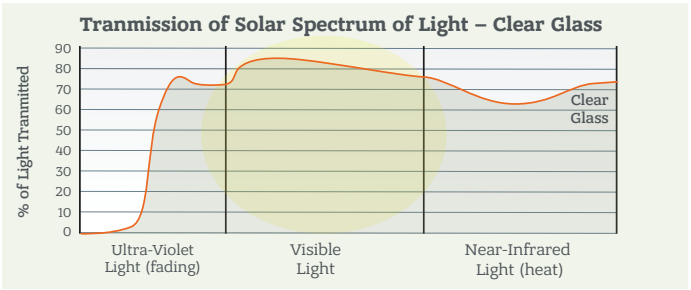
There are three types of light that greatly affect the home environment. They are ULTRAVIOLET, VISIBLE LIGHT and NEAR-INFRARED LIGHT. The following chart outlines the characteristics of each type of light.



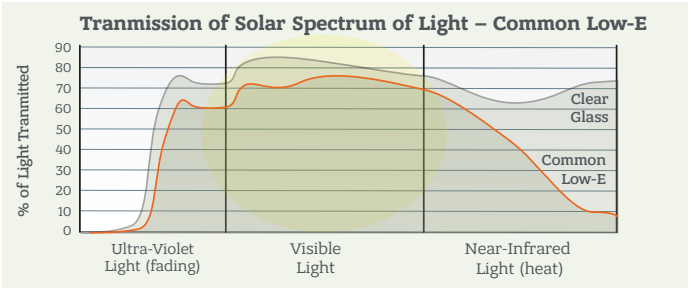
To evaluate the benefits of various glass coatings, it's helpful to compare the transmission of light across this spectrum.



Clear glass is just that, clear. It transmits much of the visible light along with much of the heat and fade inducing rays.

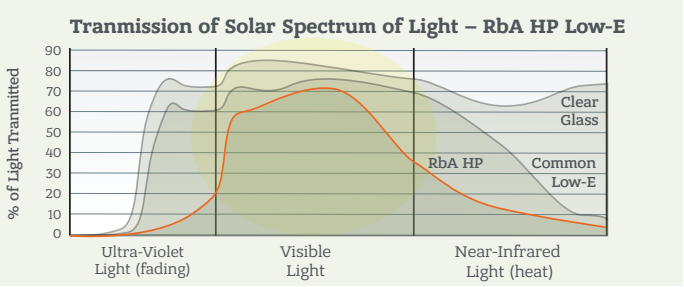


Filtering undesirable light is one benefit of low-e coatings. They limit the transmission of some of the heat as well as some of the UV rays while transmitting much of the visible light.

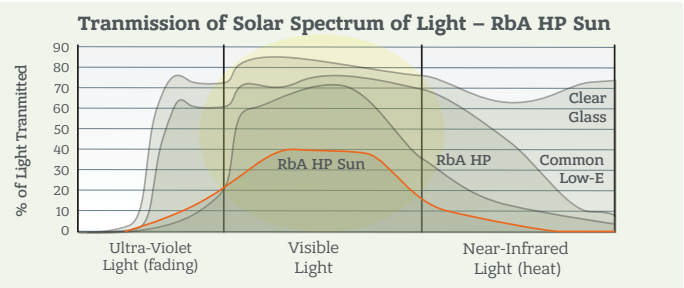


GLASS CHARACTERISTICS

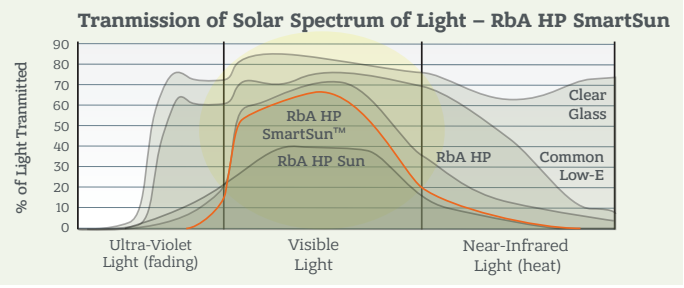
Renewal by Andersen's high performance low-e coating is considered to be spectrally selective, which means it filters out even more of the heat and fading than common low-e coatings. The graph below indicates how our standard high performance coating limits much of the undesirable light on both ends of the spectrum while transmitting much of the visible light that is represented in the center portion of the graph.



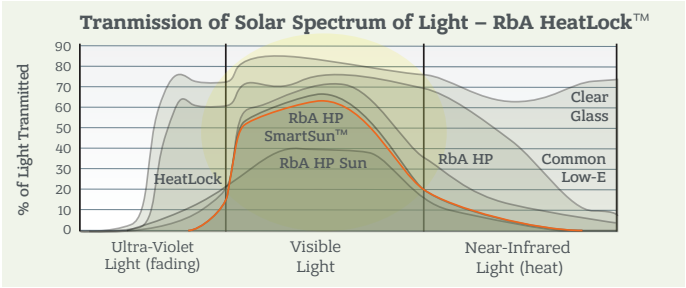
Tinting the high performance sun glass reduces even more of the heat gain and fading but also limits the amount of visible light.



The SmartSun coating filters out even more of the UV rays and controls heat gain almost as well as our high performance sun while transmitting almost as much visible light as our non-tinted standard high performance glass.



HeatLock™ maximizes visible light transmission and significantly improves u-factor.

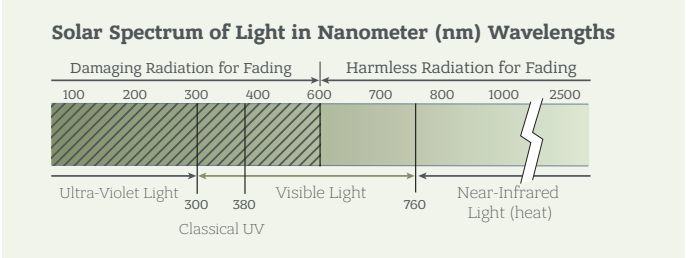


"Be wary of sellers who claim that their windows will prevent fading."

Solar Spectrum – In Nanometer Wavelengths

Low-E coatings affect subsets of the light spectrum – illustrated below.

- The majority of light rays that cause fading are ultraviolet and some are visible (in the range of 300 to 600 nanometers). Low-E coatings block some, but not all, ultraviolet and visible light. High-Performance™ glass blocks 84% of ultraviolet light.
- Light that creates photosynthesis (in the range of 400 to 700 nanometers) which is important for plant survival and growth is not prohibited by low-E coatings.

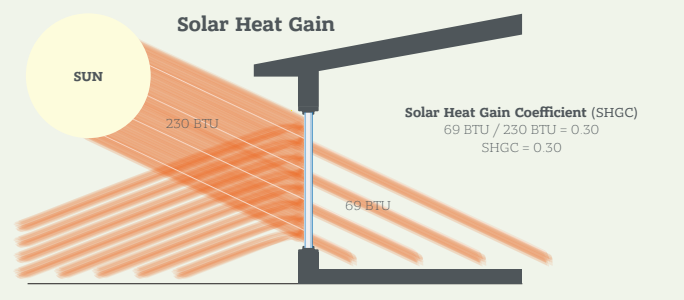


GLASS CHARACTERISTICS

There are important performance characteristics of glass that can be measured: solar heat gain, visible light transmittance, and fading. Glass performance should not be confused with total window performance (see Technical Data manual).

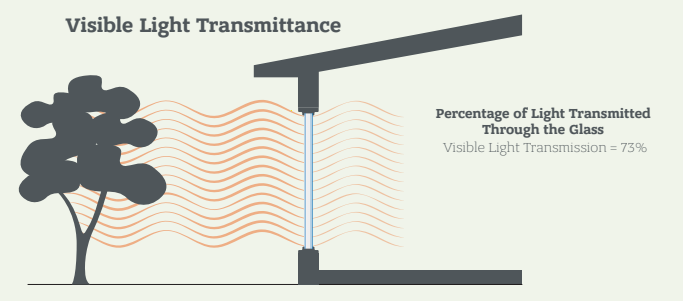
Solar Heat Gain

Solar heat gain is the amount of heat that passes through glass. Shown numerically as a decimal, it represents the percentage of heat that enters the room. The lower the solar heat gain, the less stress on air conditioner use.



Visible Light Transmittance

Visible light transmittance describes the clarity of the glass or the percentage of visible light coming through the glass. The higher the percentage, the clearer the glass.



Transmission Ultraviolet Energy (TUV)

The transmission of short-wave energy in the 300-380 nanometer portion of the solar spectrum. The energy can cause fabric fading.

Transmission Damage Function (TDW)

The transmission of UV and visible light energy in the 300-600 nanometer portion of the solar spectrum. The value includes both the UV and visible light energy that can cause fabric fading. The rating has also been referred to as the Krochmann Damage Function. This rating better predicts fading potential than UV transmission alone.

The lower the Damage Function rating, the less transmission of short- wave energy through the glass that can potentially cause fabric fading. Fabric type is also a key component of fading potential.

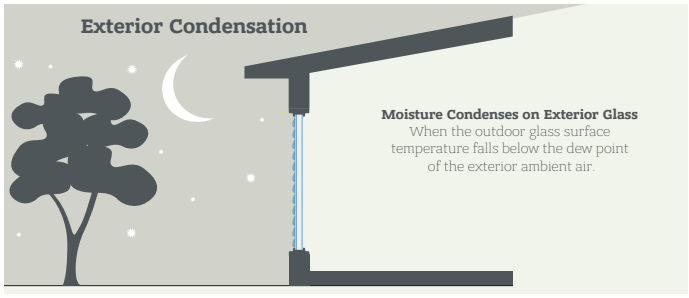
Glass Type	TUV Classical Ultraviolet Transmission (300-380NM)	TDW Krochmann Damage Function (300-600NM)
Clear Glass	58%	61%
High-Performance™	16%	33%
High-Performance Sun™	16%	24%
High-Performance SmartSun™	5%	21%
High-Performance® SmartSun™ with Heatlock™	5%	20%
High-Performance Passive Sun	29%	-

Exterior Condensation

Condensation on the exterior is not an indication that the glass is defective. In fact, that the insulated glass is doing its job - that of insulating the building from the environment. Condensation may appear due to the following atmospheric conditions:

- **Glass temperature below dew-point temperature**
- **Clear night sky**
- **Still air**
- **High relative humidity**
- **Well-insulated glass**

Exposed to these conditions, the exterior surface of the glass can radiate away enough heat so that the glass temperature falls below the dew point of the air currents. When this happens, moisture condenses on the exterior glass surface. When the glass temperature rises above the dew point, the condensation evaporates back into the air. This is commonly seen on grass, car hoods and roofs, and on building roofs and walls. If outdoor condensation creates an annoyance for the homeowner, there are some solutions that may help. Draperies should be open to allow as much heat transfer through the glass as possible. Trees or shrubbery immediately adjacent to the glass can increase the local humidity and may need to be moved. Keep in mind that the exterior surface of the glass will warm and the condensation will evaporate when the heat loss to the sky is blocked (i.e., clouds), the wind picks up, or sunlight is absorbed on the glass surface.



GLASS TYPES AND PERFORMANCE FEATURES

Renewal by Andersen offers glass types to meet specific performance needs. The options range from SmartSun™ glass with HeatLock® coating that is ENERGY STAR® certified in all US climate zones* to PassiveSun® glass that helps heat homes in northern areas. There is an option for essentially every climate, project and customer. The following chart compares the performance features of each glass option.

	ENERGY		LIGHT	
	U- FACTOR	SOLAR HEAT GAIN COEFFICIENT	VISIBLE LIGHT TRANSMITTANCE	UV PROTECTION
GLASS	How well a product prevents heat from escaping.	How well a product blocks heat caused by sunlight.	How much visible light comes through a product.	How well a product blocks ultraviolet rays.
High Performance Smart Sun Thermal control similar to tinted glass, but with the visible light transmittance similar to clear glass.	★★★☆	★★★★	★★½☆	★★★★
High Performance Smart Sun with HeatLock® Coating Applied to the room-side surface, it reflects heat back into the home and improves U-Factors.	★★★½	★★★★	★★☆☆	★★★★
High Performance Low-E4®/Low-E Outstanding overall performance for climates where both heating and cooling costs are a concern.	★★★☆	★★★☆	★★★☆	★★★☆
High Performance Sun Outstanding thermal control in southern climates where less solar heat gain is desired.	★★★☆	★★★★	★☆☆☆	★★★☆
High Performance Passive Sun* Ideal for northern, passive solar construction applications where solar heat gain is desired.	★★½☆	★☆☆☆	★★★☆	★★☆☆
Clear Dual-Pane* High visibility with basic thermal performance.	★☆☆☆	☆☆☆☆	★★★★	☆☆☆☆

* Available via NSPR.

Protective Film

Renewal by Andersen protects all windows and patio doors during delivery and installation with a protective (transparent) film applied to the glass. The protective film also minimizes time spent masking on the job-site, then peels away for a virtually spotless window.

WINDOW COLOR AND FINISH OPTIONS CHART

WINDOW EXTERIOR	Maple Interior		Pine Interior		Red Oak Interior		White Interior		Canvas Interior		Exterior Color Match	
	Exterior	Interior	Exterior	Interior	Exterior	Interior	Exterior	Interior	Exterior	Interior	Exterior	Interior
White												
Canvas												
Sandtone												
Terratone												
Dark Bronze												
Black												
Cocoa Bean											NOT AN OPTION	
Forest Green											NOT AN OPTION	
Red Rock											NOT AN OPTION	

FRAME OPTIONS

Frame design considerations on the Renewal by Andersen portfolio of products begin with evaluating the installation strategies utilized in window replacement. These strategies are:

Insert Installation Strategy

The old window frame is solid and/or interior or exterior trim needs to be saved. In this case, an insert application is the appropriate installation strategy. These installations are also typically less disruptive to the home. A typical installation requires removing the old sash and any interfering hardware from the existing window frame, yet leaves the frame and trim intact.

Solid Frame

Window Insert

Full Frame Installation Strategy

The old window is deteriorated beyond repair or opening modifications are required. In this case, a full frame application is the appropriate installation strategy. These installations can be more disruptive to a home and typically require complete removal of the existing window as well as the interior and exterior trim components.

In order to achieve either an insert or full frame window replacement strategy, the Renewal by Andersen portfolio of products incorporates three different frame designs. They are:

Full Frame

Universal Frame

The Universal Frame design incorporates features on the frame to enable both INSERT and FULL FRAME installations. The products utilizing the Universal Frame design can be configured with a variety of accessories or frame modifications to accommodate the installation method that is appropriate for the home AND incorporates an accessory kerf on the exterior for inserting L-Trims or coil stock to complete the installation.

Full Frame

The Full Frame design incorporates features on the frame to allow the attachment of accessories for a "full-frame" installation.

NOTE: The only Renewal by Andersen® products that utilize a "full-frame" design are the DB Double-Hung and PWF Picture Window.

Insert Frame

The Insert Frame design incorporates features in the frame the enable a seamless insert installation into existing window frames. The frame exterior includes an accessory kerf for inserting L-Trims or coil stock to complete the installation on the exterior.

NOTE: The only Renewal by Andersen® products that utilize an "insert frame" design are the DB Double-Hung and PWI Picture Window.

Weatherstrip

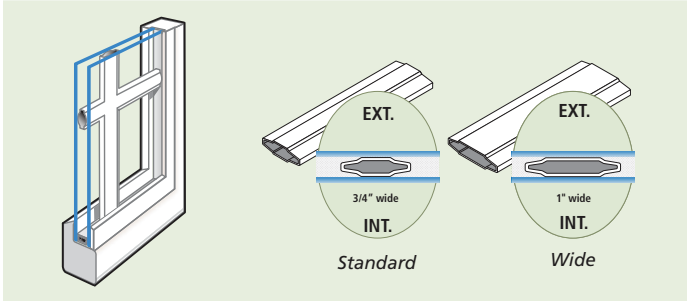
A diverse system made up of automotive grade EPDM foam filled bulbs, Soft Touch™ Tri-Fin piles and constant-force reinforced low friction polymer components provide multiple layers of protection from the elements. Refer to specific product sections for weatherstrip details.

GRILLE OPTIONS - TYPES

Four grille types are available. The interior and exterior sides of the grilles are color coordinated with each side of the window frame. Reference the color combination charts in each product section for detailed color information.

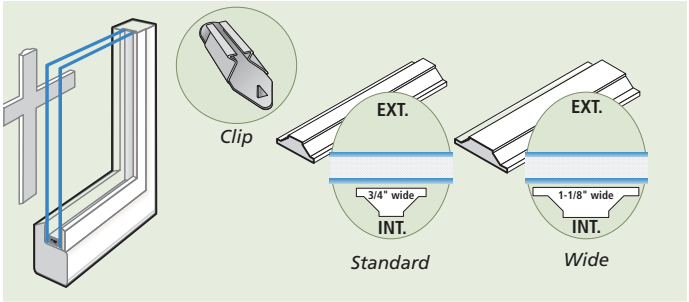
Grille-Between-the-Glass (GBG)

Sculpted aluminum grille members are placed between the two panes of glass and are available in two widths. An enamel finish replicates the interior and exterior colors of a window. On wood interiors, the interior color surface will be Sandtone.



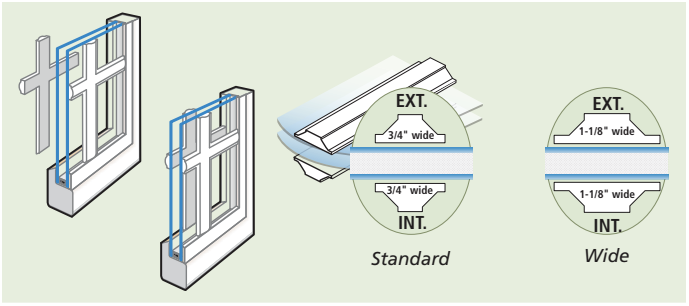
Interior Wood Grille (INTW)

Available in two hardwood options (maple or oak), interior wood grilles snap into clips positioned around the perimeter of the sash interior and may be removed to easily clean the glass. These "high-definition" interior wood grilles are available in two widths. The exterior color of an interior wood grille matches the units exterior color. The interior color of the grille matches the units interior color. If the units interior is a wood finish, the interior wood grille is an unfinished maple for units with a pine or maple interior and an unfinished oak for units with an oak interior.



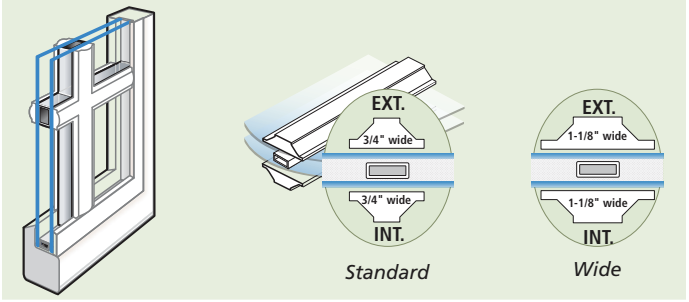
Simulated Divided Light Grille (SDL)

Simulated divided light grilles offer an exterior and interior grille with no spacer between the glass. The exterior grille is permanently applied. The interior grille is offered as permanently applied or removable for easy of cleaning the glass. The exterior grille is constructed from Fibrex Material and the color matches the exterior color of the unit.



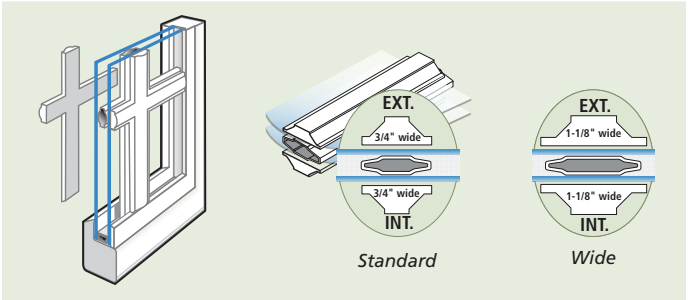
Full Divided Light Grille (FDL)

Full divided light grilles provide the classic look of a true divided light window. The high-definition exterior grille is Fibrex® and is available in two different widths. The color of the exterior grille matches the exterior color of the unit. Between the glass panes, an aluminum spacer stands slightly away from each pane to maintain thermal performance. The high-definition interior wood grille is available in two hardwood options (maple or oak), and two different widths, and may be permanently applied or removable.



GBG Full Divided Light Additional Options

The Grille Between the Glass may be specified with either an Exterior applied Fibrex grille (EXT + GBG) or an Interior grille (INTW + GBG), removable or applied.

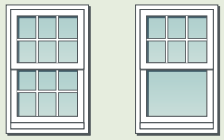


GRILLE OPTIONS - PATTERNS

Renewal by Andersen offers grille patterns and widths to fit any architectural style or the taste of any homeowner. Virtually any existing grille can be matched or custom grille created when replacing windows. Available grille patterns include colonial, prairie, modified prairie and farmhouse.

Colonial Patterns

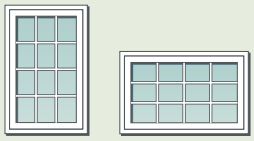
Refer to colonial pattern grilles by pattern name and grille lights wide by grille lights high for each sash.



Double-Hung Windows

Left Window: Colonial grilles, 3 lights wide by 2 lights tall, upper and lower sash.

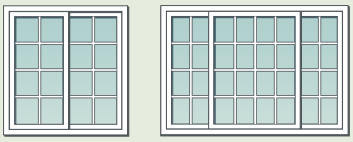
Right Window: Colonial pattern, 3 lights wide by 2 lights tall upper sash and no grille lower sash.



Casement/Awning Windows

Casement: Colonial pattern, 3 lights wide by 4 lights tall.

Awning: Colonial pattern, 4 lights wide by 3 lights tall.



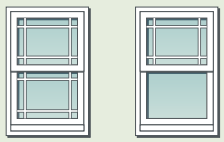
Gliding Windows

Left Window: Colonial pattern, 2 lights wide by 4 lights tall.

Right Window: Colonial pattern, 2 lights wide by 4 lights tall in the flanking sashes, 4 lights wide by 4 lights tall in the center sash.

Prairie Patterns

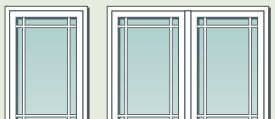
Refer to modified prairie grille by pattern name for each sash. Regardless of sash size, all prairie grilles intersect to form 4" squares of visible glass in the corners of each sash.



Double-Hung Windows

Prairie grilles, 4" x 4" squares in the corners.

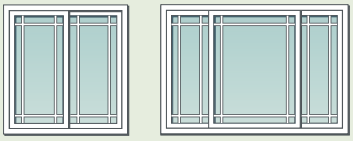
Available on one or both sash. The prairie grille pattern is not available on double hung windows narrower than 20".



Casement/Awning Windows

Prairie grilles, 4" x 4" squares in the corners.

Not available on these sizes:
Single: < 20 5/8" wide, < 20 5/8" tall
Double: < 40 1/4" wide, < 20 5/8" tall
Triple (1:1:1): < 59 15/16" wide, < 20 5/8" tall
Triple (1:2:1): < 78 5/16" wide, < 20 5/8" tall



Gliding Windows

Prairie grilles, 4" x 4" squares in the corners.

Not available on these sizes:
Double: < 40" wide, < 28" tall
Triple (1:1:1): < 58" wide, < 28" tall
Triple (1:2:1): < 74" wide, < 28" tall

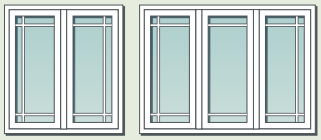
Modified Prairie Patterns

Refer to modified prairie grille by pattern name for each sash. Regardless of sash size, all modified prairie grilles intersect to form 4" squares of visible glass in the outermost 4 corners of the window, rather than each individual sash.

Double-Hung Windows

Modified Prairie grilles, 4" x 4" squares in outside corners only.

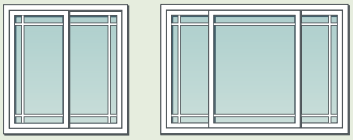
Not available on double hung windows narrower than 20".



Casement/Awning Windows

Modified Prairie grilles, 4" x 4" squares in outside corners only.

Not available on single sash units for casement, awning and picture windows.



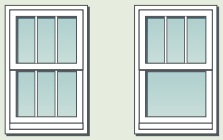
Gliding Windows

Modified Prairie grilles, 4" x 4" squares in outside corners only.

Regardless of sash size, all modified prairie grilles intersect to form 4" squares in the outermost 4 corners of the window, rather than the sash.

Farmhouse Patterns

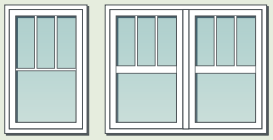
The default pattern consists of two evenly spaced vertical bars (3/4") over a 1" wide center bar to simulate a double-hung window.



Double-Hung Windows

Left Window: Farmhouse pattern, 3 lights wide by 1 light tall, upper and lower sash.

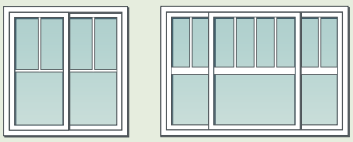
Right Window: Farmhouse pattern, 3 lights wide by 1 light tall upper sash and no grille lower sash.



Casement/Awning Windows

Farmhouse pattern, evenly spaced vertical bars (3/4") over a 1-1/8" or 2-1/4" wide center bar to simulate a double-hung window. Horizontal bar divides visible glass into two equal lights.

Number of lights wide can be specified to more or less than 3 standard lights.



Gliding Windows

Farmhouse pattern, evenly spaced vertical bars (3/4") over a 1-1/8" or 2-1/4" wide center bar to simulate a double-hung window. Horizontal bar divides visible glass into two equal lights.

Number of lights wide can be specified to more or less than 3 standard lights.

INSECT SCREEN OPTIONS

Standard Insect Screen

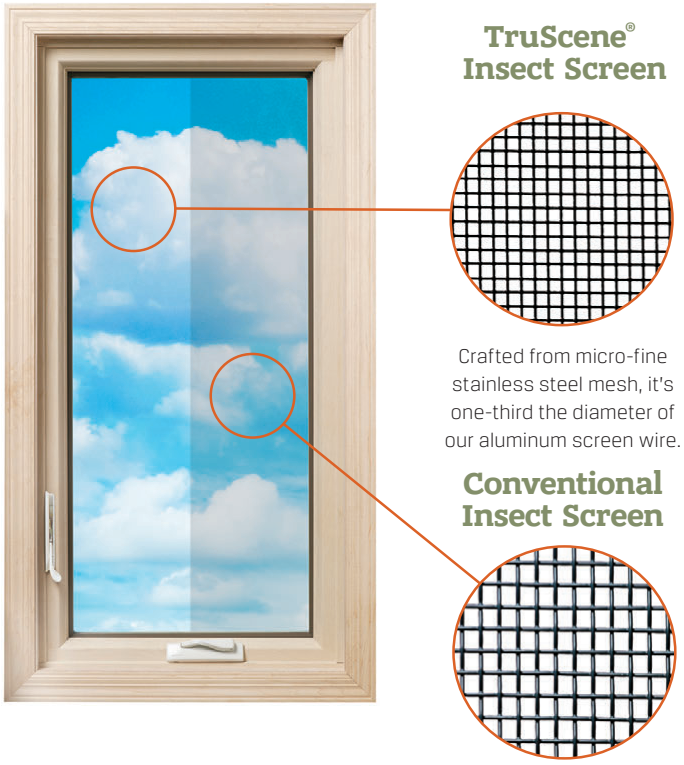
The standard insect screen is made with an aluminum frame and an easy-to-see-through fiberglass screen mesh (18 x 16 per inch mesh) in a glare resistant charcoal gray finish.

Aluminum Insect Screen

The aluminum insect screen is identical to the standard insect screen but with a durable aluminum screen mesh (18 x 16 per inch mesh) in a glare-resistant charcoal gray finish.

TruScene® Insect Screen

The TruScene insect screen is also made with an aluminum frame but uses a micro-fine stainless steel mesh (25 x 25 per inch mesh) that provides over 50% more clarity than standard or aluminum insect screens for a beautifully unobstructed view. They also let in more fresh air and sunlight while doing a better job of keeping out small insects. Optional pine, oak and maple veneers are available for TruScene insect screens.



Insect Screen Frames

Insect screen frames are made of aluminum. They are reinforced with a unique nylon corner spline to keep it from sagging and is secured to the window with wing blade fasteners in nylon housings.

Insect screen frames for double hung and gliding windows are installed on the exterior of the unit and match the unit's exterior color.

Insect screens for casement and awning windows are installed on the interior of the unit, allowing the unit to vent. Frames are available in white, stone, dark bronze and black for casement and awning windows. If the insect screen is ordered with TruScene®, a wood interior is an option.

Veneered TruScene® Insect Screen

TruScene® insect screens for casement and awning windows are available with a veneered pine, maple or oak interior.

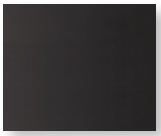
Aluminum Frame

Veneered Frame

HARDWARE OPTIONS

Renewal by Andersen offers a broad range of hardware styles and finishes, allowing the homeowner to enhance the overall design of a window and harmonize the product with a home's décor. Hardware styles are a mix of plated die cast zinc and solid forged brass. The available finishes, illustrated below, are either a durable powder-coated finish or a metal finish.

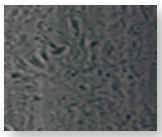

Antique Brass

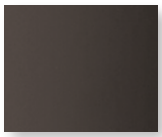

Black

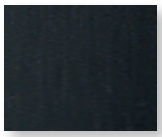

Bright Brass


Brushed Chrome


Distressed Bronze

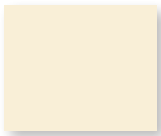

Distressed Nickel

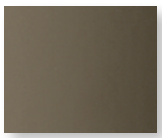

Dark Bronze

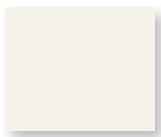

Oil Rubbed Bronze


Polished Chrome


Satin Nickel


Canvas


Stone

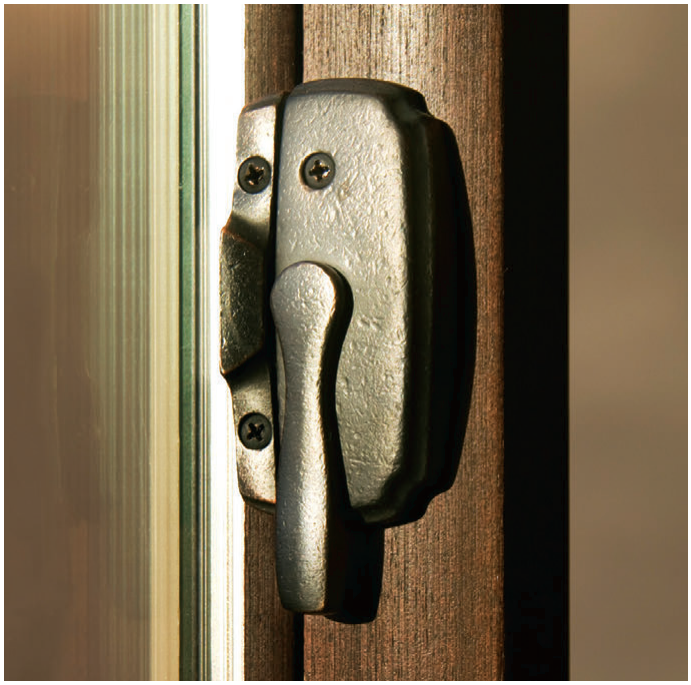

White

Distressed bronze and oil rubbed bronze are "living" finishes that will change with time and use. Printing limitations prevent exact finish replication.

Please refer to the each product's Specification and Technical Manual for hardware details.

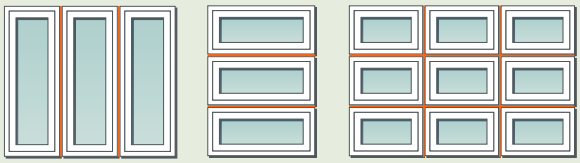

Double-Hung Lock and Keeper in Canvas

Casement Handle Hardware in Black


Gliding Window Hardware in Distressed Nickel

MULLING (JOINING) CAPABILITIES

There are many options for joining window units to create a window design to meet the needs of the customer. Windows can be joined in the following ways to create a feature window in the home.



1-Way – Ribbons **1-Way** – Stacks **2-Way** – Ribbons and Stacks

Mulling (Joining) Types

Regardless of which join type you use, it is important that Andersen joining materials and installation accessories be specified by a project architect or contractor.

There are several types of joining materials and each creates a joining system that maintains the look of Renewal by Andersen products and ensures a successful installation.

Materials vary depending on the type of units being joined and the wind load requirements. They are as follows:

Wood Mull (Joining) Material

Wood joining materials are used to create unit alignment and positive joining between units. Wood joining materials are not connected to the rough opening structure.

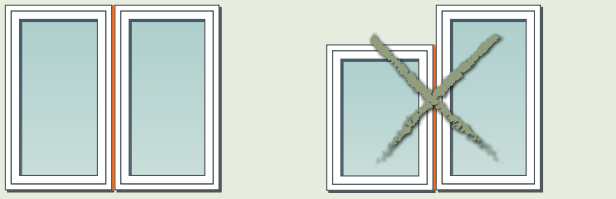
Steel Mull (Joining) Material

Steel, or reinforced joining materials, are used to create product alignment, positive joining and load transfer between the windows and the rough opening. They provide added strength capable of withstanding a variety of wind load pressures. The structural performance of any combination is only as high as the lowest structural performance rating of any individual window or joining material in the combination.

Factory Mulling (Joining) Services

Factory mulling services are available for full-frame windows. This enables installers to receive fully assembled mulled unit combinations ready upon delivery. Ribbons, stacks, and transoms are available, as well as groupings or gangs. To ensure product integrity, quality, performance, and practical handling, mulled unit combinations must conform to each of the following guidelines:

1. **This service is only available on mulled units using wood joining materials.**
2. **Mulled windows must have the same joining dimensions. (see graphic below).**

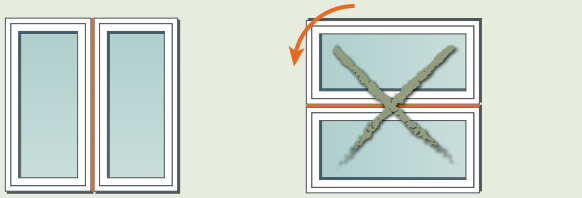


Joining Dimension Equal – YES **Joining Dimension Not Equal** – NO

MULLING (JOINING) CAPABILITIES

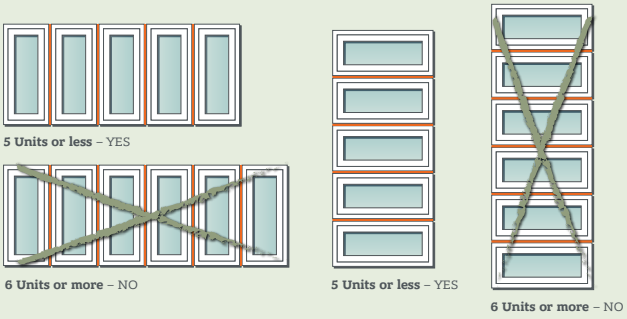
Factory Mulling (Joining) Services *continued*

3. All mulled units must be ordered in the orientation of the installation. For example, if two picture windows are mulled side-by-side, the mulled windows must be installed as a side-by-side. This orientation MUST NOT be rotated 90 degrees for a stacked installation. Also, mulled windows will not be shipped on their sides.

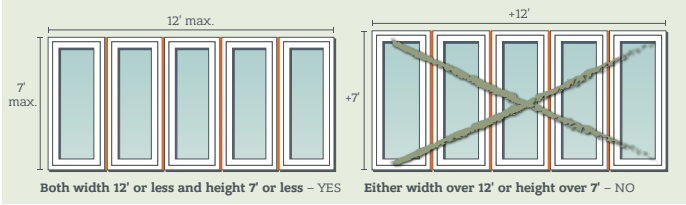


Installed in Same Orientation – YES **Installed in other Orientation** – NO

4. Mulled unit combinations are available in ribbons or stacks with a maximum of five windows. More than five windows may stress the mullions during shipment and handling.

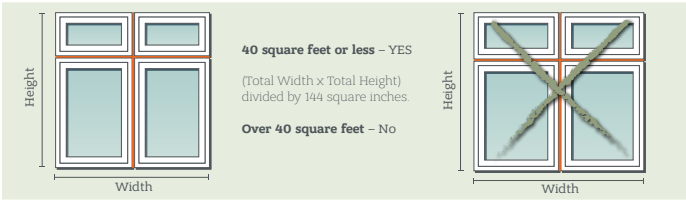


5. Mulled unit combinations have a maximum dimension of 12′ (144″) wide and 7′ (84″) tall. This dimension cannot be inverted (i.e., 7′ wide and 12′ tall) because of the restriction described in capability #3.



Both width 12′ or less and height 7′ or less – YES **Either width over 12′ or height over 7′** – NO

6. Mulled unit combinations are available in ribbons or stacks with a maximum of five windows. More than five windows may stress the joins during shipment and handling.



NOTE: Factory assembled full-frame mulled windows will be shipped with the interior and exterior mull trim strips set and sealed into the mulled unit. With two-directional combinations, the horizontal mullion exterior trim strips will be segmented. Vertical mull exterior trim strips will be continuous. This joining method promotes proper weather performance.

Renewal by Andersen
WINDOW REPLACEMENT
an Andersen Company

Gliding Window

SPECIFICATION AND TECHNICAL MANUAL

GLIDING WINDOW

ADVANTAGES and APPLICATIONS

The Renewal by Andersen® Gliding Window has a pleasing contemporary appearance that blends well with any decor. A gliding window with operations of either Active-Passive (AP) or Passive-Active (PA) consists of two sash in a single frame. A gliding window with operations of either Active-Stationary (AS) or Stationary-Active (SA) consists of one operating and one stationary sash in a single frame. A gliding window with an operation of Active-Stationary-Active (ASA) has two operating sash, one on each side of a stationary center sash, all contained within one frame. Operating sash are secured by a dual cam-type sash lock. A removable insect screen is installed on the exterior of the operating sash.

Gliding Window (AS or AP) – Interior View

ADVANTAGES:

- No horizontal sight line interruptions provide large viewing areas.
- Sash do not project outward when opened for ventilation.
- Smooth radius surfaces on frame and sash are pleasing to the eye and easier to clean.
- Mortise-and-tenon appearance on interior and exterior sash and frame corners provide an authentic, traditional hand-crafted look.

APPLICATIONS:

- Sash do not project outward, making them suitable for areas facing walkways, decks or exterior traffic areas.
- Visually compatible with other Renewal by Andersen® products.

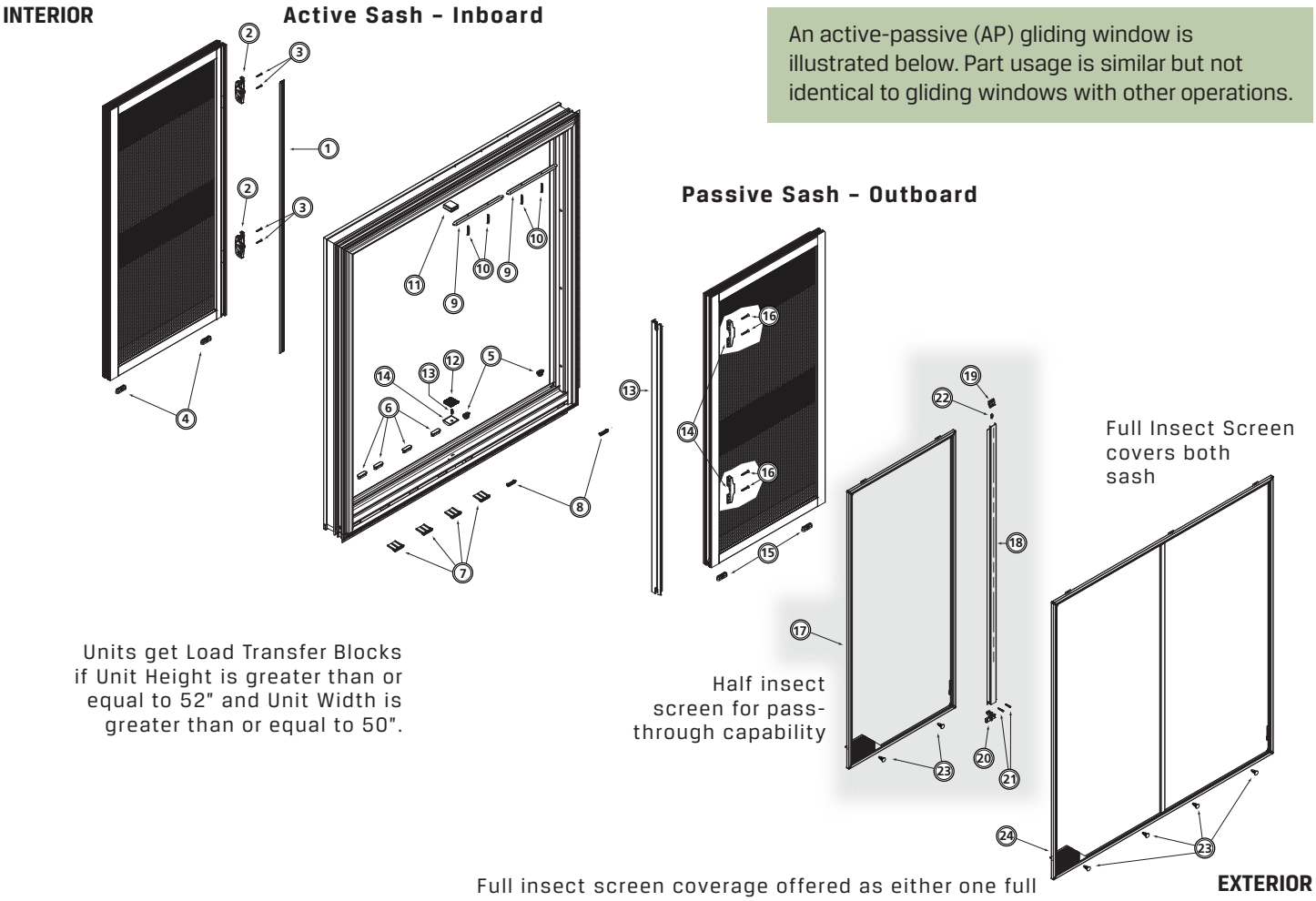
Gliding Window (ASA) – Interior View

GLIDING WINDOW - EXPLODED VIEW

The following features contribute to the Gliding windows' low maintenance, energy efficiency, ease of operation, and pleasing appearance.

Made of rigid Fibrex® material which is a unique structural composite of wood fibers and a special thermoplastic polymer. Developed by Andersen®, Fibrex combines the strength and stability of wood with the low-maintenance features of our time-tested Perma-Shield® cladding.

FRAME AND SASH FOR ACTIVE-PASSIVE (AP) UNIT



An active-passive (AP) gliding window is illustrated below. Part usage is similar but not identical to gliding windows with other operations.

Units get Load Transfer Blocks if Unit Height is greater than or equal to 52" and Unit Width is greater than or equal to 50".

Half insect screen for pass-through capability

Full insect screen coverage offered as either one full insect screen or two half insect screens based on unit size

Refer to page 05-11 for details

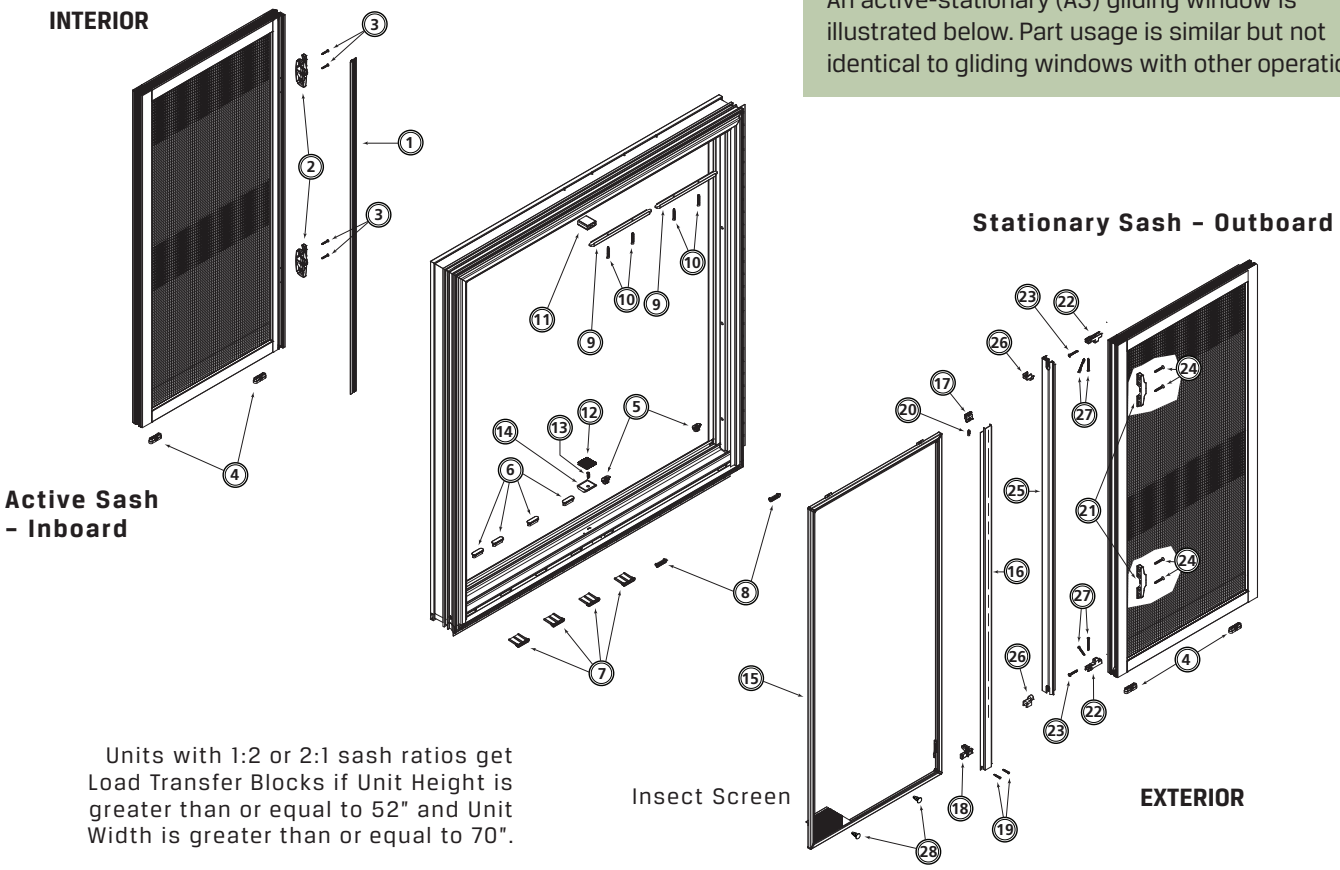
GLIDING WINDOW COMPONENTS

1. Active Sash Interlock
2. Lock – Left Hand
3. Screw – 6-10x1
4. Roller Assembly
5. Top Weep Cover
6. Active Sash Cover
7. Active Sash Chute
8. Weep Cover
9. Load Transfer Block
10. Screw – 8-15x3/4
11. Head Jamb Dust Plug
12. Meeting Stile Plug
13. Passive Sash Interlock
14. Keeper
15. Roller Assembly
16. Screw – 6-10x1
17. Half Insect Screen
18. Astragal
19. Top Astragal Clip
20. Bottom Astragal Clip
21. Screw – 6-18x1
22. Screw – 6-18x3/4
23. Insect Screen Spacer
24. Full Insect Screen

GLIDING WINDOW - EXPLODED VIEW

FRAME AND SASH FOR ACTIVE-STATIONARY (AS) UNIT

An active-stationary (AS) gliding window is illustrated below. Part usage is similar but not identical to gliding windows with other operations.



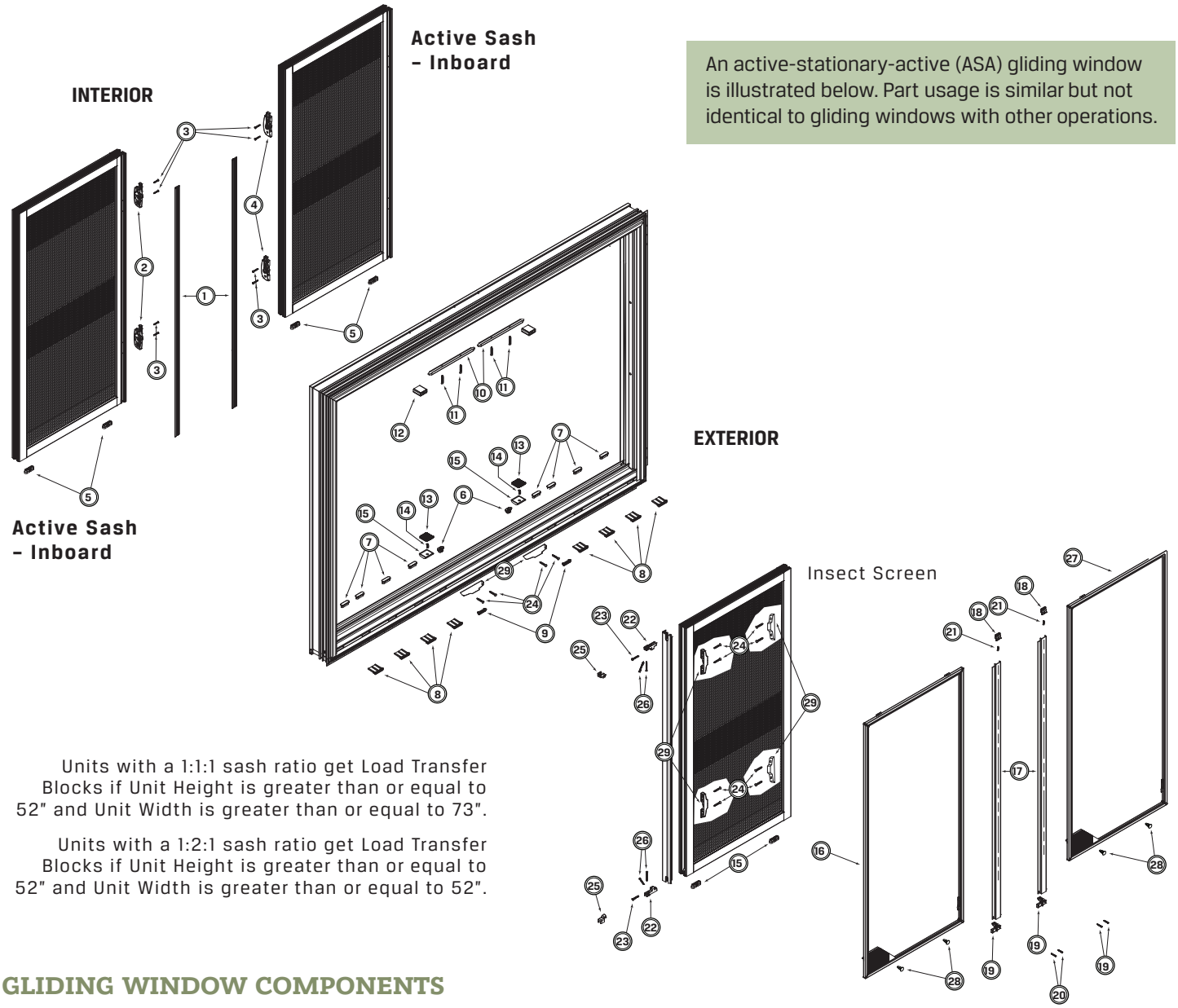
Units with 1:2 or 2:1 sash ratios get Load Transfer Blocks if Unit Height is greater than or equal to 52" and Unit Width is greater than or equal to 70".

GLIDING WINDOW COMPONENTS

1. Active Sash Interlock
2. Lock – Left Hand
3. Screw – 6-10x1
4. Roller Assembly
5. Top Weep Cover
6. Active Sash Cover
7. Active Sash Chute
8. Weep Cover
9. Load Transfer Block
10. Screw – 8-15x1-1/2
11. Head Jamb Dust Plug
12. Weatherstrip
13. Screw – 8-15x3/4
14. Meeting Stile Plug
15. Insect Screen
16 Astragal
17. Top Astragal Clip
18. Bottom Astragal Clip
19. Screw – 6-18x1
20. Screw – 6-18x3/4
21. Keeper
22. Stationary Sash Clip
23. Screw – 8-15x1-1/4
24. Screw – 6-10x1
25. Passive Sash Interlock
26. Stationary Sash Clip
27. Screw – 8-15x1-3/4
28. Insect Screen Spacer

GLIDING WINDOW - EXPLODED VIEW

FRAME AND SASH FOR ACTIVE-STATIONARY-ACTIVE (ASA) UNIT



An active-stationary-active (ASA) gliding window is illustrated below. Part usage is similar but not identical to gliding windows with other operations.

Units with a 1:1:1 sash ratio get Load Transfer Blocks if Unit Height is greater than or equal to 52" and Unit Width is greater than or equal to 73".

Units with a 1:2:1 sash ratio get Load Transfer Blocks if Unit Height is greater than or equal to 52" and Unit Width is greater than or equal to 52".

GLIDING WINDOW COMPONENTS

1. Active Sash Interlock
2. Lock – Left Hand
3. Screw – 6-10x1
4. Lock – Right Hand
5. Roller Assembly
6. Top Weep Cover
7. Active Sash Cover
8. Active Sash Chute
9. Weep Cover
10. Load Transfer Block
11. Screw – 8-15x1-1/2
12. Head Jamb Dust Plug
13. Weatherstrip
14. Screw – 8-15x3/4
15. Meeting Stile Plug
16. Insect Screen
17. Astragal
18. Top Astragal Clip
19. Bottom Astragal Clip
20. Screw – 6-18x1
21. Screw – 6-18x3/4
22. Stationary Sash Clip
23. Screw – 8-15x1-1/4
24. Screw – 6-10x1
25. Stationary Sash Clip
26. Screw – 8-15x1-3/4
27. Insect Screen
28. Insect Screen Spacer

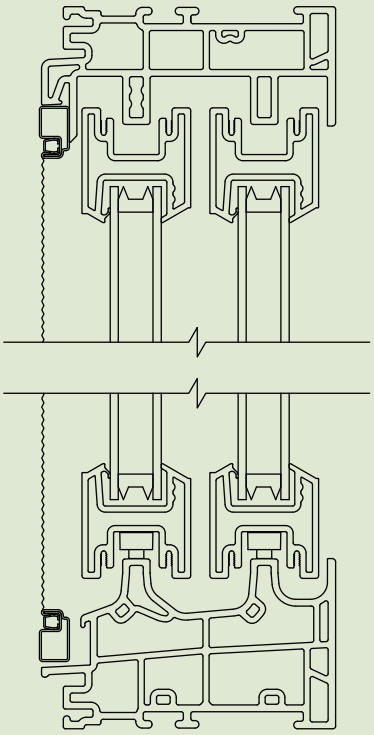
FRAME DETAILS

The Gliding Window is available with two frame options. There is a Base Frame and Extension Jamb (EJ) Frame. Base Frame and Extension Jamb frames are both available with factory applied trim options.

Base Frame

A Base Frame, which consists of a full outer frame nose and accessory kerf that is compatible with the Universal Picture Window (PWU), and a CLOSED interior frame profile. The closed interior frame profile is ideal for certain interior trim options.

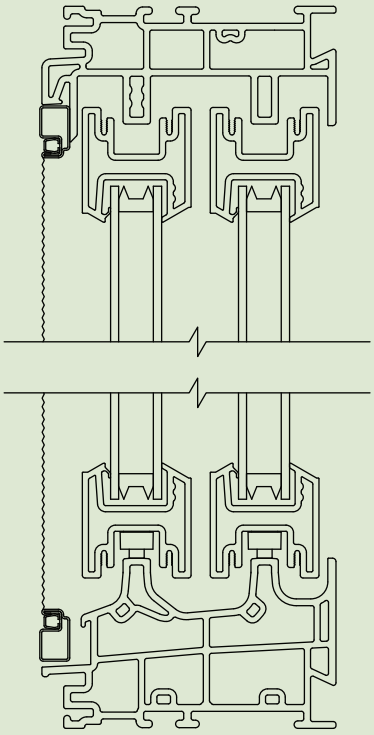
The Base Frame is consistent with the Universal Frame strategy which exists on all other Renewal by Andersen products. It has a 4" frame depth and flat interior surface for use in sealing or trimming the window. The exterior perimeter of the window is provided with a kerf to accept trim components such as L-Trim, F-Trim or coil.



Extension Jamb (EJ) Frame

An Extension Jamb Frame, which consists of a full outer frame nose and accessory kerf that is compatible with the Universal Picture Window (PWU), and a OPEN interior frame profile factory prepared to receive an Extension Jamb.

The Extension Jamb (EJ) Frame is consistent with the Universal Frame strategy which exists on all other Renewal by Andersen products. It has a 4" frame depth and contains an EJ kerf to accept an extension jamb. The exterior perimeter of the window is provided with a kerf to accept trim components such as L-Trim, F-Trim or coil.

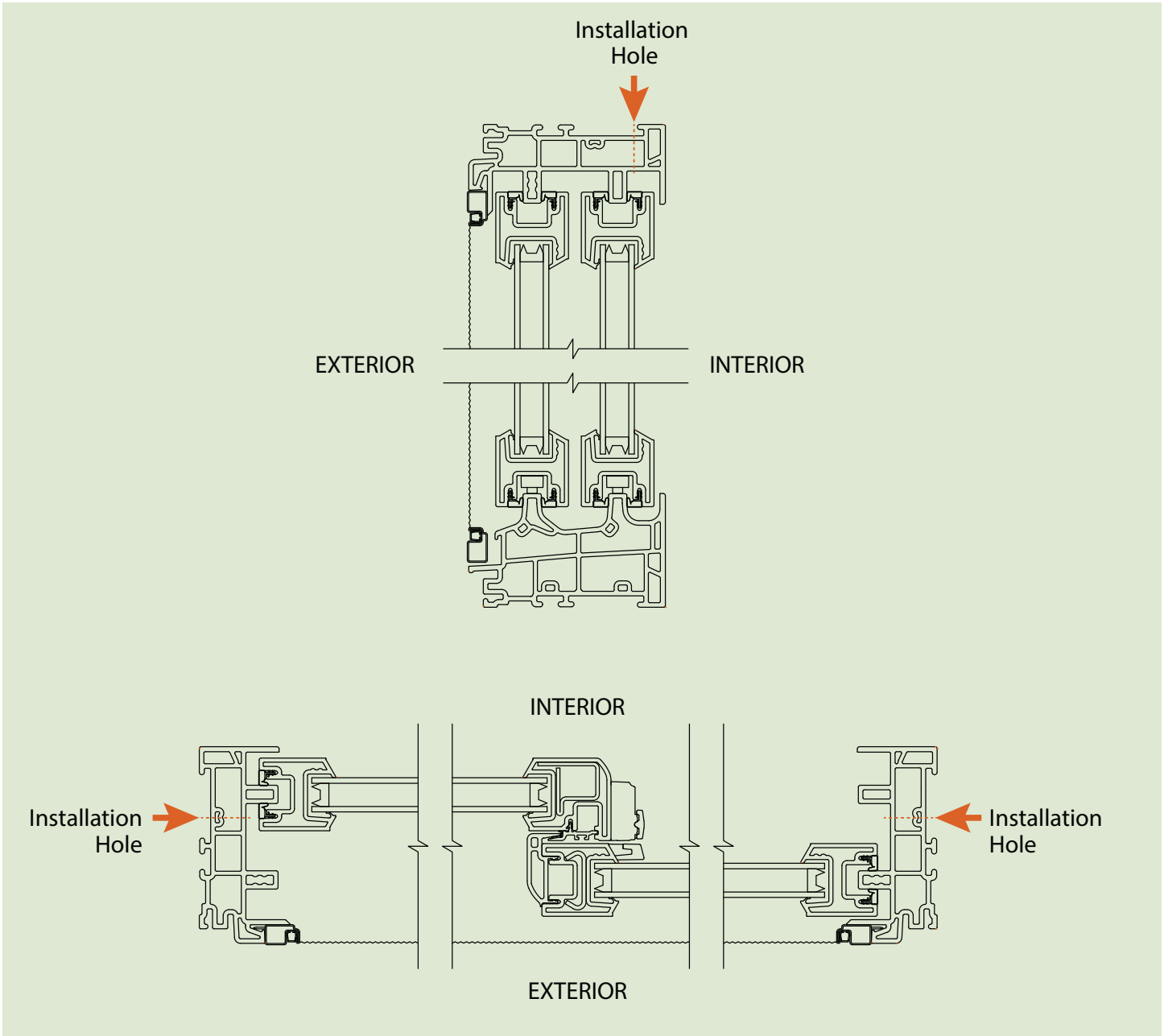


INSTALLATION HOLE LOCATIONS

Installation Hole Location Details

Installation holes, when specified on the Gliding Window family of products, are drilled at the factory as follows:

- Side Jamb: Installation holes, on each side jamb, are located in the center track. The installation screws are seated into the cavity of the side jamb profile. The installation holes are capped with color matched hole plugs. The number of holes vary by size of the unit.
- Head Jamb: Installation holes for the head jamb are located at the meeting rails in the interior track. The installation screw nests into a sleeve, allowing the screw to be accessed for future adjustment – if needed. The head of the screw is either white or Sandtone. The number of holes vary by size of the unit.
- Sill: Installation holes are not used at the sill. The sill must be secured to the rough opening with either installation clips or a construction adhesive.

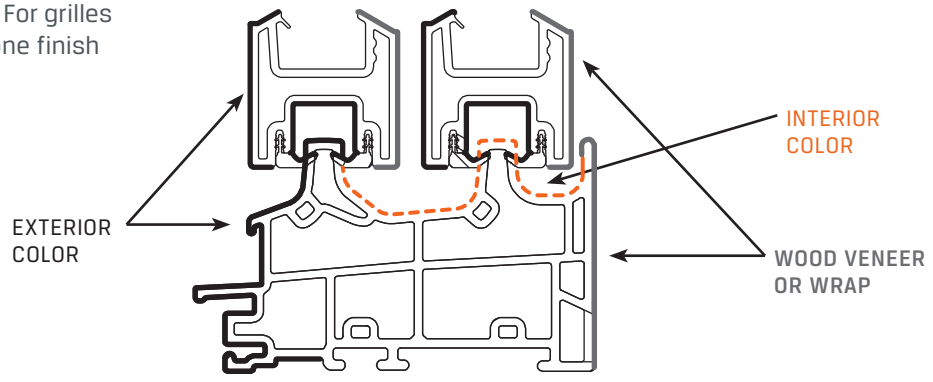


COLOR COMBINATIONS CHART

WINDOW UNIT		Interior*	Insect Screen	Hardware
Exterior	Interior	Frame Sash Channel	Frame	Interior
White	White	White	White	White
	Canvas	Canvas	White	Canvas
	Wood	White	White	Stone
Canvas	White	White	Canvas	White
	Canvas	Canvas	Canvas	Canvas
	Wood	Canvas	Canvas	Stone
Sandtone	White	White	Sandtone	White
	Sandtone	Sandtone	Sandtone	Stone
	Canvas	Canvas	Sandtone	Canvas
	Wood	Sandtone	Sandtone	Stone
Terratone	White	White	Terratone	White
	Terratone	Terratone	Terratone	Stone
	Canvas	Canvas	Terratone	Canvas
	Wood	Terratone	Terratone	Stone
Dark Bronze	White	White	Dark Bronze	White
	Dark Bronze	Terratone	Dark Bronze	Dark Bronze
	Canvas	Canvas	Dark Bronze	Canvas
	Wood	Canvas	Dark Bronze	Stone
Black	White	White	Black	White
	Black	Terratone	Black	Black
	Canvas	Canvas	Black	Canvas
	Wood	Canvas	Black	Stone
Cocoa Bean	White	White	Cocoa Bean	White
	Canvas	Canvas	Cocoa Bean	Canvas
	Wood	Canvas	Cocoa Bean	Stone
Forest Green	White	White	Forest Green	White
	Canvas	Canvas	Forest Green	Canvas
	Wood	Canvas	Forest Green	Stone
Red Rock	White	White	Red Rock	White
	Canvas	Canvas	Red Rock	Canvas
	Wood	Canvas	Red Rock	Stone

* When an interior color selection is achieved using a wrap (wood, dark bronze or black), the "Interior" color will still be visible on the frame channels and edges of sash. See graphic below for details.

- Wood interiors are available in pine, maple and oak.
- Grilles come in split finishes to match the interior and exterior finish choices of the window. For grilles between the glass, the interior is a sandtone finish when a wood interior is selected.



PATTERNED GLASS LIMITATIONS

Patterned Glass

Patterned glass lets in light while obscuring vision and adds a unique, decorative touch. Several patterns are available and each is generated on the hot glass during the manufacturing process. The options are illustrated below.


Cascade


Fern


Obscure


Reed

Note: Cascade and Reed patterns can be ordered with either a vertical or horizontal orientation.

The following tables show the patterns that have some size restrictions for casement and awning products.

Patterned Glass Unit Size Limitations

	Obscure		**Reed** (Vertical)		**Reed** (Horizontal)		**Cascade** (Vertical)		**Cascade** (Horizontal)		**Fern**	
	MAX W	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*
GL 1:1 sash ratio	none	none	none	none	96"	64"	none	none	none	none	96" x 54" or 56-9/16" x 80	
GL 1:2 sash ratio	none	none	none	none	96"	64"	none	none	none	none	96" x 54" or 56-9/16" x 80	
GT 1:1:1 sash ratio	none	none	none	none	144	64"	none	none	none	none	82-7/8" x 80" or 144" x 53-5/16	
GT 1:2:1 sash ratio	124-1/16" x 72" or 84" x 80" or 144" x 63-3/16"		112-13/16" x 72" or 84" x 80" or 124-1/16" x 65-9/16"		127-1/4" x 64" or 144 x 56-13/16"		124" x 72" or 84" x 80"		124" x 72" or 84" x 80"		58-5/8" x 80" or 144" x 33-1/2 or 106-1/4 x 50	

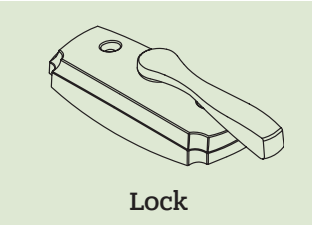
Tempered Patterned Glass Unit Size Limitations

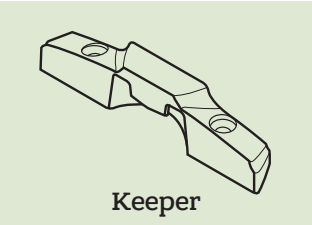
	Obscure		**Reed** (Vertical)		**Reed** (Horizontal)		**Cascade** (Vertical)		**Cascade** (Horizontal)		**Fern**	
	MAX W	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*	*MAX W*	*MAX H*
GL 1:1 sash ratio	none	none	none	none	96"	64"	none	none	none	none	96" x 47" or 87-15/16" x 72 or 72" x 80"	
GL 1:2 sash ratio	none	none	none	none	96"	64"	none	none	none	none	96" x 47" or 87-15/16" x 72 or 72" x 80"	
GT 1:1:1 sash ratio	none	none	none	none	144	64"	none	none	none	none	144" x 47" or 130" x 72" or 84" x 80	
GT 1:2:1 sash ratio	124-1/16" x 72" or 84" x 80" or 144" x 64"		118-1/16" x 72" or 84" x 80" or 124-1/16" x 61"		118-1/16" x 64" or 144 x 61"		124" x 72" or 84" x 80"		124" x 72" or 84" x 80"		90-1/16" x 72" or 84" x 80" or 144" x 47"	

HARDWARE COMPONENTS

Sash Lock and Keeper

The zinc cast dual-cam type metal sash lock, mounted at the center of the meeting stile on the interior sash, engages easily into the keeper mounted on the center of the meeting stile on the exterior sash. The Gliding Window Color Combinations Chart on 05-8 shows the hardware color for each window color combination.


Lock


Keeper

One lock is standard for all units less than 54" tall. If an additional lock and keeper is desired, single lock and keeper units can be ordered with a second lock and keeper for gliding windows between 24" and 54" tall. Two sash lock and keepers are standard with windows taller than 54".

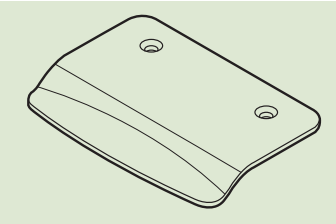
Lock Location Chart

	Height Ranges	Location
1 LOCK	Less than 54"	1" below halfway point of meeting stile
2 LOCKS	54" and Greater	1" below 1/3 and 2/3 points of meeting stile

Note: Lock and keeper locations are measured from the bottom of the sash to the first attachment hole. Lock and keeper locations can be moved up or down the meeting stile 2-1/4" to accommodate grille bars.

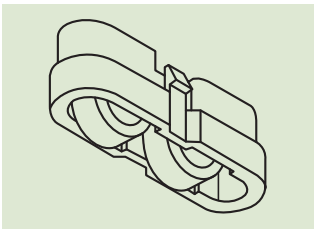
Sash Pull

A standard gliding window does not have a sash pull. A low-profile sash pull can be mounted to the meeting stile of the active sash. The sash pull color will match the lock and keeper. The pull can be custom-positioned during installation if ordered separately. Sash pulls are not recommended for passive (exterior) sash because they inhibit sash operation.



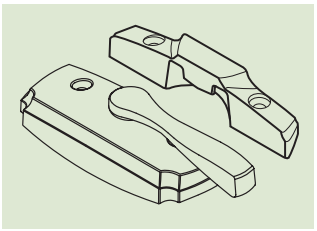
Dual Tandem Roller System

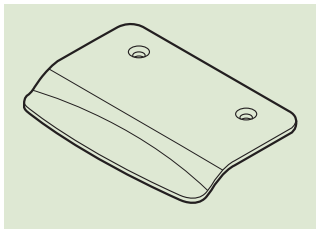
Each operable sash has two or more dual tandem rollers based on size of sash. Roller is made of durable high-impact polymers for easy operation.



Estate™ Hardware

Estate finish lock and keepers and sash pulls are available for all operating windows and are available in bright brass, antique brass, satin nickel, distressed nickel, brushed chrome, polished chrome, distressed bronze, oil-rubbed bronze and dark bronze. Hardware in each of the finishes is electroplated and/or modified to obtain the desired look.





INSECT SCREEN DETAILS

Insect screen frames for Gliding Windows are installed on the exterior of the window and match the unit's exterior color. A center bar on full insect screens add strength and rigidity.

Standard Insect Screens

The conventional or standard insect screen is made with an aluminum frame and has an easy-to-see-through fiberglass screen mesh (18 x 16 per inch mesh) in a glare resistant charcoal gray finish.

Aluminum Insect Screens

The aluminum insect screen is identical to the standard insect screen but with a durable aluminum screen mesh (18 x 16 per inch mesh) in a glare-resistant charcoal gray finish.

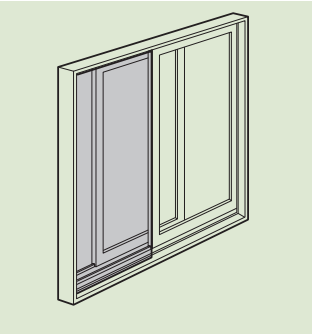
TruScene® Insect Screens

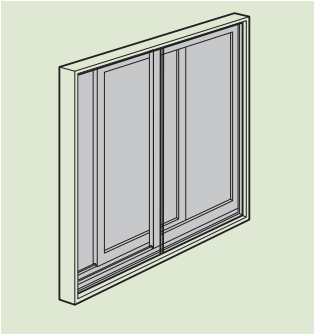
TruScene® insect screens have a micro-fine stainless steel material (25 x 25 per inch mesh) that provides over 50% more clarity than conventional Andersen insect screens.

Pass-Through (Half) Insect Screens

This optional feature is only available on AP or PA gliding windows. The pass-through capability is accomplished by operating the passive outboard sash. The insect screen is placed over the active sash. There is no insect screen over the passive sash.

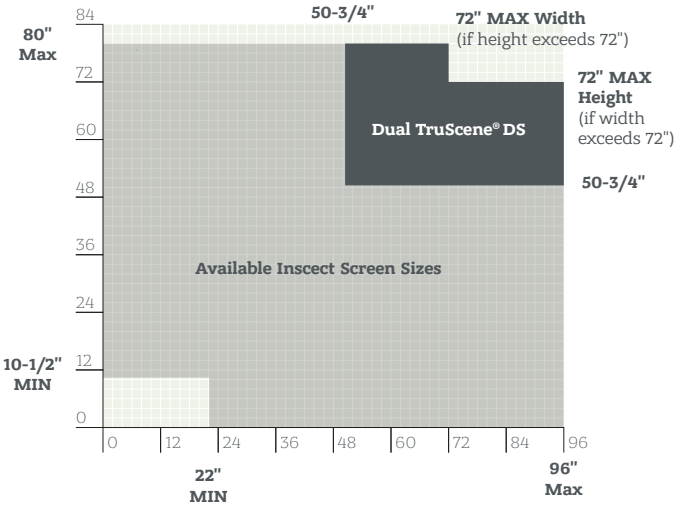
Full Insect Screens are available for all Gliding Window unit sizes. Dual panel insect screens are available based on size. There are some availability restrictions for TruScene insect screens. Based on size, some may require dual insect screen panels. Reference the following chart for details.





Insect Screen Size Restrictions

Active-Passive and Active-Stationary Gliding Windows (1:1 sash ratio) with a width greater than or equal to 50-3/4" and a height greater than or equal to 50-1/4" will have dual insect screen panels for full screen applications.



Gliding windows with a 2:1 or 1:2 sash ratio utilize a half insect screen positioned over the operating sash.

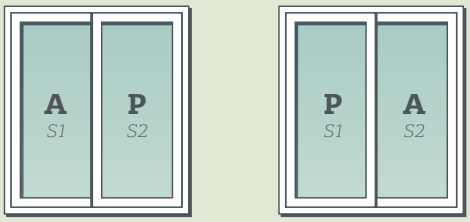
Active-stationary-active (three sash) gliding windows utilize a half insect screen positioned over each operating sash.

SASH OPERATION AND RATIOS

Operation of Gliding Windows

Sash are labeled either S1, S2 and S3 and are identified from the exterior, reading from left to right. Operation is labeled Active, Passive or Stationary. Active is always the inboard sash. Passive is alway outboard sash and operates. The Stationary sash is always outboard and does not operate.

Active-Passive (1:1 Sash Ratio) **Passive-Active** (1:1 Sash Ratio)



GL - Gliding Window (AP) GL - Gliding Window (PA)

(viewed from exterior)

Both sash operate in one frame with a 1:1 sash ratio.

A = The active inboard sash operates

P = The passive outboard sash operates

Stationary-Active (1:1 Sash Ratio) **Active-Stationary** (1:1 Sash Ratio)

GL - Gliding Window (SA) GL - Gliding Window (AS)

(viewed from exterior)

Two sash in one frame with a 1:1 sash ratio.

A = The active inboard sash operates

S = The stationary outboard sash does not operate

Stationary-Active (2:1 Sash Ratio) **Active-Stationary** (1:2 Sash Ratio)

GL - Gliding Window (SA) GL - Gliding Window (AS)

(viewed from exterior)

Two sash in one frame with a a 2:1 or 1:2 sash ratio.

A = The active inboard sash operates

S = The stationary outboard sash does not operate

NOTE: The larger sash will always be stationary (S). Limited custom ratios available via Non-Standard Product Request (NSPR).

Active-Stationary-Active (1:1:1 Sash Ratio)

GT - Gliding Window (ASA)

(viewed from exterior)

Active-Stationary-Active (1:2:1 Sash Ratio)

GT - Gliding Window (ASA)

(viewed from exterior)

Three sash in one frame with a 1:1:1 or 1:2:1 sash ratio.

A = The two flanking inboard sash always operate.

S = The stationary center outboard sash does not operate.

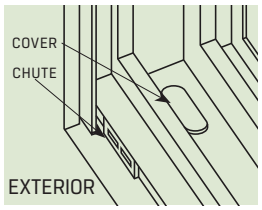
NOTE: The center sash is not available as and Active sash.

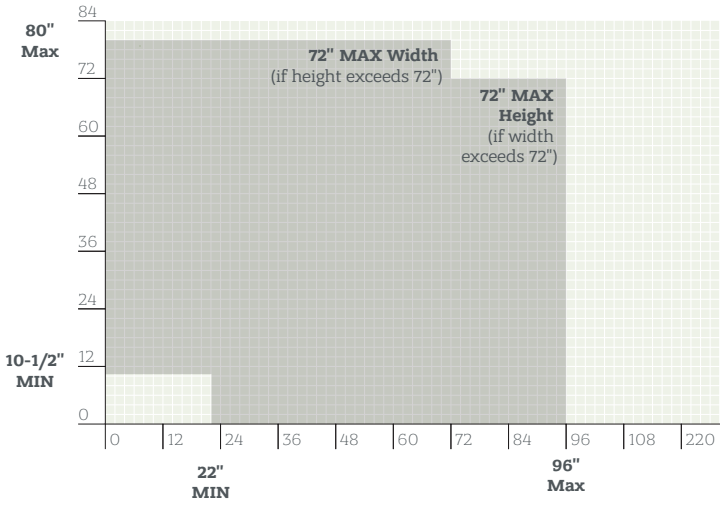
MINIMUM AND MAXIMUM SIZES

AP/PA and SA/AS

Gliding windows are available in any unit dimension between the limits identified in the chart, rounded to the nearest 1/16" inch. Gliding window performance may vary depending on window size. Please reference the Technical Section for window performance data.

Visible Covers and Chutes	
Unit Width Range	Quantity
22" to 48"	2
48" to 84"	3
84" to 96"	4





AP/PA and SA/AS (1:1 Sash Ratio) Clear Opening

To determine net clear opening dimensions enter unit height and unit width in inches in the formulas below.

Determining Clear Opening Dimensions (use to assess egress code compliance)	
Clear Opening Width (inches)	Unit Width / 2 - 4.334
Clear Opening Height (inches)	Unit Height - 4.493

Determining Clear Opening Area (use calculated numbers from above table)	
Clear Opening Area (square feet)	$\frac{\text{(Clear Opening Width) x (Clear Opening Height)}}{144}$

Clear Glass Area and Unit Area

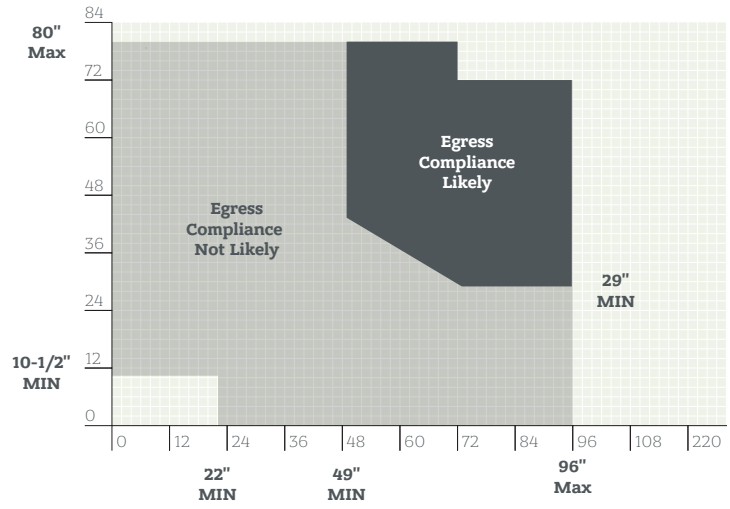
To determine the area dimensions for the window, enter unit height (H) in inches and width (W) in inches into the formulas below.

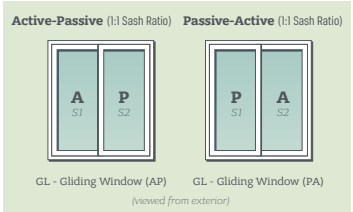
Determining Clear Glass Area	
Clear Glass Area of Active Sash (square feet)	$\left[\frac{\text{(Width - 8.099) x (Height - 7.019)}}{144}\right]$ x 1/2
Clear Glass Area of Passive Sash (square feet)	$\left[\frac{\text{(Width - 8.099) x (Height - 7.019)}}{144}\right]$ x 1/2
Clear Glass Area of Both Sash (square feet)	$\left[\frac{\text{(Width - 8.099) x (Height - 7.019)}}{144}\right]$
Overall Unit Area (square feet)	$\frac{\text{(Width) x (Height)}}{144}$

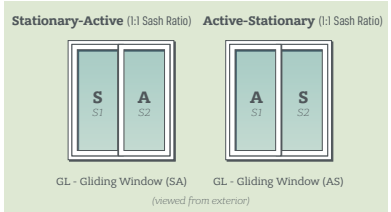
Egress Compliance Based on Unit Sizes

An egress window is a window large enough, as defined by local business codes for entry or exit in case of an emergency. Typically, the bottom of the egress window opening can't exceed 44" from the finished floor. The minimum opening area of the egress window is 5.7 square feet. The minimum egress window opening height is 24". The minimum egress window opening width is 20".

IMPORTANT: Contact your local code officials to determine precise egress codes for your home / project.





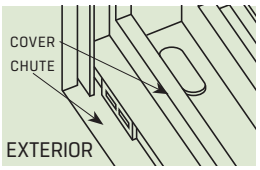


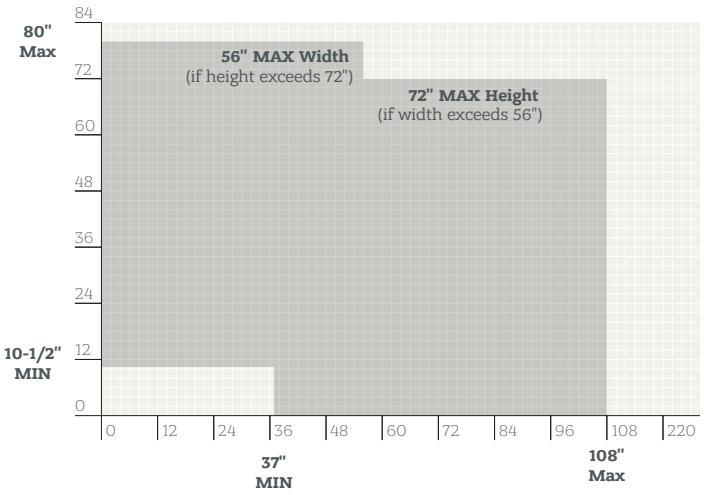
MINIMUM AND MAXIMUM SIZES

AS/SA (1:2 or 2:1 Sash Ratio)

Gliding windows are available in any unit dimension between the limits identified in the chart, rounded to the nearest 1/16" inch. Gliding window performance may vary according to window size. Please reference the Technical Section for window performance data.

Visible Covers and Chutes	
Unit Width Range	**Quantity**
37" to 68"	2
68" to 108"	3





AS/SA (1:2 or 2:1 Sash Ratio) Clear Opening

To determine net clear opening dimensions enter unit height and unit width in inches in the formulas below.

Determining Clear Opening Dimensions (use to assess egress code compliance)	
Clear Opening Width (inches)	Unit Width / 3 - 1.602
Clear Opening Height (inches)	Unit Height - 4.493
Clear Opening Area (square feet)	$\frac{\text{(Clear Opening Width) x (Clear Opening Height)}}{144}$

Clear Glass Area and Unit Area

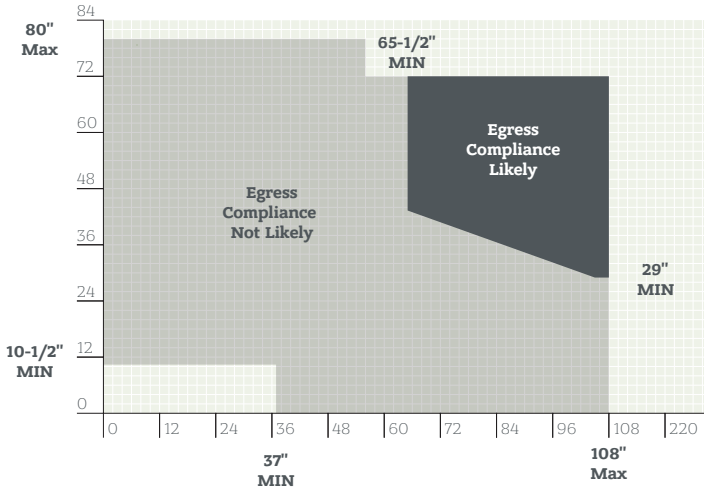
To determine the area dimensions for the window, enter unit height (H) in inches and width (W) in inches into the formulas below.

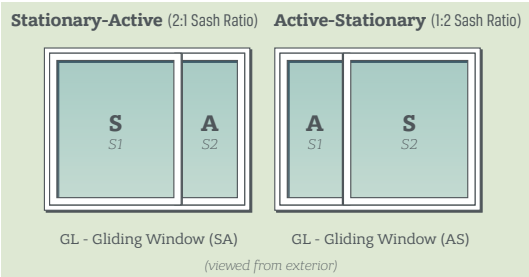
Determining Clear Glass Area	
Clear Glass Area of Active Sash (square feet)	$\left[\frac{\text{(Width / 3 - 2.7) x (Height - 7.019)}}{144}\right]$
Clear Glass Area of Stationary Sash (square feet)	$\left[\frac{\text{(2 X Width / 3- 5.399) x (Height - 7.019)}}{144}\right]$
Clear Glass Area of Both Sash (square feet)	$\left[\frac{\text{(Width - 8.099) x (Height - 7.019)}}{144}\right]$
Overall Unit Area (square feet)	$\frac{\text{(Width) x (Height)}}{144}$
Active Sash Clear Glass Width	Unit Width / 3 - 2.7
Stationary Sash Clear Glass Width	2 x Unit Width / 3 - 5.399
Stationary Sash Clear Glass Height	Unit Height - 7.019

Egress Compliance Based on Unit Sizes

An egress window is a window large enough, as defined by local business codes for entry or exit in case of an emergency. Typically, the bottom of the egress window opening can't exceed 44" from the finished floor. The minimum opening area of the egress window is 5.7 square feet. The minimum egress window opening height is 24". The minimum egress window opening width is 20".

IMPORTANT: Contact your local code officials to determine precise egress codes for your home / project.

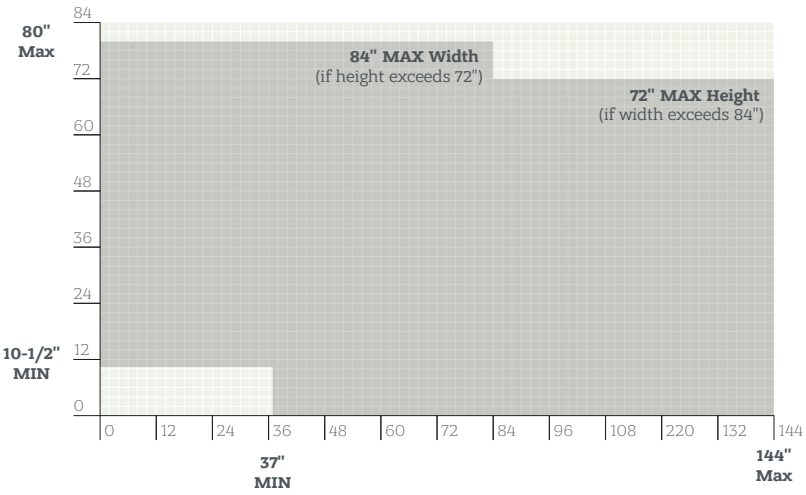




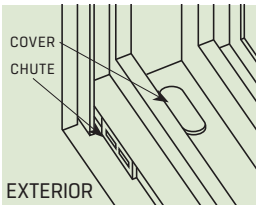
MINIMUM AND MAXIMUM SIZES

ASA (1:1:1 Sash Ratio)

Active-Stationary-Active Gliding Windows incorporate two sliding sash located on either side of a stationary sash in one frame. Two sash configurations are available. The first is a 1:1:1 sash ratio. All sash are equal in width. Both sash can be partially opened at the same time. The units are available in any unit dimension between the limits identified in the chart below, rounded to the nearest 1/16" inch. Gliding window performance may vary according to window size. Please reference the Technical Section for window performance data.



Visible Covers and Chutes	
Unit Width Range	**Quantity**
37" to 70"	4 (2 per side)
70" to 124"	6 (3 per side)
124" to 144"	8 (4 per side)



ASA (1:1:1 Sash Ratio) Clear Opening

To determine net clear opening dimensions enter unit height and unit width in the formulas below.

Determining Clear Opening Dimensions (use to assess egress code compliance)	
Clear Opening Width (inches)	Unit Width / 4 - 3.086
Clear Opening Height (inches)	Unit Height - 4.493
Clear Opening Area (square feet)	$\frac{\text{(Clear Opening Width) x (Clear Opening Height)}}{144}$

Clear Glass Area and Unit Area

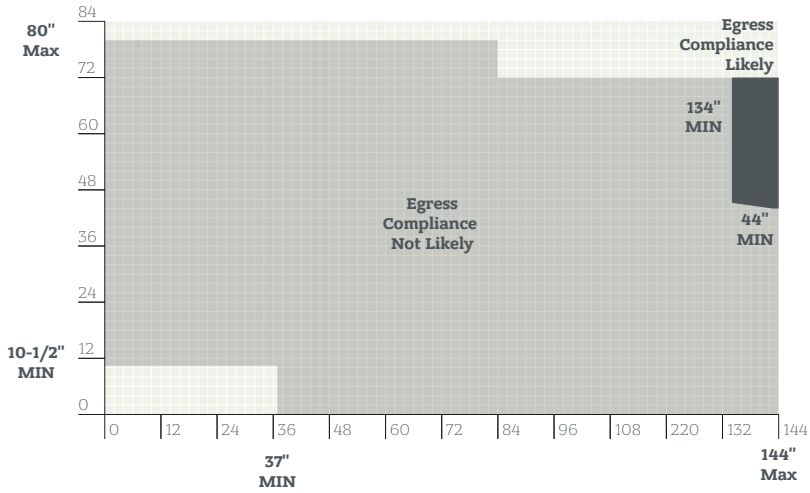
To determine the area dimensions for the window, enter unit height (H) in inches and width (W) in inches into the formulas below.

Determining Clear Glass Area	
Clear Glass Area of Active Sash (square feet)	$\left[\frac{\text{(Width / 3 - 3.399) x (Height - 7.019)}}{144}\right]$
Clear Glass Area of Stationary Sash (square feet)	$\left[\frac{\text{(Width / 3 - 3.399) x (Height - 7.019)}}{144}\right]$
Overall Unit Area (square feet)	$\frac{\text{(Width) x (Height)}}{144}$
Active Sash Clear Glass Width	Unit Width / 3 - 3.399
Stationary Sash Clear Glass Width	Unit Width / 3 - 3.399
Stationary Sash Clear Glass Height	Unit Height - 7.019

Egress Compliance Based on Unit Sizes

An egress window is a window large enough, as defined by local business codes for entry or exit in case of an emergency. Typically, the bottom of the egress window opening can't exceed 44" from the finished floor. The minimum opening area of the egress window is 5.7 square feet. The minimum egress window opening height is 24". The minimum egress window opening width is 20".

IMPORTANT: Contact your local code officials to determine precise egress codes for your home / project.



Active-Stationary-Active (1:1:1 Sash Ratio)

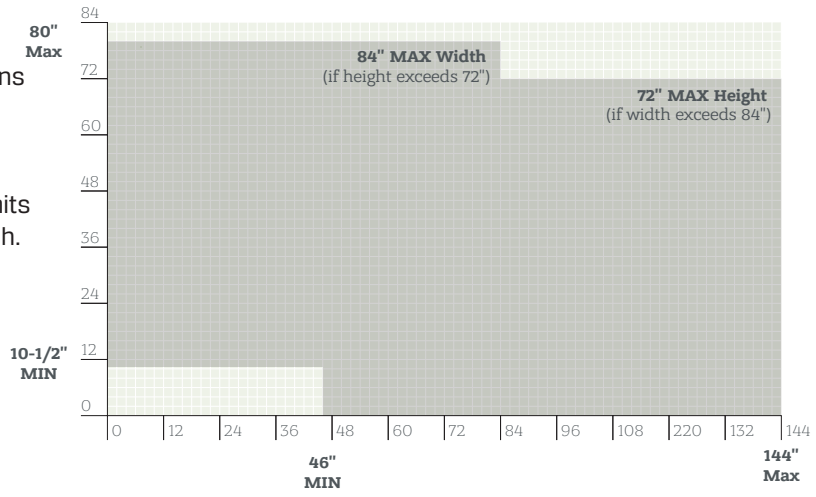
GT - Gliding Window (ASA)

(viewed from exterior)

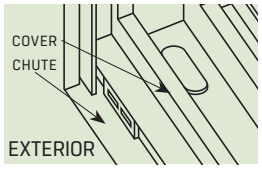
MINIMUM AND MAXIMUM SIZES

ASA (1:2:1 Sash Ratio)

Active-Stationary-Active Gliding Windows incorporate two sliding sash located on either side of a stationary sash in one frame. The second of the two sash configurations is a 1:2:1 sash ratio. The stationary sash is twice the size of each of the two sliding sash. Both sliding sash can be fully opened at the same time, allowing for excellent ventilation. The units are available in any unit dimension between the limits identified in the chart below, rounded to the nearest 1/16" inch. Gliding window performance may vary according to window size. Please reference the Technical Section for window performance data.



Visible Covers and Chutes	
Unit Width Range	**Quantity**
37" to 90"	4 (2 per side)
90" to 144"	6 (3 per side)



ASA (1:2:1 Sash Ratio) Clear Opening

To determine net clear opening dimensions enter unit height and unit width in inches in the formulas below.

Determining Clear Opening Dimensions (use to assess egress code compliance)	
Clear Opening Width (inches)	Unit Width / 4 - 3.936
Clear Opening Height (inches)	Unit Height - 4.493
Clear Opening Area (square feet)	$\frac{\text{(Clear Opening Width) x (Clear Opening Height)}}{144}$

Total Glass Area and Unit Area

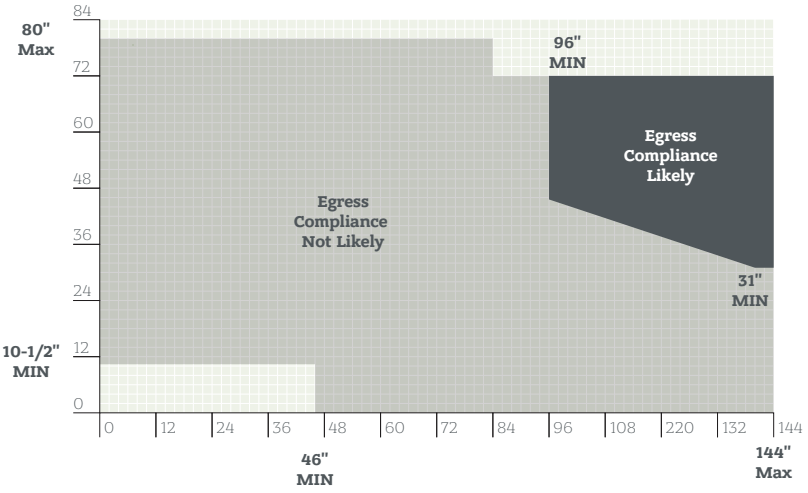
To determine the area dimensions for the window, enter unit height (H) in inches and width (W) in inches into the formulas below.

Determining Clear Glass Area	
Clear Glass Area of Active Sash (square feet)	$\left[\frac{\text{(Width / 4 - 2.5495) x (Height - 7.019)}}{144}\right]$
Clear Glass Area of Stationary Sash (square feet)	$\left[\frac{\text{(2 X Width / 2 - 5.099) x (Height - 7.019)}}{144}\right]$
Overall Unit Area (square feet)	$\frac{\text{(Width) x (Height)}}{144}$
Active Sash Clear Glass Width	Unit Width / 4 - 2.5495
Stationary Sash Clear Glass Width	2 x Unit Width / 4 - 5.099
Stationary Sash Clear Glass Height	Unit Height - 7.019

Egress Compliance Based on Unit Sizes

An egress window is a window large enough, as defined by local business codes for entry or exit in case of an emergency. Typically, the bottom of the egress window opening can't exceed 44" from the finished floor. The minimum opening area of the egress window is 5.7 square feet. The minimum egress window opening height is 24". The minimum egress window opening width is 20".

IMPORTANT: Contact your local code officials to determine precise egress codes for your home / project.

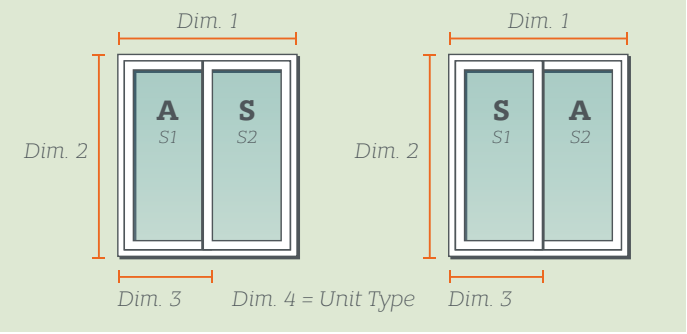


Active-Stationary-Active (1:2:1 Sash Ratio)

GT - Gliding Window (ASA)

(viewed from exterior)

CALCULATIONS



AS/SA Center of Meeting Stile Location

Dimension 1 = _____ (Must be between 37 and 108 inches. If dimension 2 is greater than 72 then dimension 1 must not exceed 56 inches)

Dimension 2 = _____ (Must be between 10-1/2 and 80 inches. If dimension 1 is greater than 56 then dimension 2 cannot exceed 72 inches)

Dimension 3 = _____ (Must result in an active sash between 10-9/16 and 47-9/16 wide and a passive sash between 10-5/16 and 69-15/16 wide)
*See below for equation

Dimension 4 = _____ (Must be AS or SA configuration)
*To check dimension 3 compliance, complete the following equations.

If Dimension 4 = AS:

Active sash width = Dimension 3 - .432 = _____

Passive sash width = Dimension 1 – Dimension 3 - .679 = _____

If Dimension 4 = SA:

Active sash width = Dimension 1 – Dimension 3 - .432 = _____

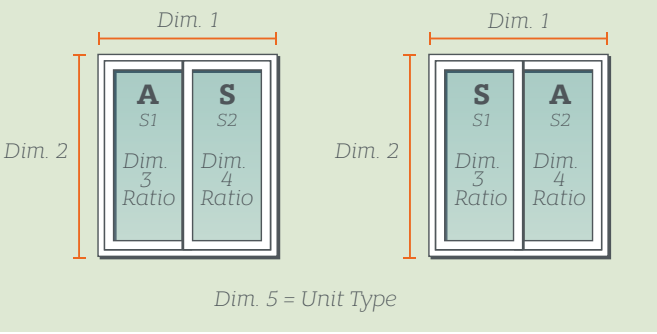
Passive sash width = Dimension 3 - .679 = _____

Calculate Clear Opening Width:

A= (Passive Sash Width + .323) – Active Sash Width – 1.458 = _____

If "A" is less than or equal to Zero:
(Unit Width – 3.308 – Passive Sash Width – .323) + A = _____

If "A" is greater than zero:
(Unit Width – 3.308 – Passive Sash Width – .323) = _____



AS/SA Sash Ratio

Dimension 1 = _____ (Must be between 37 and 108 inches. If dimension 2 is greater than 72 then dimension 1 must not exceed 56 inches)

Dimension 2 = _____ (Must be between 10-1/2 and 80 inches. If dimension 1 is greater than 56 then dimension 2 cannot exceed 72 inches)

Dimension 3 = _____ (Ratio of S1, If S1 = Active sash then dimension 3 must be smaller than dimension 4 and S1 width must be between 10-9/16 and 47-9/16 and S2 must be between 10-5/16 and 69-15/16 wide)

Dimension 4 = _____ (Ratio of S2, If S2 = Active sash then dimension 4 must be smaller than dimension 3 and S2 width must be between 10-9/16 and 47-9/16 and S1 must be between 10-5/16 and 69-15/16 wide)

Dimension 5 = _____ (Must be AS or SA configuration)

*To check dimension 3 and 4 compliance, complete the following equations.

If Dimension 5 = AS:

Active sash width = ((Dimension 1 – 8.099) / (Dimension 3 + Dimension 4))
* Dimension 3 + 3.617 = _____

Passive sash width = ((Dimension 1 – 8.099) / (Dimension 3 + Dimension 4))
* Dimension 4 + 3.370 = _____

If Dimension 4 = SA:

Active sash width = ((Dimension 1 – 8.099) / (Dimension 3 + Dimension 4))
* Dimension 4 + 3.617 = _____

Passive sash width = ((Dimension 1 – 8.099) / (Dimension 3 + Dimension 4))
* Dimension 3 + 3.370 = _____

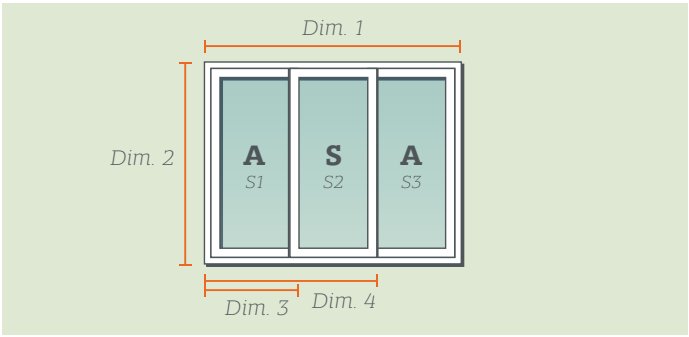
Calculate Clear Opening Width:

A= (Passive Sash Width + .323) – Active Sash Width – 1.458 = _____

If "A" is less than or equal to Zero:
(Unit Width – 3.308 – Passive Sash Width – .323) + A = _____

If "A" is greater than zero:
(Unit Width – 3.308 – Passive Sash Width – .323) = _____

CALCULATIONS



ASA Center of Meeting Stile Location

Dimension 1 = _____ (Must be between 46 and 144 inches. If dimension 2 is greater than 72 then dimension 1 must not exceed 84 inches)

Dimension 2 = _____ (Must be between 10-1/2 and 80 inches. If dimension 1 is greater than 84 then dimension 2 cannot exceed 72 inches)

Dimension 3 = _____ (Must result in an active sash (S1 and S3) between 12-1/2 and 48-3/16 wide and a passive sash (S2) between 21-1/4 and 70-1/4 wide)
*See below for equation

Dimension 4 = _____ (Must result in an active sash (S1 and S3) between 12-1/2 and 48-3/16 wide and a passive sash (S2) between 21-1/4 and 70-1/4 wide)
*See below for equation
*To check dimension 3 and 4 compliance, complete the following equations.

Calculate Sash Width:

Active sash width = Dimension 3 - .432 = _____

Passive sash width (S2) = Dimension 4 – Dimension 3 + 1.272 = _____

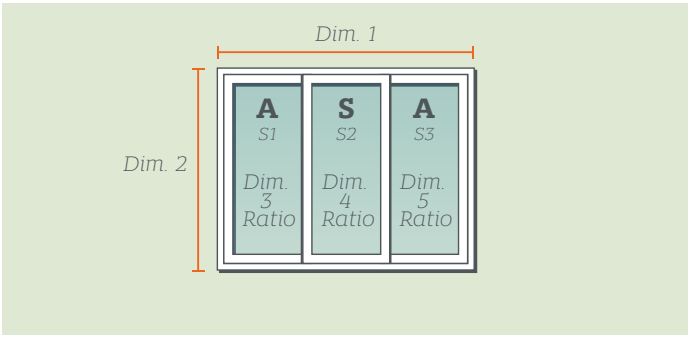
Passive sash width (S3) = Dimension 1 – Dimension 4 - .432 = _____

Calculate Clear Opening Width:

A= ((S2 / 2) + .323) – S1 – .875 = _____

If "A" is less than or equal to Zero:
((Unit Width / 2) – (S2 / 2) – 2.316) + A = _____

If "A" is greater than zero:
((Unit Width / 2) – (S2 / 2) – 2.316) = _____



ASA Sash Ratio

Dimension 1 = _____ (Must be between 46 and 144 inches. If dimension 2 is greater than 72 then dimension 1 must not exceed 84 inches)

Dimension 2 = _____ (Must be between 10-1/2 and 80 inches. If dimension 1 is greater than 84 then dimension 2 cannot exceed 72 inches)

Dimension 3 = _____ (Ratio of S1, dimension 3 must be smaller than dimension 4 and = to dimension 5 and must result in an active sash (S1 and S3) between 12-1/2 and 48-3/16 wide) *See below for equation

Dimension 4 = _____ (Ratio of S2, dimension 4 must be larger than dimension 3 and 5 and must result in a passive sash (S2) between 21-1/4 and 70-1/4 wide) *See below for equation

Dimension 5 = _____ (Must equal dimension 3)
*To check dimension 3, 4 and 5 compliance, complete the following equations.

Calculate Sash Width:

Active sash width (SI) = ((Dimension 1 – 10.198) / (Dimension 3 + Dimension 4 + Dimension 5)) * Dimension 3 + 3.617 = _____

Passive sash width (S2) = ((Dimension 1 – 10.198) / (Dimension 3 + Dimension 4 + Dimension 5)) * Dimension 4 + 3.370 = _____

Passive sash width (S3) = ((Dimension 1 – 10.198) / (Dimension 3 + Dimension 4 + Dimension 5)) * Dimension 5 + 3.617 = _____

Calculate Clear Opening Width:

A= ((S2 / 2) + .323) – S1 – .875 = _____

If "A" is less than or equal to Zero:
((Unit Width / 2) – (S2 / 2) – 2.316) + A = _____

If "A" is greater than zero:
((Unit Width / 2) – (S2 / 2) – 2.316) = _____

MULLING (JOINING) CAPABILITIES

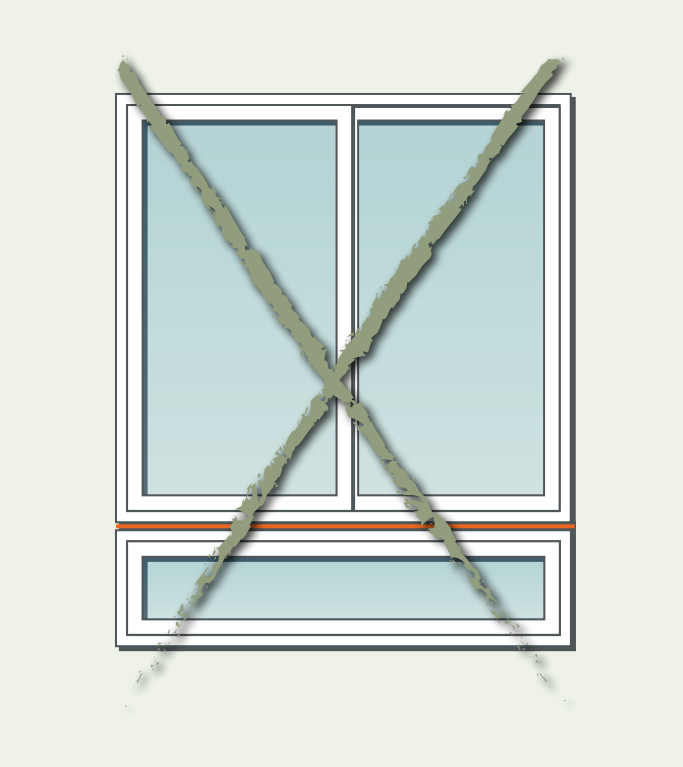
Available Factory Mull (Joined) Combinations

Stack, ribbon and two-way configurations must conform to factory mulling guidelines. Please reference the General Section for details.

Mull (Joining) Considerations and Recommendations

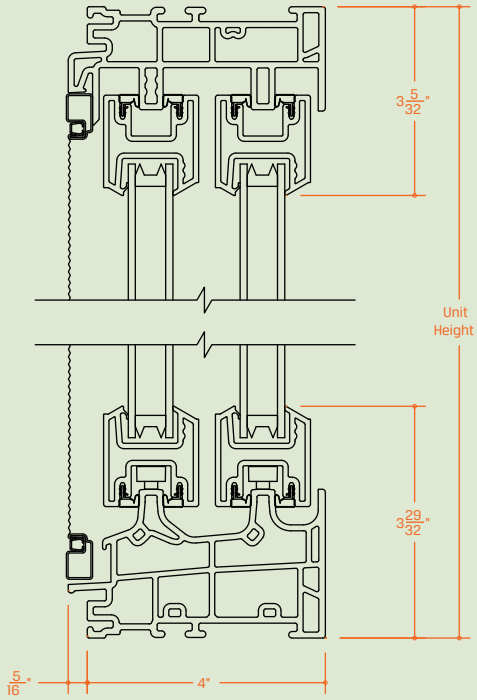
Mulling a gliding unit over any other unit is not recommended

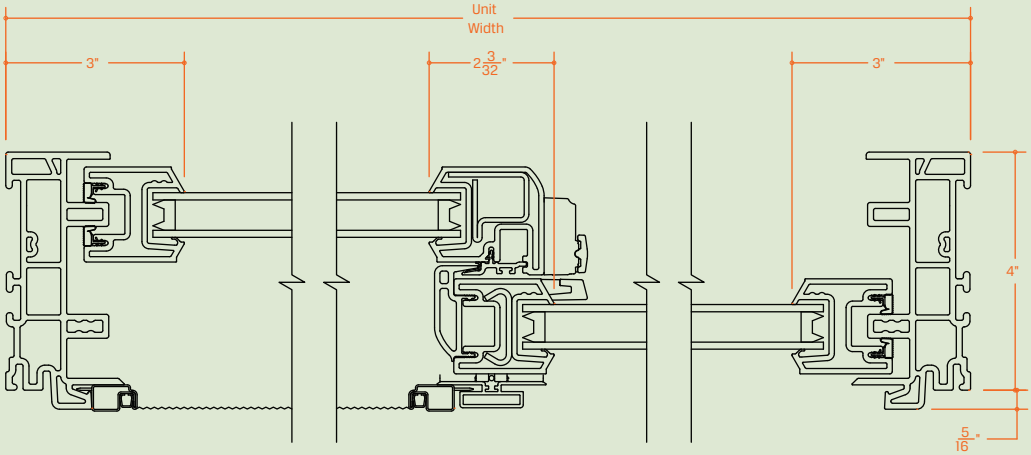
Since the Gliding Window family is a universal frame design, mulled combinations should ALWAYS specify Universal Frame products. (I.e. Universal Picture Window PWU and Universal Specialty Window SWU)



PRODUCT DETAILS

Gliding Window AS and SA Universal Frame – Base

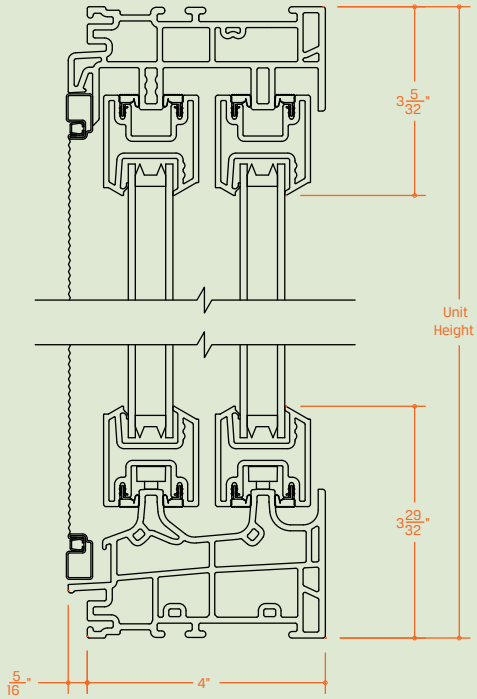


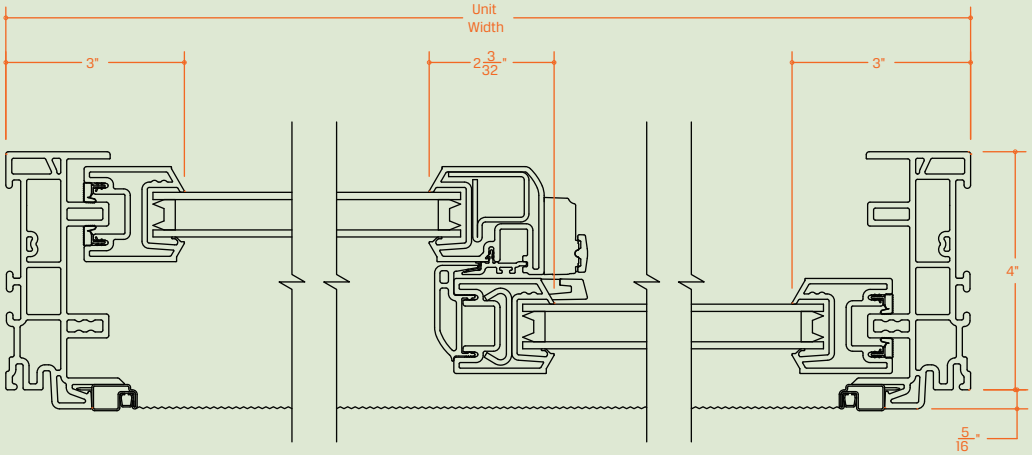


Note: Active-Stationary unit shown, the Stationary-Active unit is the mirror image of this.

PRODUCT DETAILS

Gliding Window AP and PA Universal Frame – Base

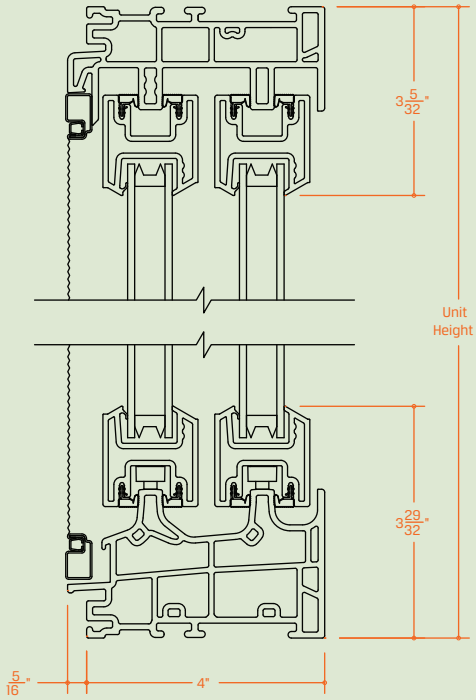


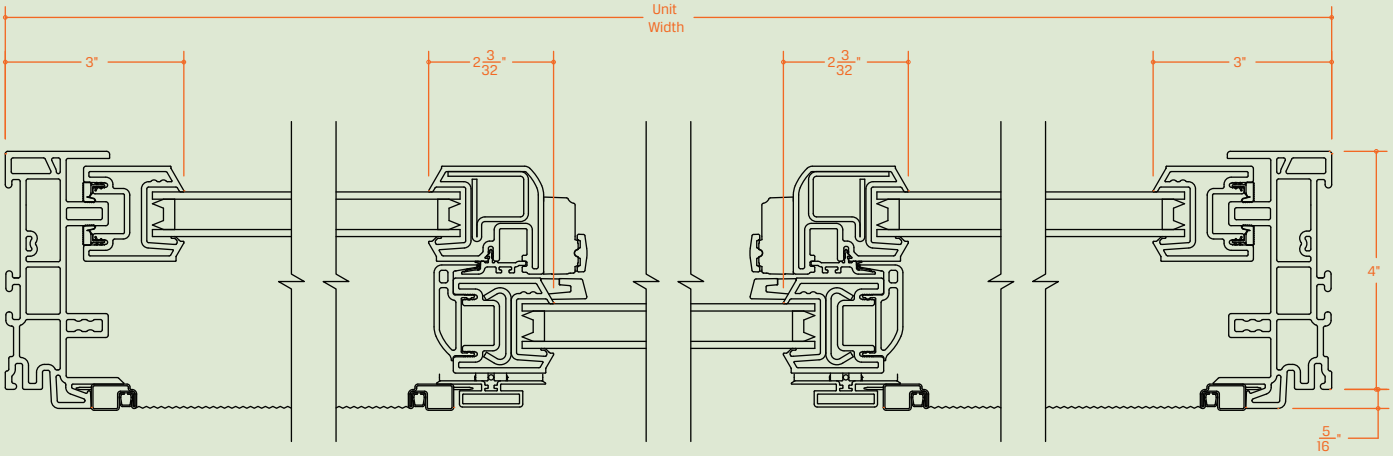


Note: Active-Passive unit shown, the Passive-Active unit is the mirror image of this.

PRODUCT DETAILS

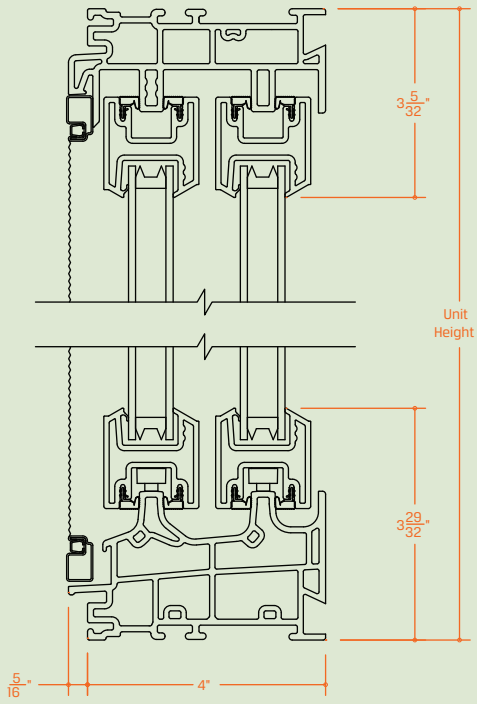
Gliding Window ASA (1:1:1 and 1:2:1 Sash Ratio) Universal Frame –Base

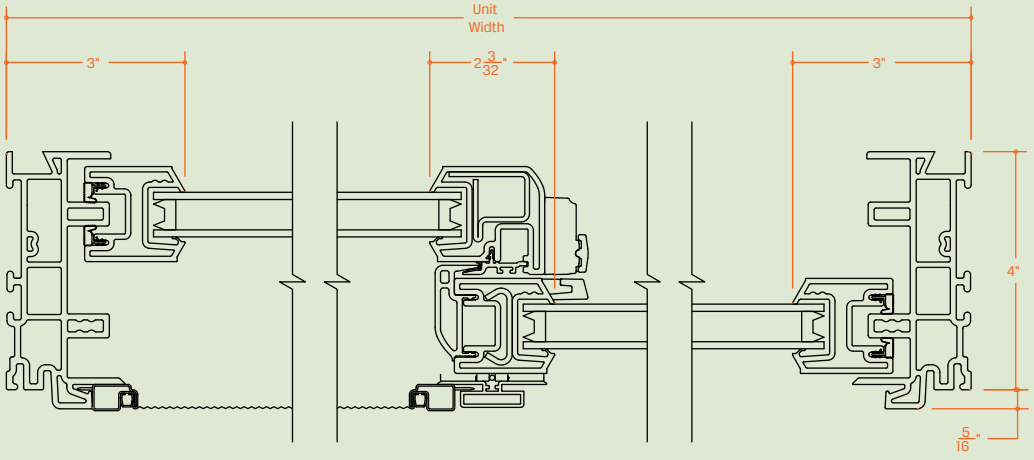




PRODUCT DETAILS

Gliding Window AS and SA Universal Frame –EJ

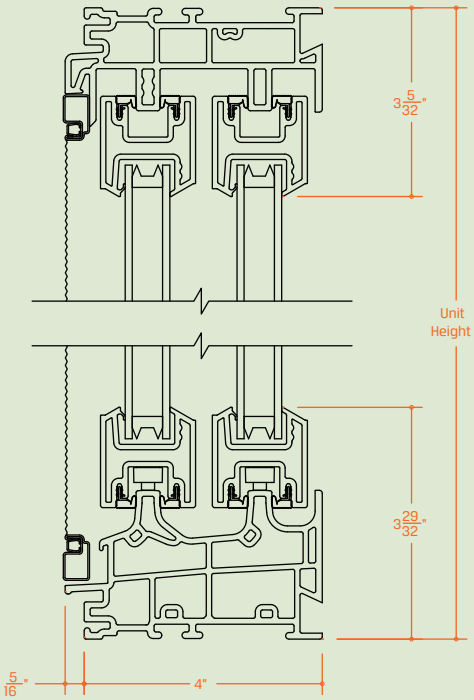


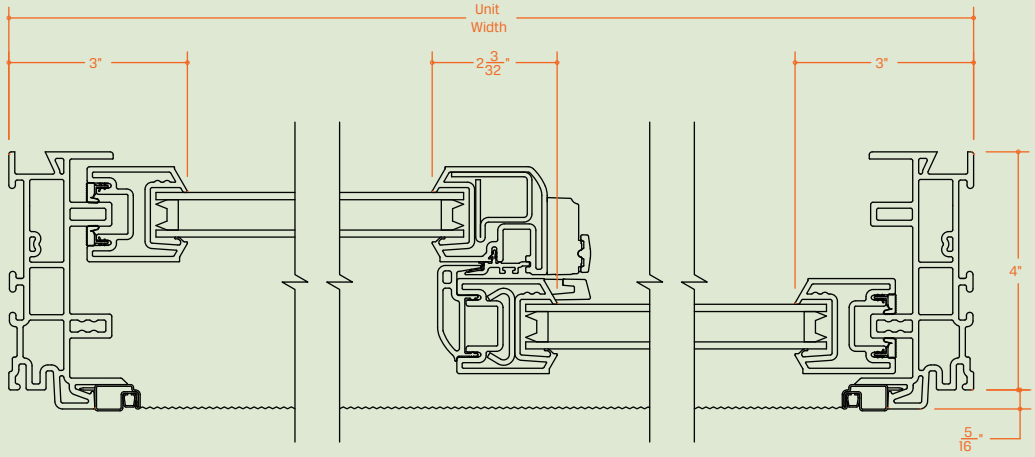


Note: Active-Stationary unit shown, the Stationary-Active unit is the mirror image of this.

PRODUCT DETAILS

Gliding Window AP and PA Universal Frame – EJ

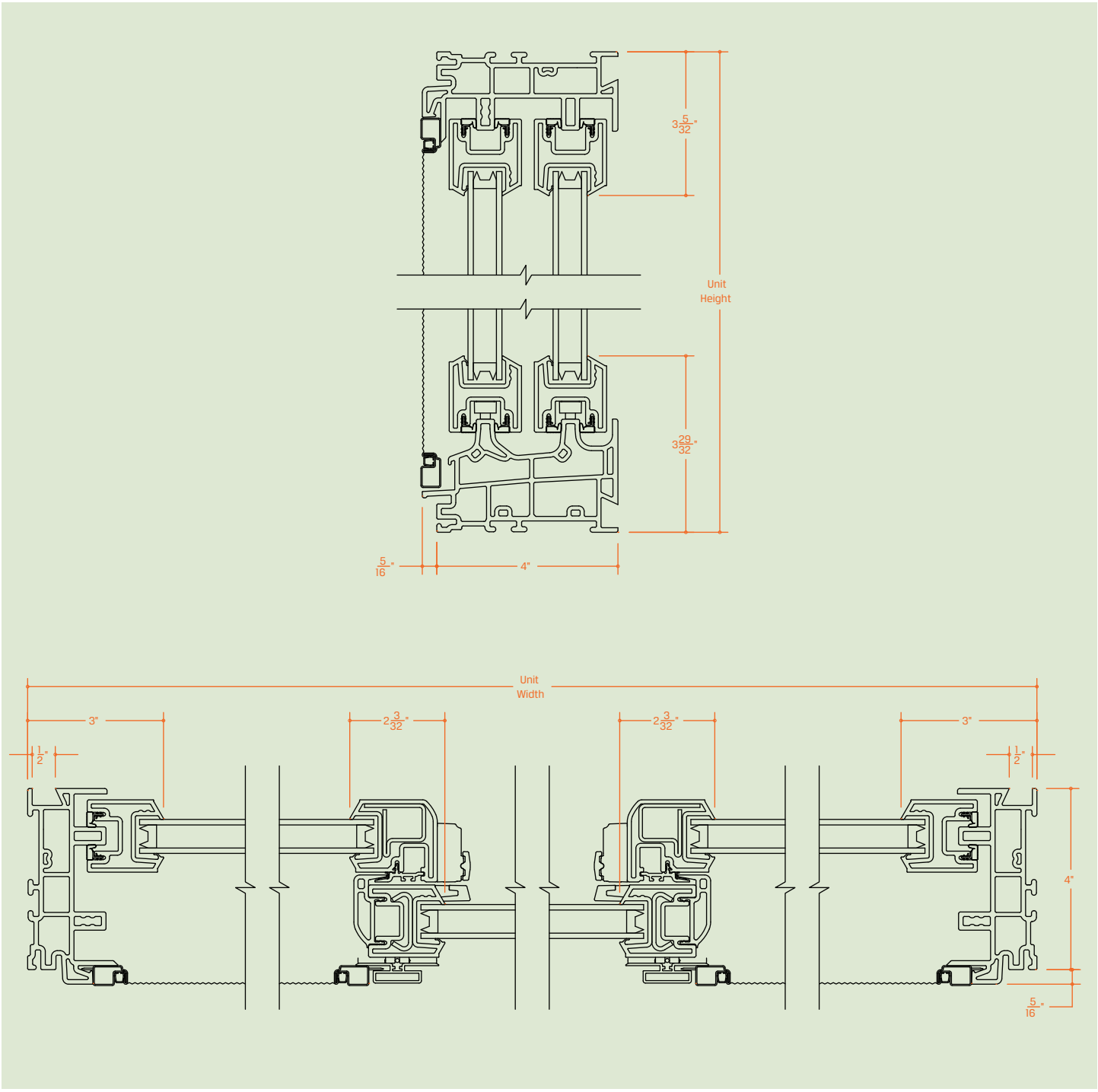




Note: Active-Passive unit shown, the Passive-Active unit is the mirror image of this.

PRODUCT DETAILS

Gliding Window ASA (1:1:1 and 1:2:1 Sash Ratio) Universal Frame – EJ



101 living
Window - 36.00W x 62.00H

EXTERIOR

360°

INTERIOR

102 living
Window - 36.00W x 62.00H

EXTERIOR

360°

INTERIOR

103 dining
Window - 69.00W x 62.00H

EXTERIOR

360°

INTERIOR

104 dining
Window - 36.00W x 62.00H

EXTERIOR

360°

INTERIOR

105 kitchen
Window - 52.00W x 37.00H

EXTERIOR

360°

INTERIOR

108 kitchen
Window - 36.00W x 62.00H

EXTERIOR

360°

INTERIOR

114 master
Window - 36.00W x 62.00H

EXTERIOR

360°

INTERIOR

116 master
Window - 69.00W x 62.00H

EXTERIOR

360°

INTERIOR

117 master bath
Window - 36.00W x 37.00H

EXTERIOR

360°

INTERIOR

118 master bath
Window - 36.00W x 37.00H

EXTERIOR

360°

INTERIOR