

# Elevate and Essential Product Performance

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## How to Use this Manual

### Manual Objectives:

The content of this manual will aid in understanding the wide variety of standards, codes, and regulations governing the use of windows and doors. Consumer-friendly information on a variety of highly-rated Marvin products along with fenestration standards, including glazing, Ultrex<sup>®</sup> finishes, hardware, and overall product performance can be used to help your clients understand what products best fit their project needs.

### Intended Audience:

#### This manual is primarily intended for professionals who:

- Provide shop drawings, sales and service to customers
- Write job specifications
- Need further product knowledge

#### Sources of Additional Help:

- Our Website: [www.marvin.com](http://www.marvin.com)
- CSI Specifications
- Installations Instructions
- Warranty Information
- Care and Maintenance
- Owner's Manual
- Parts Manual

**The online version of this document is the document of record and will be the most current version. Specifications and technical data are subject to change without notice.**

### Product Notes:

- Numbers in parentheses () following measurements are metric equivalents in millimeters rounded to the nearest whole number.
- Allow 1/16" (2) tolerance on all measurements.
- For accessories, dimensions and applications, see the Accessories chapter of this manual.
- All measurements for Rough Opening, Masonry Opening, Frame Size, Casing OM are rounded to the nearest 1/16<sup>th</sup> of an inch.
- Rounded fraction for Glass Size, Daylight Opening are to the nearest 32<sup>nd</sup> of an inch to be consistent with the above.
- E = (Egress): Window that meets the requirements for egress. Please note that the top of the sill must be no more than 44" (1118) from the floor. Code restrictions may vary depending on you local building codes.
- T = (Tempered): For safety and/or code requirements, frame sizes greater than 71 1/8" (2924) tall, Marvin recommends tempered glass. Units with Frame 25.2 sq. ft. and larger may require tempered glass.

### Trademark Information:

The following trademarks are referenced in this manual:

- E-Gard<sup>®</sup> is a registered trademark of Amesbury/Truth Hardware

### How to Submit Suggestions:

Comments or suggestions regarding this publication can be directed to: Technical Publications, Marvin, P.O. Box 100, Warroad, MN 56763 or call (218) 386-1430 or 1-800-346-5044.

**Certification and Code Information**

**Marvin meet or exceed the following industry and federal performance standards**

FGIA Fenestration Glazing Industry Alliance

*NOTE: AAMA documents referenced are FGIA publications*

- AAMA American Architectural Manufacturers Association
- ASCE American Society of Civil Engineers
- ANSI American National Standards Institute
- ASTM American Society of Testing Materials
- CSA Canadian Standards Association
  - A – Air Leakage
  - B – Water Leakage
  - C – Wind Resistance
  - Minimum Requirement = A1, B1, C1
- FenCan Fenestration Canada
- FHA Federal Housing Administration
- HUD Housing and Urban Development
- IGCC Insulating Glass Certification Council
- IGMAC Insulating Glass Manufacturers Association of Canada
- NFRC National Fenestration Rating Council
- WDMA Window and Door Manufacturers Association
- SIGMA Sealed Insulating Glass Manufacturers Association
- SMA Screen Manufacturers Association

**Marvin products have been tested and passed the following applicable test procedures referenced by AAMA, ANSI, CMBSO, CWDMA, IGCC, SIGMA, SMA, and WDMA.**

- AAMA 624 Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Fiber Reinforced Thermoset Profiles
- AAMA 1304 Voluntary Specification for Determining Forced Entry Resistance of Side-Hinged Door Systems
- WDMA I.S.4 Industry Specification for Preservative Treatment for Millwork.
- AAMA/WDMA/CSA 101/I.S.2/A440 North American Fenestration Standard/Specification for windows, doors, and skylights.
- ASTM C1036 Standard Specification for Flat Glass
- ASTM E283 Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls and Doors under specified pressure differences across the specimen.
- ASTM E2068 Standard Test Method for Determination of Operating Force of Sliding Windows and Doors
- ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
- ASTM E331 Standard Test Method for Water Penetration of Exterior Windows, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
- ASTM E90 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- ASTM E547 Standard Test Method for Water Penetration of Exterior Windows, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference
- ASTM E1886 Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials
- ASTM E1996 Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems Impacted by Wind Borne Debris in Hurricanes
- ASTM F588 Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact.
- ASTM F842 Standard Test Methods for Measuring the Forced Entry Resistance of Sliding Door Assemblies, Excluding Glazing Impact.
- ASTM E2190 Standard Specification for Insulating Glass Unit Performance and Evaluation
- ASTM F2090 Standard Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms
- SMA 1201 Specification for Insect Screen for Windows, Sliding Doors and Swinging Doors.
- AAMA/WDMA/CSA 101/I.S.2/A440-22 NAFS - North American Fenestration Standard/Specification for windows, doors and skylights.
- WDMA I.S. 11 Industry Standard for Analytical Method for Design Pressure (DP) Ratings of Fenestration Products

## **NFRC Certification Program**

### **Who is the NFRC?**

The National Fenestration Rating Council (NFRC) is an independent non-profit organization that may be made up of manufacturers, builders, designers, specifiers, code officials, utilities, regulators and consumers formed to establish a national energy performance rating system for fenestration products.

Sanctioned by the federal government under the Energy Policy Act of 1992, NFRC will, in addition to U-factor (thermal transmission) and SHGC (Solar Heat Gain Coefficient), rate other performance metrics such as Condensation Resistance (CR) or Condensation Index (CI), Visible Transmission (VT), etc. .

It is important to note that the NFRC is not setting minimum performance standards or mandating specific performance levels. NFRC has established a single rating system with a rigorous process for comparing product performance. By certifying and labeling their products in accordance with the NFRC program, manufacturers demonstrate their commitment to provide accurate energy performance information.

### **Whole Product Performance**

NFRC ratings are based on “whole product performance”. Although a window, door, or skylight may have high performance glazing, its overall performance may be reduced by a poorly performing frame. Similarly, a very energy efficient frame may be wasted on ineffective glazing and sealing. Whole product performance helps builders and consumers compare products of different construction and attributes directly.

When reading a NFRC Label, it is important to remember that the U-Factor, Solar Heat Gain Coefficient (SHGC), and Visible Transmittance (VT), values represent the whole window, not the center-of-glass

### **NFRC Labeling**

#### Certification and Labeling Process

Window and door manufacturers attempting to certify their fenestration products are required to have them evaluated by two different types of independent NFRC accredited laboratories.

1. The first type of laboratory is a computer simulation lab which evaluates a window or door's thermal efficiency by computer simulation programs. The computer program takes into account the product's frame and glazing system attributes and derives overall thermal performance (U-Factor, SHGC, VT).
2. The second type of laboratory is a physical testing laboratory which takes an actual product and evaluates it in a thermal chamber. The physical test lab will also derive overall thermal performance (U-Factor, SHGC, VT).

Window Label must include U-Factor, Visible Transmittance, Solar Heat Gain Coefficient, and Air Leakage. In addition, NFRC has a Condensation Rating that is optional for manufacturers to include.

- U-Factor: Measures how well a product can keep heat from escaping from the inside of a room. The lower the number, the better a product is at keeping keep in.
- Visible Transmittance: Measures how well a product is designed to effectively light your home with daylight. The higher the number, the more natural light is let in.
- Solar Heat Gain Coefficient: Measures how well a product can resist unwanted heat gain, which is especially important during summer cooling season. The lower the number, the less you'll spend.
- Air Leakage: Measures how much air will enter a room through a product. The lower the number, the fewer drafts you'll experience.
- Condensation Rating: Measures how well a product resists condensation. The higher the number, the better.

*For additional regional information, please contact your local Marvin representative.*

**Building Categories and Design Factors**

Design Wind Pressure (PSF) - ASCE 7-10												
Location	Zone	Effective Wind Area (SF)	Basic Wind Speed V (MPH)									
			110		115		120		125		130	
Walls	4	10	13	-14	14	-15	16	-17	17	-18	18	-20
		50	11	-13	12	-14	14	-16	15	-17	16	-18
		500	9	-10	9	-11	10	-12	11	-13	12	-14
			135		140		145		150		155	
		10	20	-21	21	-23	23	-25	24	-26	26	-28
		50	17	-20	18	-21	20	-23	21	-24	23	-26
		500	13	-15	14	-16	15	-17	16	-18	17	-19
			160		165		170		175		180	
		10	28	-30	29	-32	31	-34	33	-36	35	-38
		50	24	-28	26	-29	27	-31	29	-33	31	-35
500	18	-21	19	-22	21	-23	22	-25	23	-26		
Walls	5		110		115		120		125		130	
		10	13	-18	14	-19	16	-21	17	-23	18	-24
		50	11	-15	12	-16	14	-18	15	-19	16	-21
		500	9	-13	9	-14	10	-16	11	-17	12	-18
			135		140		145		150		155	
		10	20	-26	21	-28	23	-30	24	-33	26	-35
		50	17	-22	18	-24	20	-26	21	-27	23	-29
		500	13	-20	14	-21	15	-23	16	-24	17	-26
			160		165		170		175		180	
		10	28	-37	29	-39	31	-42	33	-44	35	-38
50	24	-31	26	-33	27	-35	29	-37	31	-39		
500	18	-28	19	-29	21	-31	22	-33	23	-35		

Metric Conversions: 1 PSF = 47.9 pascals

1 SF = 0.0929 SM

1 MPH = 0.447 M/S

**NOTE:**

- Design wind pressures above represent the net pressure (sum of external and internal pressures) applied normal to all surfaces.
- Values shown are for exposure B. For other exposures, multiply values shown by the following factor: exposure C: 1.40 and exposure D: 1.66
- Linear interpolation between values of tributary area is permissible.
- Values shown are for an importance factor I = 1.0. For other values of I, multiply values shown by I.
- Plus and minus signs signify pressure acting toward and away from the exterior surface, respectively.
- All component and cladding elements shall be designed for both positive and negative pressures shown in the table.
- Notation:
  - 10 percent of least horizontal dimension or 0.4 h, whichever is smaller, but not less than 40% of least horizontal dimension or 3 ft (914).
  - Mean roof height in feet (meters).

**BUILDING WIND LOADS**

The information presented is provided to simplify the determination of structural wind load requirements of ASCE 7-16. ASCE 7-16 may not have local precedence. Please refer to your local codes for design pressures that apply to your area.

ASCE 7-16 Design wind load tables are based on the following:

- Wind loads tables are based on Exposure B.
- Tributary area of the structural elements is less than or equal to 10 sq. ft.
- Does not apply to roof areas.
- Roof slope is greater than 10 degrees.
- Building is less than or equal to 30 (9144) feet tall.
- The building is completely enclosed, all windows and doors are designed to withstand full wind load.
- Applicable to components and cladding, which include windows and doors.

If the tributary area is greater than 10 sq. ft. or if the roof slope is less than 10 degrees, the design wind loads from this table may be conservative. However, if the building has openings in the elevation which may allow wind to pass through, the design values in the tables may be too low. For these cases, ASCE 7-16 should be consulted.

NOTE: Windows and doors designed to resist wind loading are not considered openings.

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**Building Categories and Design Factors****EXPOSURES**

**Exposure B:** Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single family dwellings or larger. For buildings with a mean roof height of less than or equal to 30ft (9.1m). Exposure B shall apply where the ground surface roughness, as defined by Surface Roughness B, prevails in the upwind direction for a distance greater than 1,500ft (457m). For buildings with a mean roof height greater than 30ft (9.1m), Exposure B shall apply where Surface Roughness B prevails in the upwind direction for a distance greater than 2,600ft (792m) or 20 times the height of the building, whichever is greater.

**Exposure C:** Open terrain with scattered obstructions having heights generally less than 30 ft. (9.1 m). This category includes flat open country, grasslands and shorelines in hurricane prone regions.


**Exposure D:** Flat, unobstructed areas and water surfaces. This category includes smooth mud flats, salt flats, and unbroken ice. Shall apply where the ground surface roughness, as defined by Surface Roughness D, prevails in the upwind direction for a distance greater than 5,000ft (1,524m) or 20 times the building height, whichever is greater. Exposure D shall also apply where the ground surface roughness immediately upwind of the site is B or C, and the site is within a distance of 600ft (183m) or 20 times the building height, whichever is greater, from the Exposure D condition as defined in the previous sentence. For a site located in the transition zone between exposure categories, the category resulting in the largest wind forces shall be used.

**INSTRUCTIONS:**

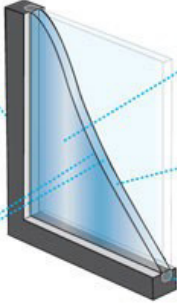
- Determine the Basic Wind Speed (V) in mph from Design Wind Load Table based on the location of the building.
- Determine the Roof Height (h) of the building in feet. This is the mean height of the roof above the lowest grade adjacent to the building. Eave height may be used for roof slope of less than 10 degrees.
- Determine least width (B) of the building in feet. This is defined as the shortest distance between two parallel lines which contain the entire building floor plan.
- Determine high pressure outside corner loading zones (a) in feet from building illustration on following page.  $a = (0.10) \times (B)$  or  $a = (0.4) \times (h)$ , whichever is smaller, but not less than either  $(0.04) \times (B)$  or 3 feet (76).
- Determine design pressure from Design Pressure Table.
- All design pressure values are assumed for buildings with an importance Factor Category of II. See Design Factors chart on following page.
- If category III, IV is more appropriate then multiply the design pressure by the corresponding Design Factor - See Design Factor chart.





**WHAT MAKES A WINDOW ENERGY-EFFICIENT?**  LEARN MORE AT [energystar.gov](http://energystar.gov)

Today, manufacturers use an *array of technologies* to make ENERGY STAR qualified windows.




**QUALITY FRAME MATERIALS**  
A variety of durable, low-maintenance framing materials reduce heat transfer and help insulate better.

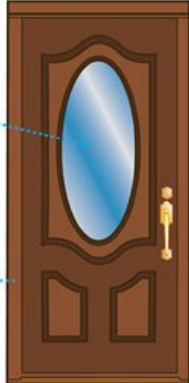
**MULTIPLE PANES**  
Two panes of glass, with an air- or gas-filled space in the middle, insulate much better than a single pane of glass. Some ENERGY STAR qualified windows include three or more panes for even greater energy-efficiency, increased impact resistance, and sound insulation.

**LOW-E GLASS**  
Special coatings reflect infrared light, keeping heat inside in winter and outside in summer. They also reflect damaging ultraviolet light, which helps protect interior furnishings from fading.

**GAS FILLS**  
Some energy-efficient windows have argon, krypton, or other gases between the panes. These odorless, colorless, non-toxic gases insulate better than regular air.

**WARM EDGE SPACERS**  
A spacer keeps a window's glass panes the correct distance apart. Non-metallic and metal/non-metal hybrid spacers also insulate pane edges, reducing heat transfer through the window.

**WHAT MAKES A DOOR ENERGY EFFICIENT?**  CHANGE FOR THE BETTER WITH ENERGY STAR



**MULTIPLE GLASS PANES**  
Double or triple-paned insulating glass is used to reduce heat flow.

**IMPROVED CORE MATERIALS**  
Fiberglass, wood cladding, and steel with polyurethane foam core are among the most energy-efficient door materials available today.

**TIGHTER FIT AND IMPROVED WEATHER STRIPPING**  
New frames may include a magnetic strip to create a tighter seal that reduces air leakage around the edges.

**ENERGY STAR® Program - United States**

[www.energystar.gov](http://www.energystar.gov)

**About ENERGY STAR®**

ENERGY STAR® is a program of the U.S. Environmental Protection Agency helping us all save money and protect the environment through energy efficient products and practices.

Residential Windows, Doors and Skylights

Thanks to advances in technology, today's ENERGY STAR® certified windows, doors, and skylights offer greater savings than ever before. Just look for the ENERGY STAR® label.

**Save energy and money.**

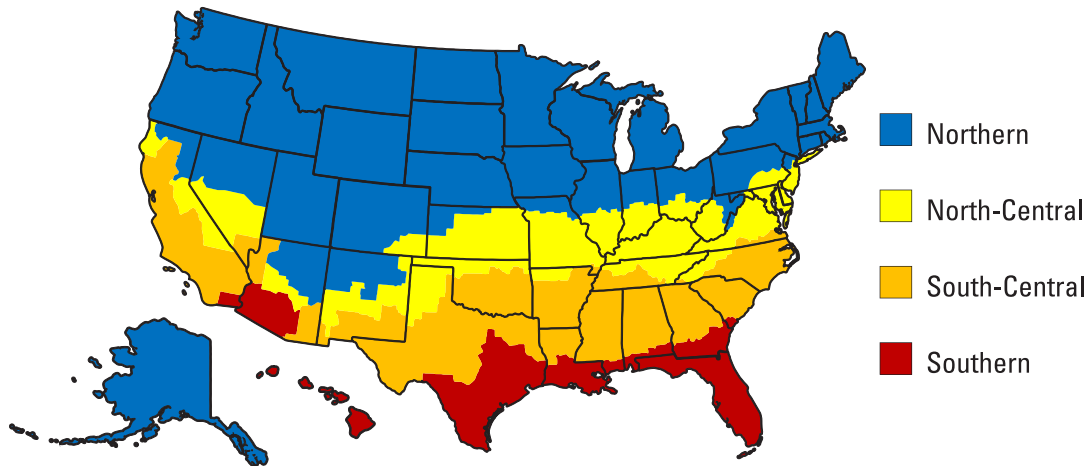
Replacing old windows with ENERGY STAR® certified windows lowers household energy bills. Lower energy consumption also reduces greenhouse gas emissions from power plants and shrinks a house's carbon footprint.

Current Specification Effective Date: October 23, 2023.

As of October 23, 2023, ENERGY STAR® certified windows, doors, and skylights meet new performance levels, see below.

Windows and skylights must meet NFRC U-Factor and, where applicable, Solar Heat Gain Coefficient (SHGC) requirements based on climate zone. Doors must meet U-Factor and, where applicable, SHGC requirements based on glazing level (amount of glass).

At this time, many Marvin product lines are certified for the ENERGY STAR® program. For more specific information, please refer to the individual product sections in your Marvin catalog.



WINDOWS			
Climate Zone	U-Factor <sup>1</sup>	SHGC <sup>2</sup>	
Northern	≤ 0.22	≥ 0.17	Prescriptive
	= 0.23	≥ 0.35	
	= 0.24		
	= 0.25		≥ 0.40
	= 0.26		
North-Central	≤ 0.25	≤ 0.40	Equivalent Energy Performance
South-Central	≤ 0.28	≤ 0.23	
Southern	≤ 0.32	≤ 0.23	

DOORS			
Glazing Level	Climate Zone	U-Factor <sup>1</sup>	SHGC <sup>2</sup>
Opaque	All Zones	≤ 0.17	No Rating
≤ ½-Lite	All Zones	≤ 0.23	≤ 0.23
> ½-Lite	Northern	≤ 0.26	≤ 0.40
	North-Central		
	South-Central	≤ 0.28	≤ 0.23
	Southern		

Air Leakage for Sliding Doors ≤ 0.3 cfm/ft<sup>2</sup>  
 Air Leakage for Swinging Doors ≤ 0.5 cfm/ft<sup>2</sup>  
<sup>1</sup> Btu/h-ft<sup>2</sup>-°F  
<sup>2</sup> Solar Heat Gain Coefficient

Air Leakage ≤ 0.3 cfm/ft<sup>2</sup>  
<sup>1</sup> Btu/h-ft<sup>2</sup>-°F  
<sup>2</sup> Solar Heat Gain Coefficient

**ENERGY STAR® Most Efficient - United States**

The ENERGY STAR® Most Efficient is an extension of the ENERGY STAR® brand and is designed to recognize and advance the most efficient products among those that are certified to ENERGY STAR®. This recognition is for specific categories and awarded for a specific year.

Marvin has long been a leader in providing our customers with energy efficient options. We are pleased to announce that Marvin meets the US ENERGY STAR® Most Efficient criteria with over 40 product types and 27,000+ glazing options.

**MOST EFFICIENT CRITERIA**

<b>Climate Zone</b>	<b>U-factor</b>	<b>SHGC</b>
<b>Northern</b>	$\leq 0.20$	$\geq 0.20$
<b>North-Central</b>	$\leq 0.20$	$\leq 0.40$
<b>South-Central</b>	$\leq 0.20$	$\leq 0.23$
<b>Southern</b>	$\leq 0.21$ $= 0.22$	$\leq 0.23$ $\leq 0.21$

As more product and glazing options are certified throughout the year, additional qualifying options will become available. The EPA has set up a page on its website where consumers can go to find all of the Marvin options that meet the Most efficient criteria.

To view the latest listing of Most Efficient-qualifying products, click [here](#).



## ENERGY STAR® Program - Canada

This technical specification determines how residential windows, doors, and skylights sold in Canada are certified for the ENERGY STAR® program. This specification is issued by Natural Resources Canada (NRCAN). NRCAN has been authorized by the U.S. Environmental Protection Agency (EPA) to promote and administer the ENERGY STAR name and symbol in Canada. A product must meet this specification in order to be promoted as ENERGY STAR certified in Canada by its manufacturer or authorized agent. Manufacturers must also sign a Fenestration Administrative Arrangement with NRCAN.

### Performance metrics

**U-Factor:** The heat transfer per time per area and per degree of temperature difference in  $W/m^2 \cdot K$  ( $Btu/h \cdot ft^2 \cdot ^\circ F$ ). The U-factor multiplied by the interior-exterior temperature difference and by the projected fenestration product area yields the total heat transfer through the fenestration product due to conduction, convection, and long-wave infra-red radiation. A U-factor in  $Btu/h \cdot ft^2 \cdot ^\circ F$  multiplied by 5.678263 converts the value to  $W/m^2 \cdot K$ . The U-factor in  $Btu/h \cdot ft^2 \cdot ^\circ F$  shall conform with Table 1 before the conversion to  $W/m^2 \cdot K$ .

**Solar heat gain coefficient (SHGC):** The ratio of the solar heat gain entering the space through the fenestration product to the incident solar radiation.

**Air leakage:** the flow of air that passes through fenestration products in  $L/s/m^2$ . Air leakage infiltration is the flow of air into the building envelope and exfiltration is the flow of air out of the building envelope. An air leakage in  $cfm/ft^2$  multiplied by 5.08 converts the value to  $L/s/m^2$ . The air leakage value in  $cfm/ft^2$  shall conform with Table 1 before the conversion to  $L/s/m^2$ .

**Energy rating (ER):** a unitless value derived from a formula that balances heat loss (U-factor), air leakage loss and potential passive solar gain of a fenestration product. The ER is applied to fenestration systems intended to be installed in a vertical orientation in low-rise residential buildings. The simplified ER equation is as follows:

$$ER = (57.76 \times SHGC_w) - (21.90 \times U_w) - (1.97 \times L_{75}) + 40 \text{ where}$$

- i.  $SHGC_w$  = fenestration system solar heat gain coefficient
- ii.  $U_w$  = fenestration system U-factor ( $W/m^2$ )
- iii.  $L_{75}$  = fenestration system air leakage rate at a pressure difference of 75 Pa, established in accordance with AAMA/WDMA/CSA 101/I.S.2/A440 (North American Fenestration Standard) in  $L/s \cdot m^2$ . The  $L_{75}$  shall be the average of the infiltration and exfiltration measurements.

A complete explanation of the ER equation may be found in the CSA A440.2 Standard.

### U-factor Criteria for Residential Windows and Doors

Product	Maximum U-factor $W/m^2 \cdot K$	Maximum U-factor $Btu/h \cdot ft^2 \cdot ^\circ F$
Windows and Doors	1.22	0.21

### Alternate ER Criteria for Residential Windows and Doors

Product	Minimum ER (unitless)
Windows and Doors	34

**Air Leakage requirements:** Fenestration models must have an air infiltration rate and an air exfiltration rate less than or equal to 1.5  $L/s/m^2$ .

Marvin options that meet the ENERGY STAR Canada criteria can be viewed in the NRCAN listing for [NRCAN ENERGY STAR Searchable Product List](#).

**ENERGY STAR® Most Efficient - Canada****Most Efficient criteria for windows and sliding glass doors 2023**

The window or sliding glass door must:

- be manufactured by an ENERGY STAR Canada Participant
  - be sold in Canada, registered with NRCAN as ENERGY STAR certified and posted on the Canada/NRCAN website
  - meet the labeling section of the *Guidelines for the labeling and promotion of ENERGY STAR certified fenestration products*
  - meet the following specific criteria:
    - A U-factor of  $1.05 \text{ W/m}^2 \cdot \text{K}$  ( $0.18 \text{ Btu/h} \cdot \text{ft}^2 \cdot ^\circ\text{F}$ ) or lower
- OR**
- An Energy Rating (ER) of 40 (unitless) or higher

Marvin options that meet the Most efficient criteria can be viewed in the NRCAN listing for [NRCAN Most Efficient Windows and Sliding Glass Doors](#)

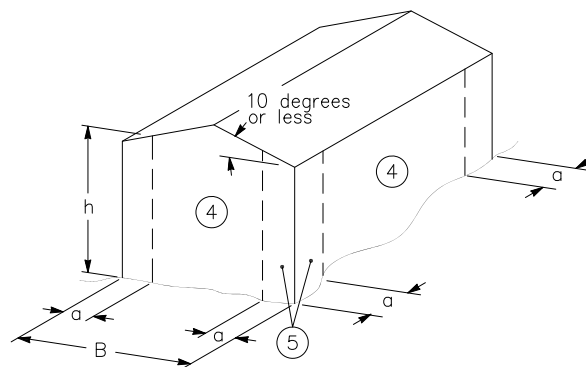


**Building Categories and Design Factors**

Building Categories	
Category	Nature of Occupancy
I	Building and structures that represent a low hazard to human life in the event of failure, such as agricultural building, certain temporary facilities, and minor storage facilities.
II	Building and structures where primary occupancy is one in which more than 300 people congregate in one area.
III	Building and other structures in which more than 300 people congregate in one area or structures containing sufficient quantities of toxic, explosive, or other hazardous substances including, but not limited to: Petro chemical facilities Fuel storage facilities Manufacturing or storage facilities for hazardous chemicals Manufacturing or storage facilities for explosives
IV	Building and Structures designated as essential facilities including, but limited to: Hospital and other medical facilities having surgery or emergency treatment areas. Fire or rescue and police stations. Structures and equipment in government. Communication centers and other facilities required for emergency responses. Designated shelters for hurricanes.

Design Factors		
Category	Non-Hurricane prone regions and Hurricane prone regions with V = 85/100 mph and Alaska	Hurricane prone regions with V greater than 100 mph
I	0.87	0.77
II	1.00	1.00
III	1.15	1.15
IV	1.15	1.15

*NOTE: Hurricane prone regions with V greater than 100 mph*



**Wind Speed Map - ASCE 7-16**

NOTES: Basic Wind Speeds for Occupancy Category II Buildings and Other Structures.

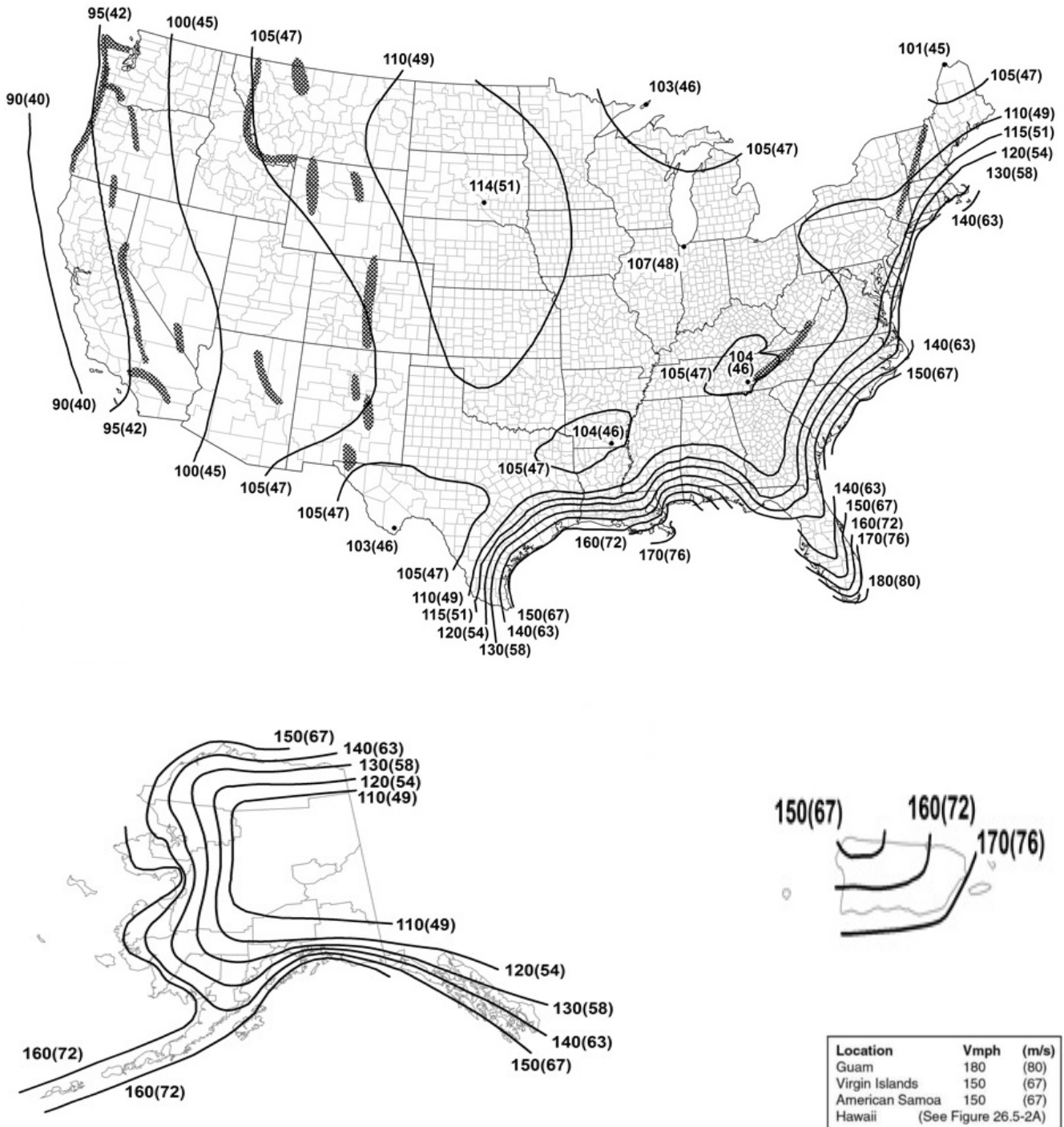
Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33ft (10m) above ground for Exposure C category.

Linear interpolation between contours is permitted.

Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.

Mountainous terrain, gorges, ocean promontories, and special wind regions shall be examined for unusual wind conditions.

Wind speeds correspond to approximately a 7% probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 Years).



**Product Design Pressures - Elevate (Standard Product)**

Elevate Window and Door Product Values - Standard Product			
Product Type	Maximum Frame Size	AAMA/WDMA/CSA 101/I.S.2/A440	CSA-A440
			Air
Elevate Casement - Operable	36" x 71 1/8"	LC-PG50	A3
Elevate Casement - Stationary Units	36" x 71 1/8"	LC-PG50-FW	A3
Elevate Awning - Operable	48" x 47 1/8"	LC-PG50	A3
Elevate Awning - Stationary	48" x 47 1/8"	LC-PG50-FW	A3
Elevate Casement Picture/Transom	72" x 59 1/8"	LC-PG50-FW	FIXED
	56" x 71 1/8"	LC-PG50-FW	FIXED
Elevate Casement Narrow Frame - Operable	36" x 71 1/8"	LC-PG50-C	A3
Elevate Awning Narrow Frame - Operable	48" x 47 1/8"	LC-PG50-AP	A3
Elevate Casement Narrow Frame - Picture/Transom	72" x 59 1/8"	LC-PG50-AP	FIXED
	56" x 71 1/8"	LC-PG50-AP	FIXED
Elevate Double Hung - Operable	53 1/2" x 75 3/4"	LC-PG40-H	A3
	53 1/2" x 83 3/4"	LC-PG35-H	A3
Elevate Double Hung - Cottage	41 1/2" x 67 3/4"	LC-PG40-H	A3
Elevate Double Hung - Operable (HP)	53 1/2" x 75 3/4"	LC-PG50-H	A3
	53 1/2" x 83 3/4"	LC-PG40-H	A3
Elevate Double Hung - Cottage (HP)	41 1/2" x 67 3/4"	LC-PG50-H	A3
Elevate Double Hung - Picture/Transom	53 1/2" x 83 3/4"	LC-PG35-FW	FIXED
	61 1/2" x 75 3/4"	LC-PG40-FW	FIXED
Elevate Double Hung - Picture (HP)	53 1/2" x 83 3/4"	LC-PG40-FW	FIXED
	61 1/2" x 75 3/4"	LC-PG50-FW	FIXED
Elevate Double Hung Insert	42 3/32" x 84"	LC-PG40-H	A2
Elevate Double Hung Insert - Cottage	42 3/32" x 68 1/2"	LC-PG35-H	A2
	54" x 68 1/2"	LC-PG35-H	A2
Elevate Double Hung Insert Picture/Transom	62" x 84"	LC-PG40-FW	Fixed
Elevate Glider - OX / XO	71 1/2" x 59 3/4"	LC-PG30-HS	A2
Elevate Glider - XOX	95 1/2" x 59 3/4"	LC-PG30-HS	A2
Elevate Direct Glaze Polygon	84" x 84"	CW-PG55-FW	FIXED
Elevate Direct Glaze Round Top	71" x 36"	SP-PG50-FW	FIXED
Elevate Aluminum Direct Glaze Round Top	83" x 72 7/8"	LC-PG50-FW	FIXED
Elevate Sliding Patio Door - 2 panels	71" x 82"	R-PG30-SD	A2
Elevate Sliding Patio Door - 3 panels	106 1/2" x 82"	R-PG30-SD	A2
Elevate Inswing Door - 1 panel	36 5/16" x 95 1/2"	LC-PG30-SHD	A2
Elevate Inswing Door - 2 panels	71" x 95 1/2"	LC-PG30-SHD	A2
Elevate Inswing Door - 1 panel (HP)	36 5/16" x 95 1/2"	LC-PG50-SHD	A2
Elevate Inswing Door - 2 panels (HP)	71" x 95 1/2"	LC-PG50-SHD	A2
Elevate Outswing Door - 1 panel	36 5/16" x 96"	LC-PG50-SHD	A3
Elevate Outswing Door - 2 panels	71" x 96"	LC-PG50-SHD	A3
Elevate Sliding French Door - 2 panels	95" x 86"	LC-PG40-SD	A3
	95" x 95 1/2"	LC-PG30-SD	A3
Elevate Sliding French Door - 2 panels (HP)	95" x 95 1/2"	LC-PG50-SD	A3
Elevate Sliding French Door - 3 panels	106 1/2" x 86"	LC-PG40-SD	A3
	142 1/2" x 95 1/2"	LC-PG30-SD	A3
Elevate Sliding French Door - 3 panels (HP)	106 1/2" x 95 1/2"	LC-PG50-SD	A3
Elevate Sliding French Door - 4 panels	189" x 95 1/2"	LC-PG30-SD	A2



**Product Design Pressures - Elevate (IZ3 Product)**

Elevate Window and Door Products - Impact Zone (IZ3)		
Product Type	Frame Size	AAMA/WDMA/CSA 101/I.S.2/A440
Elevate Casement - Operable	36" x 71 1/8"	LC-PG55-C
Elevate Casement - Stationary Units	36" x 71 1/8"	LC-PG55-C
Elevate Casement Picture/Transom	56" x 71 1/8"	LC-PG55-FW
	72" x 55 1/8"	LC-PG55-FW
Elevate Awning - Operable	48" x 47 1/8"	LC-PG55-AP
Elevate Awning - Stationary	48" x 47 1/8"	LC-PG55-AP
Elevate Double Hung - Operable	41 1/2" x 75 3/4"	LC-PG55-H
Elevate Double Hung - Cottage	41 1/2" x 67 3/4"	LC-PG55-H
Elevate Double Hung - Picture/Transom	53 1/2" x 75 3/4"	LC-PG55-FW
	61 1/2" x 63 3/4"	LC-PG55-FW
Elevate Direct Glaze Polygon	95" x 71 1/2"	LC-PG55-FW
Elevate Outswing French Door - O, X	36 5/16" x 95 1/2"	LC-PG55-SHD
Elevate Outswing French Door - XX	71" x 95 1/2"	LC-PG55-SHD
Elevate Inswing French Door - O, X	36 5/16" x 95 1/2"	LC-PG55-SHD
Elevate Inswing French Door - XO/OX, XX	71" x 95 1/2"	LC-PG55-SHD
Elevate Sliding French Door - XO/OX	95" x 95 1/2"	LC-PG55-SD
Elevate Direct Glaze Round Top Casement Impact	83 1/2" x 83 1/2"	LC-PG55-FW
Elevate Direct Glaze Round Top Double Hung Impact	83 1/2" x 83 1/2"	LC-PG55-FW

Product Design Pressures - Essential

Essential Window and Door Product Values - Standard Product			
Product Type	Max Frame Size	AAMA/WDMA/CSA 101/I.S.2/A40	CSA-A440
			Air
Essential Casement	27 1/2" x 83 1/2"	R-PG40-C	A3
	35 1/2" x 71 1/2"	LC-PG40-C	A3
	35 1/2" x 83 1/2"	LC-PG40-C	A3
Essential Awning	59 1/2" x 47 1/2"	LC-PG40-AP	A3
Essential Casement Picture/Transom	71 1/2" x 71 1/2"	LC-PG40-FW	FIXED
	47 1/2" x 83 1/2"	LC-PG40-FW	FIXED
Essential Double/Single Hung	35 1/2" x 59 1/2"	LC-PG50-H	A3
	47 1/2" x 47 1/2"	LC-PG50-H	A3
	35 1/2" x 77 1/2"	LC-PG40-H	A3
	41 1/2" x 65 1/2"	LC-PG40-H	A3
	47 1/2" x 59 1/2"	LC-PG40-H	A3
	47 1/2" x 77 1/2"	LC-PG30-H	A3
Essential Double Hung - Cottage	47 1/2" x 65 1/2"	LC-PG30-H	A3
Essential Single Hung - Cottage	35 1/2" x 71 1/2"	LC-PG30-H	A3
	47 1/2" x 77 1/2"	LC-PG25-H	A3
Essential Glider - OX/XO	71 1/2" x 41 1/2"	LC-PG40-HS	A3
	71 1/2" x 59 1/2"	LC-PG30-HS	A3
Essential Glider - XOX	95 1/2" x 59 1/2"	LC-PG25-HS	A3
Essential Double Hung Picture/Transom	59 1/2" x 71 1/2"	LC-PG50-FW	FIXED
Essential Direct Glaze Round Top	83" x 83"	CW-PG50-FW	FIXED
	87" x 50"	CW-PG50-FW	FIXED
Essential Sliding Patio Door - 2 panels	95" x 81"	LC-PG30-SD	A3
	95" x 95"	LC-PG25-SD	A3
Essential Sliding Patio Door - 3 panels	107 1/2" x 95 1/2"	LC-PG30-SD	A3
Essential Direct Glaze Polygon	83" x 83"	LC-PG50-FW	A3

**Product Rating Codes / Performance Classes/Design Pressure Ratings**

Performance Classes (‘08, ‘11, ‘17 Standards)	(psf) Min. DP	(psf) Struct. Press.	(psf) Water Press.	(cfm/ft <sup>2</sup> ) Max. Air. Inf.
R = Residential	15	22.56	2.92	0.3 (1.57 psf)
LC = Light Commercial	25	37.59	3.76	0.3 (1.57 psf)
CW = Commercial	30	45.11	4.59	0.3 (1.57 psf)
AW = Architectural	40	60.15	7.95	0.1 or 0.3 (6.27 psf)
Metric	(Pa)	(Pa)	(Pa)	(L/s/m <sup>2</sup> )
R = Residential	720	1080	140	1.5 (75 Pa)
LC = Light Commercial	1200	1800	180	1.5 (75 Pa)
CW = Commercial	1440	2160	220	1.5 (75 Pa)
AW = Architectural	1920	2880	380	0.5 or 1.5 (300 Pa)

*NOTE: AAMA/WDMA chose to establish 2.86 psf as the minimum air pressure used during water testing although it is greater than 15% of the design pressure at DP15.*

Performance Grade						
Performance Grade		PG15	PG20	PG25	PG30	PG35
Design Pressure (DP)	(psf)	15.04	20.05	25.06	30.08	35.09
Structural Test Pressure (STP)	(psf)	22.56	30.08	37.59	45.11	52.63
Water penetration resistance test pressure	(psf)	2.92	3.13	3.76	4.59	5.43
Performance Grade		PG40	PG45	PG50	PG55	PG60
Design Pressure (DP)	(psf)	40.10	45.11	50.13	55.14	60.15
Structural Test Pressure (STP)	(psf)	60.15	67.67	75.19	82.71	90.23
Water penetration resistance test pressure	(psf)	6.06	6.89	7.52	8.35	9.19
Metric Performance Grade		PG15	PG20	PG25	PG30	PG35
Design Pressure (DP)	(Pa)	720	960	1,200	1,440	1,680
Structural Test Pressure (STP)	(Pa)	1,080	1,440	1,800	2,160	2,520
Water penetration resistance test pressure	(Pa)	140	150	180	220	260
Metric Performance Grade		PG40	PG45	PG50	PG55	PG60
Design Pressure (DP)	(Pa)	1,920	2,160	2,400	2,640	2,880
Structural Test Pressure (STP)	(Pa)	2,880	3,240	3,600	3,960	4,320
Water penetration resistance test pressure	(Pa)	290	330	360	400	440

STC/OITC Glass Values - Elevate

Product Type	Exterior Glazing	Airspace	Interior or Center Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>Elevate Casement and Awning</b>								
ELCA	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	28	24	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	32	28	
	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	28	24	Tripane
	1/8" (3.1)	5/16" (7.5)	9/32" (6.9) PVB laminate	--	--	33	29	Impact
	5/32" (3.9)	9/32" (7.0)	9/32" (6.9) SGP laminate	--	--	30	27	Impact
ELAWN	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	29	24	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	32	27	
	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	30	24	Tripane
	1/8" (3.1)	5/16" (7.5)	9/32" (6.9) PVB laminate	--	--	32	28	Impact
	5/32" (3.9)	9/32" (7.0)	9/32" (6.9) SGP laminate	--	--	31	27	Impact
ELCAP	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	27	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	31	27	
	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	28	21	Tripane
	1/8" (3.1)	5/16" (7.5)	9/32" (6.9) PVB laminate	--	--	32	27	Impact
	5/32" (3.9)	9/32" (7.0)	9/32" (6.9) SGP laminate	--	--	30	27	Impact
<b>Elevate Casement Narrow Frame and Awning Narrow Frame</b>								
ELCANF	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	28	25	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	33	29	
ELAWNPF	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	28	24	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	32	27	
ELCANFP	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	26	22	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	31	27	
<b>Elevate Double Hung</b>								
ELDH	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	27	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	30	26	
	1/8" (3.1)	5/16" (7.5)	9/32" (6.9) PVB laminate	--	--	32	28	Impact
ELDHP	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	27	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	31	26	
	1/8" (3.1)	5/16" (7.5)	9/32" (6.9) PVB laminate	--	--	32	27	Impact
	1/8" (3.1)	9/32" (7.0)	9/32" (6.9) SGP laminate	--	--	31	27	Impact
ELDHIN	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	29	24	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	31	27	
ELDHINP	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	27	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	31	26	
<b>Elevate Glider</b>								
ELGL	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	28	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	--	--	30	27	
<b>Elevate Direct Glaze</b>								
ELDG-CA	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	28	23	
	1/8" (3.1)	17/32" (13.0)	3/16" (4.7)	--	--	32	27	
	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	28	23	Tripane
	5/16" (3.9)	17/32" (13.0)	9/32" (6.9) PVB laminate	--	--	33	28	Impact
	1/4" (5.7)	13/32" (9.8)	13/32" (10.1) SGP laminate	--	--	35	31	Impact
ELDG-DH/Door	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	--	--	27	22	
	1/8" (3.1)	17/32" (13.0)	3/16" (4.7)	--	--	32	27	
	5/16" (3.9)	17/32" (13.0)	9/32" (6.9) PVB laminate	--	--	34	28	Impact
	1/4" (5.7)	13/32" (9.8)	13/32" (10.1) SGP laminate	--	--	34	30	Impact
<b>Elevate Direct Glaze Round Top IZ3</b>								
ELDGRT-CA	5/16" (3.9)	17/32" (13.0)	9/32" (6.9) PVB laminate	--	--	34	28	Impact
	1/4" (5.7)	13/32" (9.8)	13/32" (10.1) SGP laminate	--	--	34	30	Impact
ELDGRT-DH/Door	5/16" (3.9)	17/32" (13.0)	9/32" (6.9) PVB laminate	--	--	34	28	Impact
	1/4" (5.7)	13/32" (9.8)	13/32" (10.1) SGP laminate	--	--	34	30	Impact

**STC/OITC Glass Values - Elevate (Doors)**

Sound Transmission Class and Outdoor-Indoor Transmission Class Values						
Product Type	Exterior Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>Elevate Inswing French Door</b>						
<b>ELIFD</b>	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	28	24	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	32	27	
	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	29	25	High Performance
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	33	28	High Performance
	5/32" (3.9)	5/16" (8.0)	9/32" (6.9) SGP Laminate	32	29	Impact
<b>Elevate Outswing French Door</b>						
<b>ELOFD</b>	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	30	24	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	32	27	
	5/32" (3.9)	5/16" (8.0)	9/32" (6.9) SGP laminate	32	29	Impact
<b>Elevate Sliding French Door</b>						
<b>ELSFD</b>	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	28	24	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	31	27	
	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	28	24	High Performance
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	31	27	High Performance
	5/32" (3.9)	5/16" (8.0)	9/32" (6.9) SGP Laminate	31	28	Impact
<b>Elevate Sliding French Door</b>						
<b>ELSPD</b>	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	27	23	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	30	26	

**STC/OITC Glass Values - Essential**

Essential Sound Transmission Class and Outdoor-Indoor Transmission Class Values						
Product Type	Exterior Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>Essential Casement and Awning</b>						
ESCA	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	28	24	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	31	26	
ESAWN	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	28	24	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	33	28	
ESCAP/TR	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	28	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	33	28	
<b>Essential Single Hung and Double Hung</b>						
ESDH	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	27	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	28	25	
ESSH	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	27	22	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	32	27	
ESDHP	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	29	25	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	30	25	
<b>Essential Glider</b>						
ESGL	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	27	24	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	29	26	
<b>Essential Direct Glaze Round Top</b>						
ESDGRT	1/8" (3.1)	5/8" (16.0)	1/8" (3.1)	27	22	
	1/8" (3.1)	19/32" (14.5)	3/16" (4.7)	32	26	
<b>Essential Direct Glaze</b>						
ESDG	1/8" (3.1)	5/8" (16.0)	1/8" (3.1)	26	21	
	1/8" (3.1)	19/32" (14.5)	3/16" (4.7)	32	27	
<b>Essential Sliding Patio Door</b>						
ESSPD	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	27	23	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	28	24	


**STC/OITC Glass Availability - Elevate Casement and Awning**


ELCA  
Width (Frame Size)

	16	18	20	22	24	26	28	30	32	34	36
Height (Frame Size) 24											
25											
27											
29											
31											
33											
35											
37											
39											
41											
43											
45											
47											
49											
51											
53											
55											
57											
59											
61											
63											
65											
67											
69											
71											

ELAWN  
Width (Frame Size)

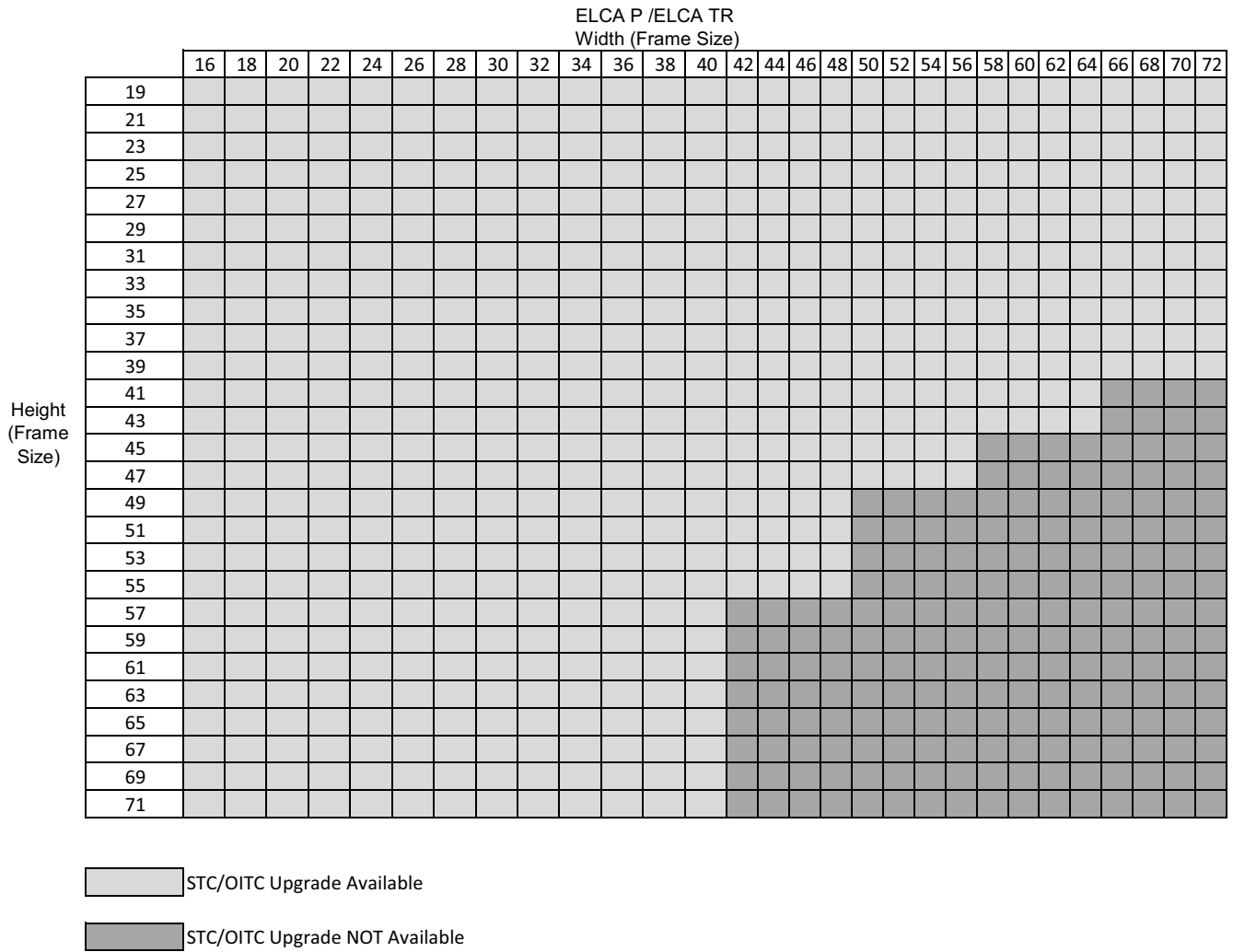
	24	26	28	30	32	34	36	38	40	42	44	46	48
Height (Frame Size) 19													
21													
23													
25													
27													
29													
31													
33													
35													
37													
39													
41													
43													
45													
47													

 STC/OITC Upgrade Available

 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Casement and Awning Picture/Transom**



*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*



**STC/OITC Glass Availability - Elevate Double Hung**

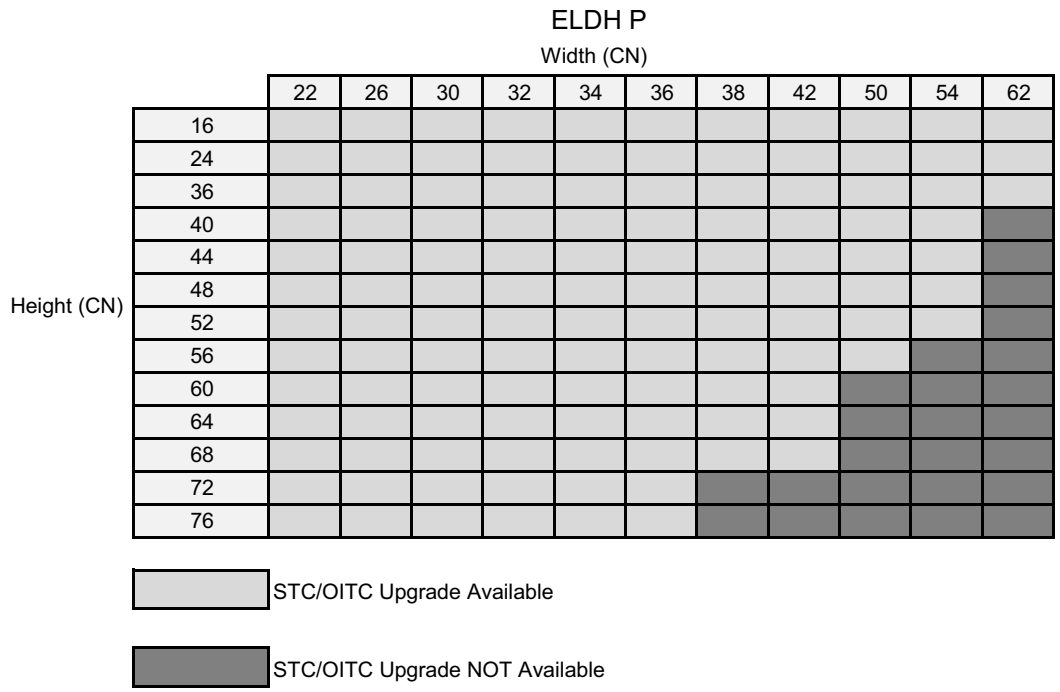
		ELDH Width (CN)													
		22	24	26	28	30	32	34	36	38	40	42	48	54	
Height (CN)	16														
	36														
	38														
	40														
	42														
	44														
	46														
	48														
	50														
	52														
	54														
	56														
	58														
	60														
	62														
	64														
	66														
68															
70															
72															
74															
76															

 STC/OITC Upgrade Available

 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Double Hung Picture**



*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Double Hung IZ3**

ELDH IZ3  
Width (CN)

	22	24	26	28	30	32	34	36	38	40	42	48	54
16													
36													
38													
40													
42													
44													
46													
48													
50													
52													
54													
56													
58													
60													
62													
64													
66													
68													
70													
72													
74													
76													

Height (CN)

 PVB

 SGP

*This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Double Hung Picture IZ3**

ELDH P IZ3  
Width (CN)

	22	26	30	32	34	36	38	42	50	54	62
Height (CN) 16											
24											
36											
40											
44											
48											
52											
56											
60											
64											
68											
72											
76											

PVB

SGP

*This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*



**STC/OITC Glass Availability - Elevate Glider**

ELGL  
Width (CN)

	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
Height (CN) 24																			
26																			
28																			
30																			
32																			
34																			
36																			
38																			
40																			
42																			
44																			
46																			
48																			
50																			
52																			
54																			
56																			
58																			
60																			

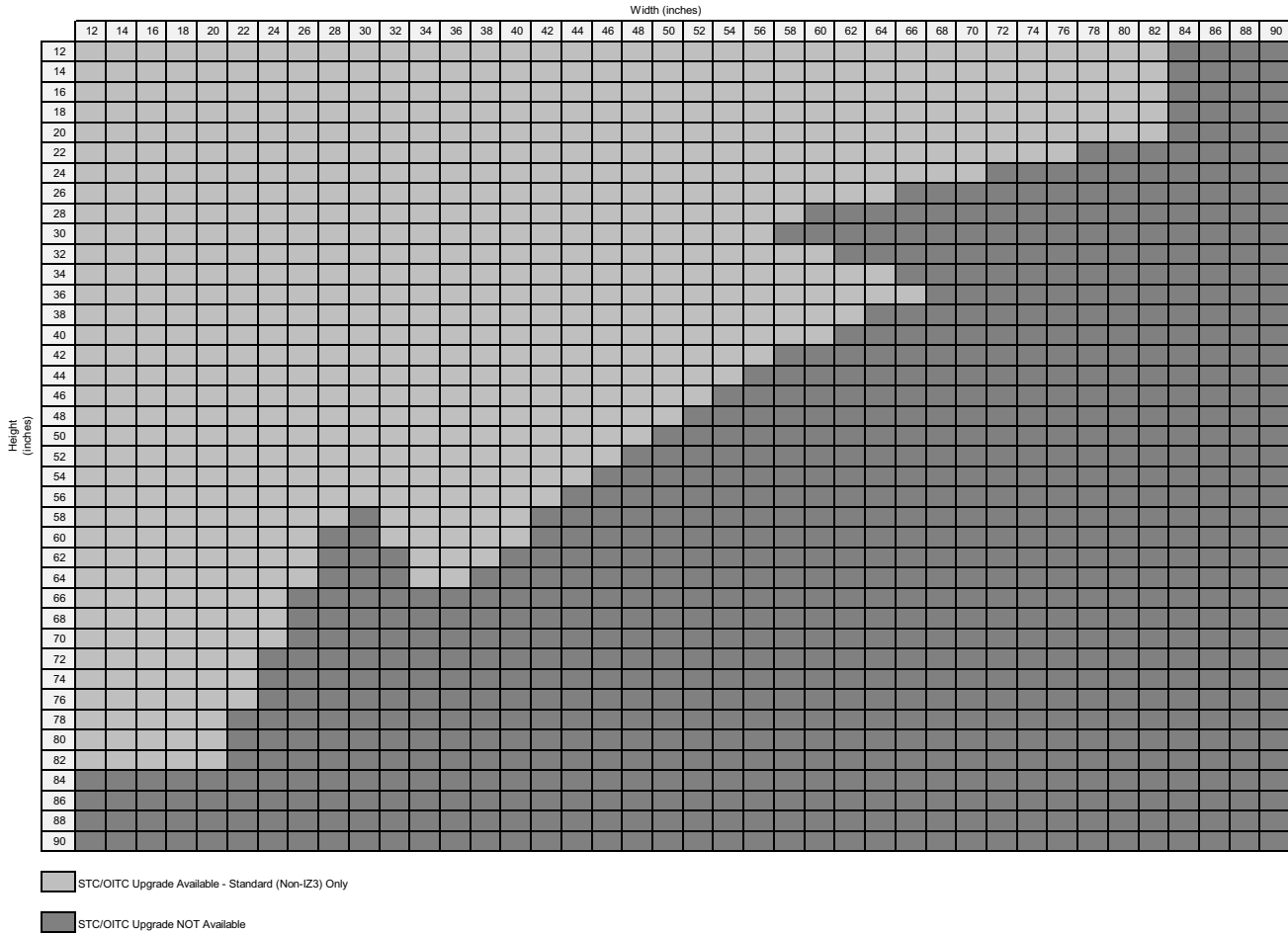
ELGL TS  
Width (CN)

	72	74	76	78	80	82	84	86	88	90	92	94	96
Height (CN) 24													
26													
28													
30													
32													
34													
36													
38													
40													
42													
44													
46													
48													
50													
52													
54													
56													
58													
60													

 STC/OITC Upgrade Available  
 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Polygon**



*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*





**STC/OITC Glass Availability - Elevate Bifold Doors**

**Bifold Doors**

		Width (CN)		No. of Panels
		20-6	22-0	7
		17-8	19-0	6
		15-0	16-0	5
		12-0	12-8	4
		9-0	9-8	3
		6-0	6-6	2
		3-0	3-4	1
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

 STC/OITC Upgrade Available  
 STC/OITC Upgrade NOT Available



**STC/OITC Glass Availability - Elevate Sliding Doors**

**Sliding French Door**

2-panel  
Width (CN)

		5-0	6-0	8-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

3-panel  
Width (CN)

		7-6	9-0	12-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

4-panel  
Width (CN)

		10-0	12-0	16-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

**Sliding Patio Door**

2-panel  
Width (CN)

		5-0	6-0	8-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

3-panel  
Width (CN)

		7-6	9-0	12-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

4-panel  
Width (CN)

		10-0	12-0	16-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

	STC/OITC Upgrade Available
	STC/OITC Upgrade NOT Available

**STC/OITC Glass Availability - Elevate Swinging Doors**

**Inswing French Door**

1-panel

		Width (CN)		
		2-6	2-8	3-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

**Outswing French Door**

1-panel

		Width (CN)		
		2-6	2-8	3-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

2-panel

		Width (CN)		
		5-0	5-4	6-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

2-panel

		Width (CN)		
		5-0	5-4	6-0
Height (CN)	6-5			
	6-8			
	7-0			
	8-0			

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

	STC/OITC Upgrade Available
	STC/OITC Upgrade NOT Available



**STC/OITC Glass Availability - Elevate Casement and Awning Narrow Frame**

ELCANF  
Width (Frame Size)

	16	18	20	22	24	26	28	30	32	34	36
24											
25											
27											
29											
31											
33											
35											
37											
39											
41											
43											
45											
47											
49											
51											
53											
55											
57											
59											
61											
63											
65											
67											
69											
71.125											

ELAWNNF  
Width (Frame Size)

	24	26	28	30	32	34	36	38	40	42	44	46	48
19.125													
21.125													
23.125													
25.125													
27.125													
29.125													
31.125													
33.125													
35.125													
37.125													
39.125													
41.125													
43.125													
45.125													
47.125													

 STC/OITC Upgrade Available  
 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Casement Narrow Frame Picture/Transom**

ELCANF P / ELCANF TR  
Width (Frame Size)

	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
19.125																													
21.125																													
23.125																													
25.125																													
27.125																													
29.125																													
31.125																													
33.125																													
35.125																													
37.125																													
39.125																													
41.125																													
43.25																													
45.125																													
47.125																													
49.125																													
51.125																													
53.125																													
55.125																													
57.125																													
59.125																													
61.125																													
63.125																													
65.125																													
67.125																													
69.125																													
71.125																													

STC/OITC Upgrade Available  
 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Double Hung Insert**

<b>ELDHIN</b>																				
Width (Frame Size)																				
	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	
Height (Frame Size)	28																			
	30																			
	32																			
	34																			
	36																			
	38																			
	40																			
	42																			
	44																			
	46																			
	48																			
	50																			
	52																			
	54																			
	56																			
	58																			
	60																			
	62																			
	64																			
	66																			
68																				
70																				
72																				
74																				
76																				
78																				
80																				
82																				
84																				

 STC/OITC Upgrade Available

 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Elevate Double Hung Insert Picture**

ELDHN P																									
Width (Frame Size)																									
Height (Frame Size)	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62		
16																									
18																									
20																									
22																									
24																									
26																									
28																									
30																									
32																									
34																									
36																									
38																									
40																									
42																									
44																									
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58																									
60																									
62																									
64																									
66																									
68																									
70																									
72																									
74																									
76																									
78																									
80																									
82																									
84																									

- STC/OITC Upgrade Available
- STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*



**STC/OITC Glass Availability - Essential Casement and Awning**

ESCA  
Width (CN)

	1-6	1-8	1-10	2-0	2-2	2-4	2-6	2-8	2-10	3-0
Height (CN) 2-0										
2-2										
2-4										
2-6										
2-8										
2-10										
3-0										
3-2										
3-4										
3-6										
3-8										
3-10										
4-0										
4-2										
4-4										
4-6										
4-8										
4-10										
5-0										
5-2										
5-4										
5-6										
5-8										
5-10										
6-0										
6-2										
6-4										
6-6										
6-8										
6-10										
7-0										

ESAWN  
Width (CN)

	1-6	1-8	1-10	2-0	2-2	2-4	2-6	2-8	2-10	3-0	3-2	3-4	3-6	3-8	3-10	4-0	4-2	4-4	4-6	4-8	4-10	5-0	
Height (CN) 1-6																							
1-8																							
1-10																							
2-0																							
2-2																							
2-4																							
2-6																							
2-8																							
2-10																							
3-0																							
3-2																							
3-4																							
3-6																							
3-8																							
3-10																							
4-0																							

-  STC/OITC Upgrade Available
-  STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Availability - Essential Casement Picture/Transom**

ESCA TR  
Width (CN)

		1-6	1-8	1-10	2-0	2-2	2-4	2-6	2-8	2-10	3-0	3-2	3-4	3-6	3-8	3-10	4-0	4-6	5-0	6-0	
Height (CN)	1-0																				
	1-2																				
	1-4																				
	1-6																				

ESCA P  
Width (CN)

		3-6	3-8	3-10	4-0	4-2	4-4	4-6	4-8	4-10	5-0	5-2	5-4	5-6	5-8	5-10	6-0
Height (CN)	2-0																
	2-2																
	2-4																
	2-6																
	2-8																
	2-10																
	3-0																
	3-2																
	3-4																
	3-6																
	3-8																
	3-10																
	4-0																
	4-2																
	4-4																
	4-6																
	4-8																
	4-10																
	5-0																
	5-2																
	5-4																
	5-6																
	5-8																
	5-10																
	6-0																
	6-2																
	6-4																
	6-6																
6-8																	
6-10																	
7-0																	

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*







**STC/OITC Glass Availability - Essential Double Hung Picture**

ESDH TR

		Width (CN)																						
		1-6	1-8	1-10	2-0	2-2	2-4	2-6	2-8	2-10	3-0	3-2	3-4	3-6	3-8	3-10	4-0	4-2	4-4	4-6	4-8	4-10	5-0	
1-0																								
1-2																								
1-4																								
1-6																								

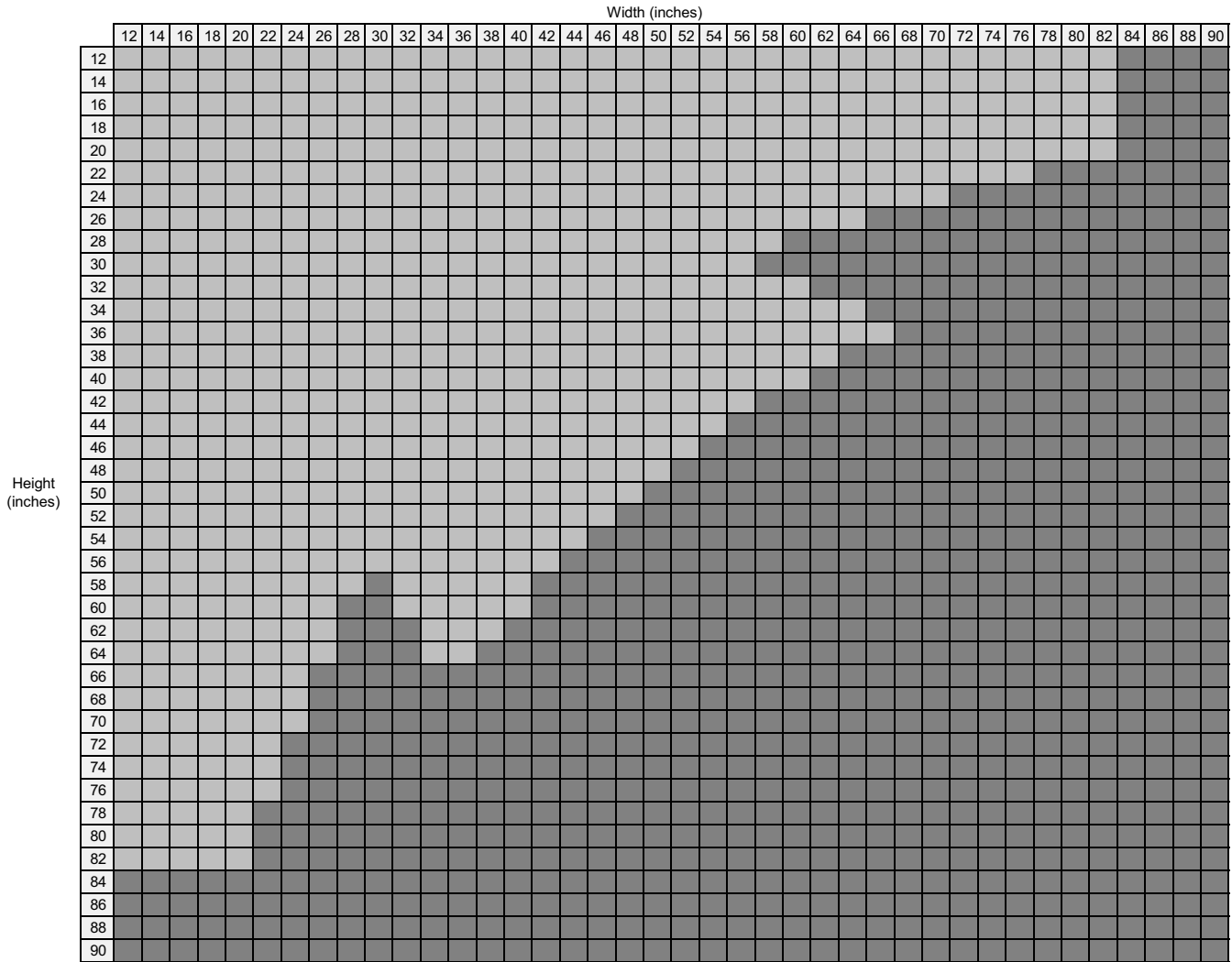
ESDH P

		Width (CN)												
		3-0	3-2	3-4	3-6	3-8	3-10	4-0	4-2	4-4	4-6	4-8	4-10	5-0
Height (CN)	3-0													
	3-2													
	3-4													
	3-6													
	3-8													
	3-10													
	4-0													
	4-2													
	4-4													
	4-6													
	4-8													
	4-10													
	5-0													
	5-2													
	5-4													
	5-6													
	5-8													
	5-10													
6-0														

-  STC/OITC Upgrade Available
-  STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Values - Essential Polygon**



*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Values - Essential Glider**

		Width (CN)															
		1-6	1-8	1-10	2-0	2-2	2-4	2-6	2-8	2-10	3-0	3-2	3-4	3-6	3-8	3-10	4-0
Height (CN)	2-0																
	2-2																
	2-4																
	2-6																
	2-8																
	2-10																
	3-0																
	3-2																
	3-4																
	3-6																
	3-8																
	3-10																
	4-0																
	4-2																
	4-4																
	4-6																
	4-8																
	4-10																
	5-0																
	5-2																
	5-4																
	5-6																
	5-8																
	5-10																
6-0																	
6-2																	
6-4																	
6-6																	

 STC/OITC Upgrade Available

 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**STC/OITC Glass Values - Essential Sliding Patio Door**

2-panel  
Width (CN)

		50	60	80
Height (CN)	68			
	610			
	80			

3-panel  
Width (CN)

		90
Height (CN)	610	
	80	

 STC/OITC Upgrade Available

 STC/OITC Upgrade NOT Available

*NOTE: This chart is for reference only. For exact limits of STC/OITC upgrade, refer to OMS or contact Marvin Sales & Support representative.*

**Ultrex and Capillary Tube Information**

**ULTREX CLADDING CHARACTERISTICS:** Ultrex is a composite material of fiberglass filaments that are shaped and matted, then saturated with compound resins. Ultrex offers stability, and stands up to the elements such as; sun, rain, airborne pollutants, and salt water. Ultrex also acts as a structural component adding to the entire window or door unit, and has a very low rate of expansion and contraction. Under the same conditions as vinyl, Ultrex moves only 1/10th as much as vinyl, it actually moves at the same minimal rate as window glass, reducing wear and tear on thermal seals. The impermeable factory finish is a patented acrylic coating which is applied utilizing a zero emission process. The finish provides excellent gloss and color retention, hardness, abrasion and chemical resistance. The dry film thickness is greater than 3 mils.

**CAPILLARY TUBES:** As a general rule, capillary tubes (also known as breather tubes) are recommended in 1-lite insulated units installed in elevations of 5,000 feet or more above sea level. Capillary tubes are also recommended in smaller (or) divided lite units where one side of glass is less than 12" (305) in length at elevations above 3,000 feet or more above sea level. Marvin does not install capillary tubes into insulated units just for transit through higher elevations (such as insulated units shipping to the west coast via Rocky Mountains). The final installation location of the unit determines if a capillary tube is necessary or not.

**Ultrex, Refinishing Information****ULTREX REFINISHING INFORMATION****Painting Ultrex**

You will need to supply:

- 320-400 grit sandpaper
- Quality exterior grade acrylic latex paint
- Foam paint brush
- Masking tape

1. Thoroughly sand the factory finish with 320-400 grit sandpaper.
2. Wash the surface with water and detergent to remove contaminants, rinse with clear water and dry thoroughly.
3. Mask any window components that will not be painted.
4. Coat the Ultrex with a quality exterior grade acrylic latex paint.
5. Acrylic latex products gain full adhesion after the seven to ten days cure.
6. Spot test a small area after seven to ten days to verify adequate surface preparation prior to finishing large areas.

**Cleaning Ultrex**

For regular cleaning and maintenance of Elevate and Essential products, non-abrasive household cleaner will not harm the factory finish. Accidental wood stain can be removed safely with painters naphtha (the same solvent used for thinning stain) and is not considered a harsh chemical as some of our literature cautions.

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**General Painting and Staining Instructions, Wood Preservative Information****GENERAL PAINTING AND STAINING INSTRUCTIONS**

Finish paint on primed or bare wood windows and doors must be applied immediately following installation and repainted periodically to avoid damage to the wood. LAP THE FINISH COAT 1/16" ONTO THE GLASS FOR A PROPER MOISTURE SEAL.

WHEN APPLYING PAINT OR OTHER FINISH TO WINDOWS IT IS EXTREMELY IMPORTANT THAT YOU DO NOT PAINT: weather stripping or other non-wood parts; hardware, handles, rollers, etc.; or any surface which has an abrasive or sliding contact with another surface. Paints, stains and varnishes contain solvents which cause plastics or vinyls to dry out and become brittle. Once brittle, they will need to be replaced.

Abrasive cleaners or harsh solutions containing solvents should not be used on Elevate and Essential products. Painters naphtha is recommended for removing excessive paint or stain.

The exterior surfaces of Elevate wood windows come to you with a low maintenance finish. However, the interior must be painted or stained and varnished by carefully following these instructions. Before finishing, bare wood window and door surfaces must be clean and dry. Remove handling marks, debris, or effects or exposure to moisture by sanding lightly with 220 or 320 grit sandpaper and clean before applying your choice or finish.

**PAINTING:** Use only a high-quality oil base or latex paint. To provide good adhesion of paint, a compatible prime coat should be applied. Paint with sash or panels open (or removed) and do not close until thoroughly dry. Apply one coat of primer and two coats of top quality paint according to the paint manufacturer's instructions. **NOTE: DO NOT APPLY PAINT TO THE MARVIN FACTORY PREFINISH WITHOUT FIRST CONTACTING YOUR MARVIN DEALER FOR PROPER INSTRUCTIONS.**

**STAINING:** Apply stain according to the manufacturer's instructions. Apply as many coats of stain as necessary to achieve the desired color. After the stain is thoroughly dry, apply at least two coats of varnish.

**WOOD PRESERVATIVE INFORMATION**

WOODTREAT MB is a clear water repellent wood preservative which has been specially formulated by Kop-Coat, Inc. for the treatment of millwork prior to factory or field priming, painting, finishing. It penetrates into the wood to provide effective long-term protection from moisture, mold, mildew, decay and wood destroying fungi which would adversely affect the appearance and/or serviceability of the millwork.

The water repellent WOODTREAT MB helps to stabilize the wood. The non-film forming treatment will not peel or chip off. It has been specially formulated for compatibility with oil and water base primers.

The preservative in WOODTREAT MB is an iodine base fungicide commonly marked under the name Troysan Polyphase. Troysan Polyphase is biodegradable,

The preservative complies with WDMA Standards I.S. 4 and exceeds all WDMA industry standard requirements for a water repellent preservative treatment for millwork.

TIMBERTREAT 6WT, a biodegradable additive also manufactured by Kop-Coat, Inc., is added to the WOODTREAT MB for protection against termites, carpenter ants, beetles and other wood destroying insects.

The stable composition and bond durability of TIMBERTREAT 6WT provides long term protection. Combined, WOODTREAT MB and TIMBERTREAT 6WT provide unsurpassed excellent protection against both decay and insect attack.



**Abbreviations**

**Elevate and Essential Product Abbreviations**

BAY	Bay	ELAWN	Elevate Awning
BOW	Bow	ELCA	Elevate Casement
C	Cottage Style	ELDGCA	Elevate Direct Glaze Casement
CA	Casement	ELCAP	Elevate Casement/Awning Picture
DH	Double Hung	ELCATR	Elevate Casement/Awning Transom
FS	Frame Size	ELDG RECT	Elevate Direct Glaze
GBG	Grilles-Between-the-Glass	ELIFD	Elevate Inswing French Door
GL	Glider	ELIFDDGTR	Elevate Inswing Direct Glaze French Door
L	Left-Handed	ELOFD	Elevate Outswing French Door
MO	Masonry Opening	ELOFDDG	Elevate Outswing Fench Door Direct Glaze
MM	Millimeters	ELDGDH	Elevate Direct Glaze Double Hung
N/A	Not Available	ELCART	Elevate Round Top
O	Stationary	ELALDGRT	Elevate Aluminum Direct Glaze Round Top
OM	Outside Measurement	ELSFD	Elevate Sliding French Door
POLY	Polygon	ELSFDDGTR	Elevate Sliding French Door Transom
R	Right-Handed	ELSPD	Elevate Sliding Patio Door
RECT	Rectangle	ELSPDDGTR	Elevate Sliding Patio Door Direct Glaze
RO	Rough Opening	ELDHIN P	Elevate Insert Double Hung Picture
SDL	Simulated Divided Lites	ELDHIN TR	Elevate Insert Double Hung Transom
Sq. Ft.	Square Feet	ELDH	Elevate Double Hung
X	Operating	ELDHP	Elevate Double Hung Picture
2W	2 Units Wide	ELDHTR	Elevate Double Hung Transom
3W	3 Units Wide	ELGL	Elevate Glider
4W	4 Units Wide	ELGLTS	Elevate Glider Triple Sash
ESAWN	Essential Awning		
ESCA	Essential Casement		
ESCAP	Essential Casement Picture		
ESCATR	Essential Casement Transom		
ESDG POLY	Essential Polygon		
ESDH	Essential Double Hung		
ESDHP	Essential Double Hung Picture		
ESDHTR	Essential Double Hung Transom		
ESGL	Essential Glider		
ESGL TS	Essential Glider Triple Sash		
ESDG RT	Essential Round Top		
ESSH	Essential Single Hung		
ESSPD	Essential Sliding Patio Door		
ESSPD DGTR	Essential Sliding Patio Door Direct Glaze Transom		

## Glossary of Terms

*This glossary is for reference only. For Marvin Windows and Doors Product conditions please refer to individual sections and specifications throughout this manual.*

**AAMA** – see FGIA

**ACTIVE PANEL** – Primary operating door panel.

**AIR INFILTRATION** – The amount of air leaking through cracks in walls, windows, and doors.

**ASSEMBLY** – Single units mullied together.

**ARGON GAS** – An inert, non-toxic gas used in insulating windows to reduce heat transfer.

**AWNING WINDOW** – Awning windows are projected windows having one sash hinged at the top edge and projecting outward from the plane of the window bottom.

**BALANCE** – A mechanical device spring loaded used in double hung windows as a means of balancing the weight of the sash during opening and closing.

**BAY WINDOW** – An arrangement of three or more individual window units, attached so as to project from the building at various angles.

**BOW WINDOW** – A series of adjoining window units, installed on a radius.

**CAPILLARY TUBES** – A tube inserted into the insulating glass spacer that allows the inside and outside air pressure to equalize in higher elevations.

**CASEMENT WINDOW** – Casement windows contain outswinging sash that project away from the plane of the frame and are side hinged at the jambs. Sash are mounted by use of hinging hardware which allow them to swing. The sash are operated by roto operators. Unit may include one or more locking handles to secure sash tightly in the frame in a closed position.

**CAULKING** – A mastic compound for filling joints and sealing cracks to prevent leakage of air and water. Commonly made of silicone or a rubber based material.

**CLEAR OPENING (CO)** – The opening created when the window or door is completely open.

**CONDENSATION RESISTANCE (CR)** – Measures the ability of a product to resist the formation of condensation on the interior surface of that product. The higher the CR rating, the better it resists forming condensation.

**COTTAGE WINDOW** – A window with unequal sash, top and bottom.

**DAYLIGHT OPENING (DLO)** – The width and height of the visible glass.

**DESIGN PRESSURE (DP)** – The pressure a product is designed to withstand.  $DP = \text{Effective velocity pressure} \times 1.25$ .

**DIRECT GLAZE (DG)** – Refers to a window with no sash. The glass is glazed directly into the frame and is stationary.

**DOUBLE HUNG WINDOW** – A window unit operating vertically. The sash weight is offset by a counterbalancing mechanism mounted in the jambs. Unit may include one or more locking devices to secure the sash in the closed position. Both sash in a double hung are operable. See also – Balance.

**EGRESS** – The act of leaving an enclosed space. In the window industry the term refers to the dimensions of the opening of a window or door (the horizontal and vertical clear distance). Established by building codes. The purpose for establishing minimum egress dimensions is to insure that in an emergency situation a person attempting to leave a building has adequate area to escape.

**EMISSIVITY** – A measure of a surface's ability to emit long – wave infrared radiation or room temperature radiant heat energy. Emissivity varies from 0 (no emitted infrared) to 1 (100% emitted infrared). The lower the emissivity, the lower the resultant U-value.

**ESCUTCHEON** – A decorative door handle attached to the stile directly behind the handle(s). Generally square or rectangular shaped.

**FENESTRATION** – Openings in a building wall, such as windows, doors, and skylights designed to permit the passage of air, light, and people.

**FGIA** - Fenestration Glazing Industry Alliance (formerly AAMA). A national trade association that establishes voluntary standards for the window, door, and skylight industry. Note: Many standards referenced in the Codes will still reference AAMA documents which are FGIA publications.

**FOOTBOLT** – A locking rod device installed vertically in the stile or astragal of a door or screen which when activated secures the panel or screen in a stationary position.

**FRAME** – The stationary portion of a window that encloses either the glass (direct glaze) or the sash (operating or stationary) and consists of the following parts:

1. HEAD JAMB – The top frame member.
2. Sill – The bottom frame member.
3. SIDE JAMB – Side or vertical frame members.
4. JAMB EXTENSION – The addition onto the standard jamb to adapt a window unit to deeper wall thicknesses, in most cases will be factory applied unless specified otherwise.

**GLASS SIZE (GS)** – The measurement of the actual glass, not the visible glass.

**GLIDER WINDOW** – A window unit operating horizontally. Typically consisting of two sash, with one sash operable. Unit may include one or more locking devices to secure the sash in the closed position. One sash must remain stationary.

## Glossary of Terms

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**GRILLES** – Removable Grille – A narrow profiled wood member that snaps into place on the interior surface of the glass giving a divided appearance. Grilles Between Glass – A narrow profiled aluminum member installed between two pieces of glass that gives a divided appearance. *sections and specifications throughout this manual.*

**HANDING** – A term used to describe the right or left hand operation of a window or door.

**HEADBOLT** – A locking rod device installed vertically in the stile or astragal of a door or screen which when activated secures the door in a stationary position.

**INACTIVE PANEL** – Secondary operating door panel.

**INSULATING GLASS (IG)** – Two pieces of glass spaced apart with an aluminum edge spacer to create a hermetically sealed section of glass with an air space.

**INSERT** – A specially designed, made-to-order sash and frame unit that is used to replace existing double hung sash and hardware in an existing frame– without disturbing existing interior trim or exterior casing.

**JAMBS** – Vertical members of a window or doors outside frame.

**JAMB EXTENSION** – A jamb-like member, usually surfaced on four sides, which increases or extends the depth of the exterior or interior window or door frame.

**LOW E GLASS** – Low E stands for low emissivity. The lower the emissivity the higher the percentage of long wave radiation blocked thereby improving thermal performance. Low E glass is coated with a thin microscopic, virtually invisible, metal or metallic oxide layer. The primary function is to reduce the U-value by suppressing radioactive heat flow. A secondary feature is the blocking of short wave radiation to impede heat gain.

**MULTI-POINT LOCKING SYSTEM** – A line of standard or optional multiple point locking mechanisms installed on the operative panel(s)/ sash of various Marvin products to enhance security and performance.

**OBSCURE GLASS** – Glass formed by running molten glass through special rollers. These rollers have a pattern on them causing the glass to become patterned and thus “obscure.”

**OPERATING FORCE** – The forces required to maintain sash or panel motion in either the initial opening or closing direction.

**OUTSIDE MEASUREMENT OF THE FRAME** – The width and the height of the unit not including the casing.

**OX AND XO** – The letters OX or XO identify the operation of window or door units as viewed from the exterior. The letter O stands for stationary while the letter X stands for operating.

**PANEL** – A part of a fenestration product composed of a light of glass surrounded by a door frame. Similar to a sash.

**PERFORMANCE CLASS** – A means to grade a products performance. R = Residential, LC = Light Commercial, CW = Commercial, AW = Architectural Window

**PERFORMANCE GRADE** – A numeric designator that defines performance that applies to; air leakage resistance, water penetration resistance and deflection resistance according to Standard Specifications.

**PICTURE WINDOW** – A non-operating window unit. A window consisting of frame, sash, and glass, with no hardware.

**PITCH** – A term used to describe the angle of a roof. For example: A 412 pitch indicates that the roof rises 4 (102) vertically for each 12 (305) horizontally.

**POLYGON** – A high level term used to describe triangles, trapezoids, pentagons, hexagons and octagons.

**PULTRUSION** – Lineal profiles of constant cross section manufactured by combining plastic resin and continuous glass fiber reinforcement. These thermally insulating and structural components are ideally suited for applications where strength, thermal stability and weather resistance are required, such as in patio door frames and commercial windows.

**R-VALUE** – A measure of the resistance of a glazing material or fenestration assembly to heat flow. It is the inverse of the “U” Value. Higher numbers indicate greater insulating capabilities. See “U” Value.

**RABBET** – A groove along or near the edge of a piece of wood.

**RADIUS** – The length of an imaginary line from the center point of a circle to the arc or circumference of a circle.

**RAILS** – The cross or horizontal members of the framework of a sash, door or other panel assembly.

**REINFORCEMENT** – Material added to individual sash or frame members to increase strength or stiffness.

**ROTO GEAR** – A term used to describe the steel drive worm, gears and crank device used for opening awnings and Casements.

**ROUGH OPENING** – The opening in the wall where a window or door unit is to be installed. Openings are larger than the size of the unit to allow room for insulation and to shim the unit square.

**ROUND TOP** – Generally a semicircle window which is mulled to the top of another window or door, thus forming the round top appearance.

## Glossary of Terms

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**SASH** – The operating and/or stationary portion of the window unit that is separate from the frame. The sash consists of the following parts:

1. **STILES** – Vertical sash members.
2. **RAILS** – Horizontal sash members.
3. **CHECK RAILS** – Horizontal sash members that meet, as in double hung units. These could also be vertical check stiles as in the glider or patio door

**SCREEN** – A product used with a window or door consisting of a four-sided frame surrounding a fiberglass mesh designed to keep insects out.

**SEALANT** – A compound used to fill and seal a joint or opening. Also the material used to seal edges of insulated glass.

**SIMULATED DIVIDED LITE: SDL** – Permanent wood or Ultrex bars applied to the interior and exterior of a one-lite piece of glass to simulate authentic divided lites. Optional spacer bar available with all glass types.

**SNUBBER** – An interlocking metal bracket attached at the center of the hinge side of a casement sash and frame with certain heights and top sides of an awning sash and frame with certain widths. It allows operation but pulls the sash tightly against the frame weather strip to maximize performance when closed.

**SOLAR HEAT GAIN COEFFICIENT (SHGC)** – The lower a window's SHGC, the less solar heat it transmits, and the greater its shading ability.

**SPACER** – Used to separate the two pieces of glass in an insulating glass panel.

**SQUARE FOOT** – For measuring the area of a unit. RO width (in inches) x RO height (in inches) divided by 144 equals the area in square feet of a unit

**STATIONARY** – A non-operating sash, panel or unit.

**STILES** – The upright or vertical perimeter pieces of a sash, panel or screen.

**STRUCTURAL TEST PRESSURE** – The pressure differential applied to a window to determine structural load capacity.

**TEMPERED GLASS** – Float glass panels heated and then cooled rapidly in a controlled environment. This process makes the glass several times stronger than regular glass. It also makes it safer because when broken it yields small pebble-like fragments.

**TRANSOM** – A window above a window or door. Transoms can be either stationary or operating.

**U-FACTOR** – Hourly rate of heat transfer for one square foot of surface when there is a temperature difference of one degree F of air on the two sides of the surface, also recognized as "U" Value or Heat Transmission Coefficient.

**ULTREX** – A pultruded composite material made of polyester resin and glass fibers.

**U-VALUE** – (Btu/hr-sq ft - \*f) The lower the U-Value, the greater the resistance to heat flow and better its insulating value.

**UNIT** – One single product such as a one wide casement.

**VENTING OPENING** – The total opening created when a door or window is completely open.

**VISIBLE LIGHT TRANSMITTANCE (VLT)** – Percentage of visible light transmitted through the unit.

**WDMA** – Window and Door Manufacturers Association.

**WEATHER STRIP** – A flexible material or device used to seal the opening between a sash/panel and frame, typically made of vinyl or foam.