

# Product Performance and Information

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## MANUAL HISTORY

On the bottom left hand corner of each page is a date and year that will help the user identify when a change has been made to the information contained on the page. The most current version of the manual can be found at [www.marvin.com](http://www.marvin.com). The chart below details when the paper copy of the revised manual was printed along with the corresponding month and date.

PRINT DATE	NOTES/MEMO TOPIC
March 1998	Original Release
March 1999	General Update
July 1999	General Update
October 1999	General Update
April 2000	General Update
July 2001	General Update
December 2001	General Update
May 2002	General Update
June 2002	General Update
July 2002	General Update
November 2002	General Update
February 2003	General Update
March 2003	General Update
January 2004	General Update
April 2004	General Update
May 2004	Integrity Door change (XX configuration) and uniform frame, chapters updated: 5,6,7,8,9,10
May 2005	Chapters updated – 3,6,7,8,9,10
Feb 2006	Redesigned Wood–Ultrex Double Hung and Glider, optional folding hardware for casement and awning
April 2006	New All Ultrex Single Hung and Polygon
Sept 2006	All Ultrex and Wood–Ultrex prairie lite option available
Nov 2006	New All Ultrex Glider, SDL and GBG in Wood–Ultrex Round Top units
April 2007	New Wood–Ultrex Outswing French Door, New All Ultrex Double Hung, bronze color added
Sept 2007	New Integrity Wood–Ultrex Casement and Awning
March 2008	All Ultrex Sliding Patio Door, Cashmere color option for entire product line
June 2008	Impact glazed products, new handle profile for sliding french door
Oct 2008	New sizes for Integrity Wood–Ultrex Casement and Double Hung, All Ultrex Single and Double Hung
April 2009	New sizes for Round Top by Marvin, Ebony exterior color of All Ultrex Product, Impact glazing for Wood–Ultrex Sliding French Door
Dec 2010	Warranty update, Impact glazing for Wood–Ultrex, NFRC update, new casement sizes, coastal hardware for All Ultrex, 9065 Wood–Ultrex Sliding French Door
Feb 2011	New All Ultrex Series Round Top, optional keyed lock for sliding patio door, thermal performance data updated
April 2011	LoE–180™ on all glass products, 44 call height for Wood–Ultrex Double Hung

## MANUAL HISTORY

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June 2012	Additional awning sizes, special sizing for Wood-Ultrex windows, additional sizes for All Ultrex Glider and Patio Door, New All Ultrex Jamb extension, STC/OITC glass option
July 2013	Added Exterior Casing options, Updated mull limits and elevations for expanded sizes, Updated egress charts, New Accessories Chapter
Dec 2013	Added Wood-Ultrex Insert Double Hung window, updated glossary with new term, updated abbreviations, corrected double hung egress charts and formula page for special sizes, added CE marked info for international customers, updated All Ultrex Glider weather strip
Feb 2015	Updated the Low E naming convention.
Feb 2016	General Update; updated STC/OITC.
April 2016	ISFD – Implemented the design of the 4 panel configuration frame, sill, and panels to the 2 and 3 panel configurations. Now offering a high performance option on the 2 and 3 panel configuration. Also added a coastal hardware option to the 4 panel configuration.
August 2016	IIFD – Introduced G3 IIFD, IIFD HP, IIFD IZ3 products; Discontinued IIFD G2 production; Cambridge exterior escutcheon width reduced; New hinge release; added ORB hinge option, Bronze Sill/ Dark Weather Strip package release; Impact SDLS option release. Arctic White frame parts no longer available for field service. Discontinued ISD frame components (pre-2004).
June 2017	IOFD– Introduced IOFD G2 products, new hinge release and color offerings, sill/dark weather strip released.
February 2018	Updated Ebony exterior color specification.

**HOW TO USE THIS MANUAL**

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**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 Integrity Windows and Door products along with fenestration standards, including glazing, Ultrex finishes, and overall product performance can be used to help your clients understand what products best for 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
- Installation 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:**

- Number in parentheses () following measurements are metric equivalents in millimeters to the nearest whole number.
- Allow 1/16" (2) tolerance on all measurements
- For accessories, dimensions and application, see the Accessories chapter in 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 fractions for Glass Size, Daylight Opening are to the nearest 1/32<sup>nd</sup> of an inch to be consistent with above.
- E = (Egress): Windows 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 your local building codes.
- T = (Tempered): For safety and/or code requirements, frame sizes greater than 71 1/8" (2924) tall, Integrity 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 is a registered trademark of Truth Hardware

**How to Submit Suggestions**

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

## CERTIFICATION & CODE INFORMATION

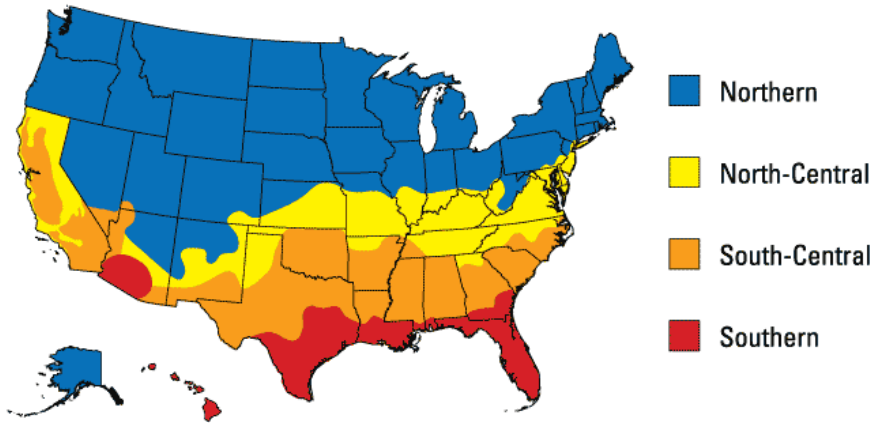
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Integrity windows and doors meet or exceed the following industry and federal performance standards.

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
CWDMA	Canadian Window and Door Manufacturers Association
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

**Integrity 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 Organic Coatings on Fiber Reinforced Thermoset Profiles”
AAMA 1304	“Forced Entry Resistant Test for Side-Hinged Doors”
ANSI / AAMA / WDMA	1. Wood Windows – I.S.2 2. Wood Sliding Patio Door I.S.2 3. Water-Repellent Preservative I.S.4
101/I.S. 2/A440-08	“Voluntary Performance Specification for Windows, Doors and Unit Skylights”
101/I.S. 2/A440-11	“Voluntary Performance Specification for Windows, Doors and Unit Skylights”
ASTM E-283	“Standard Test Method for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors”
ASTM E-2068	“Standard Test Method for Determination of Operating Force of Sliding Windows and Doors”
ASTM E-330	“Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differences”
ASTM E-331	“Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differences”
ASTM E-90	“Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements”
ASTM E-547	“Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Differences”
ASTM E-1886	“Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials”
ASTM E-1996	“Standard Test Method for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Wind Borne Debris in Hurricanes”
ASTM F-588	“Forced-Entry Resistant Test for Windows”
ASTM F-842	“Forced-Entry Resistant Test for Sliding Glass Doors”
ASTM E-2190	“Standard Specification for Insulating Glass Unit Performance and Evaluation”
ASTM F-2090	“Standard Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms”
CCPOA	“California Crime Prevention Officers Association”
SMA 1004	“Specification for Aluminum Tubular Frame Screen for Windows”
Federal Specification	DD-G-451-D “Glazing Thickness”



**Doors**

Glazing Level	U-Factor <sup>1</sup>	SHGC <sup>2</sup>
Opaque	≤ 0.21	No Rating
≤ ½-Lite	≤ 0.27	≤ 0.30
> ½-Lite	≤ 0.32	≤ 0.30

<sup>1</sup> Btu/h-ft<sup>2</sup>·°F

<sup>2</sup> Fraction of incident solar radiation

**Windows**

Climate Zone	U-Factor <sup>1</sup>	SHGC <sup>2</sup>	
Northern	≤ 0.30	Any	Prescriptive
	= 0.31	≥ 0.35	Equivalent Energy Performance
	= 0.32	≥ 0.40	
North-Central	≤ 0.32	≤ 0.40	
South-Central	≤ 0.35	≤ 0.30	
Southern	≤ 0.60	≤ 0.27	

## Energy Star Most Efficient – United States

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

Integrity Windows and Doors has long been a leader in providing our customers with energy efficient options. We are pleased to announce that Integrity meets the US ENERGY STAR Most Efficient criteria with its Wood-Ultrex tripane glazing option.

### MOST EFFICIENT CRITERIA

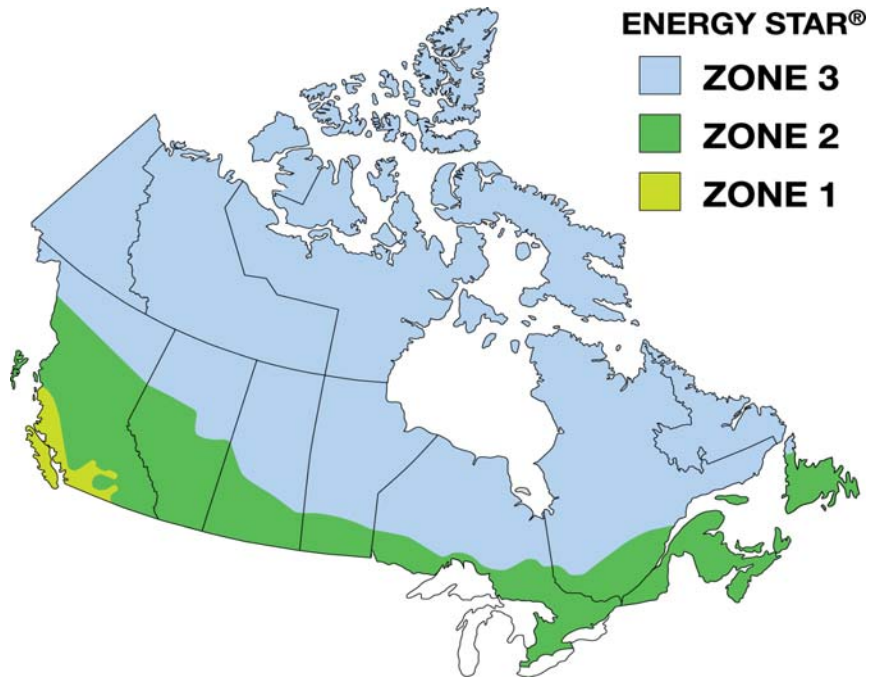
Energy Star Zone	U-value	SHGC
Northern	$\leq 0.20$	$\geq 0.20$
North-Central	$\leq 0.20$	$\leq 0.40$
South-Central	$\leq 0.20$	$\leq 0.25$
Southern	$\leq 0.20$	$\leq 0.25$

Qualifying Integrity products are listed below. Performance values are located at [www.marvin.com](http://www.marvin.com).

### Integrity Wood-Ultrex® Series

Product Type	Glazing
Casement	Tripane Low E2/E1
Awning	Tripane Low E2/E1
Casement Picture	Tripane Low E2/E1
Casement Direct Glaze	Tripane Low E2/E1





**ENERGY STAR Requirements for Windows and Doors**  
(Effective February 1, 2015)

Zone	Heating Degree – Day Range	Compliance Paths				
		Energy Rating (ER)	or	U-Factor		
		Minimum ER (unitless)	or	Maximum U-Factor $W/m^2 \cdot K$ (Btu/h·ft. <sup>2</sup> ·°F)	and	Minimum ER (unitless) Windows and Sliding Glass Doors Only
1	< 3500	25	or	1.60 (0.28)	and	16
2	3500 to < 6000	29	or	1.40 (0.25)	and	20
3	≥ 6000	34	or	1.20 (0.21)	and	24



## Energy Star Most Efficient – Canada

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Natural Resources Canada (NRCan) has developed a new program to encourage more energy efficient products and options called ENERGY STAR Most Efficient. This is an extension of the Canadian ENERGY STAR brand and is designed to recognize and advance the most efficient products among those that qualify for Canadian ENERGY STAR. This recognition is for specific categories and awarded for a specific year.

Integrity Windows and Doors has long been a leader in providing our customers with energy efficient options. We are pleased to announce that Integrity meets the Canadian ENERGY STAR Most Efficient criteria with its Wood-Ultrex tripane glazing option.

### **MOST EFFICIENT CRITERIA**

<b>Options</b>	<b>U-value</b>	<b>ER</b>
<b>Option 1</b>	N/A	>=36
<b>Option 2</b>	<=0.20	>= 26

Qualifying Integrity products are listed below. Performance values are located at [www.marvin.com](http://www.marvin.com).

### **Integrity Wood-Ultrex® Series**

<b>Product Type</b>	<b>Glazing</b>
<b>Casement</b>	Tripane Low E2/E1
<b>Awning</b>	Tripane Low E2/E1
<b>Casement Picture</b>	Tripane Low E2/E1
<b>Casement Direct Glaze</b>	Tripane Low E2/E1

## WIND SPEED AND DESIGN TABLES

DESIGN WIND PRESSURE (PSF) – ASCE 7–2005																						
Location	Zone	Effective Wind Area (SF)	Basic Wind Speed V (MPH)																			
			85	90	100	110	120	130	140	150	160	170										
Walls	4	10	+13	-14	+15	-16	+18	-19	+22	-24	+26	-28	+30	-33	+35	-38	+40	-44	+46	-50	+52	-56
		50	+12	-13	+13	-14	+16	-18	+19	-22	+23	-26	+27	-30	+31	-35	+36	-40	+41	-46	+46	-51
		500	+10	-11	+11	-12	+13	-15	+16	-18	+19	-21	+23	-25	+26	-29	+30	-34	+34	-38	+39	-43
	5	10	+13	-17	+15	-19	+18	-24	+22	-29	+26	-35	+30	-41	+35	-47	+40	-54	+46	-62	+52	-70
		50	+12	-15	+13	-16	+16	-20	+19	-25	+23	-29	+27	-34	+31	-40	+36	-46	+36	-52	+46	-59
		500	+10	-11	+11	-12	+13	-15	+16	-18	+19	-21	+23	-25	+26	-29	+30	-34	+30	-38	+39	-43

Metric Conversions: 1 PSF = 47.9 pascals

1 SF = 0.0929 SM

1 MPH = 0.447 M/S

### Notes:

- 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:
  - a: 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.
  - h: 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 7–2005. ASCE 7–2005 may not have local precedence. Please refer to your local codes for design pressures that apply to your area."

ASCE 7–98 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 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 7–2005 should be consulted. NOTE: Windows and doors designed to resist wind loading are not considered openings.

## 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. Use of this exposure category shall be limited to those areas for which terrain representative of Exposure B prevails in the upward direction for a distance of at least 1,500 ft (460 m) or 10 times the height of the building or other structure, 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 exposed to wind flowing over open water (excluding shorelines in hurricane prone regions) for a distance of at least 1 mile (1.61 km) Shorelines in Exposure D include inland waterways, the Great Lakes and coastal areas of California, Oregon, Washington and Alaska. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water. Exposure D extends inland from the shoreline a distance of 1500 feet (460 m) or 10 times the height of the building or structure, whichever is greater.

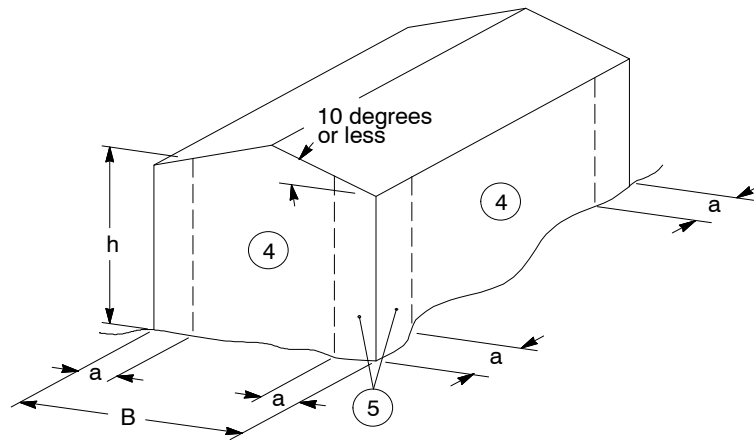
## INSTRUCTIONS:

- 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.
- 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.

**BUILDING CATEGORIES AND DESIGN FACTORS**

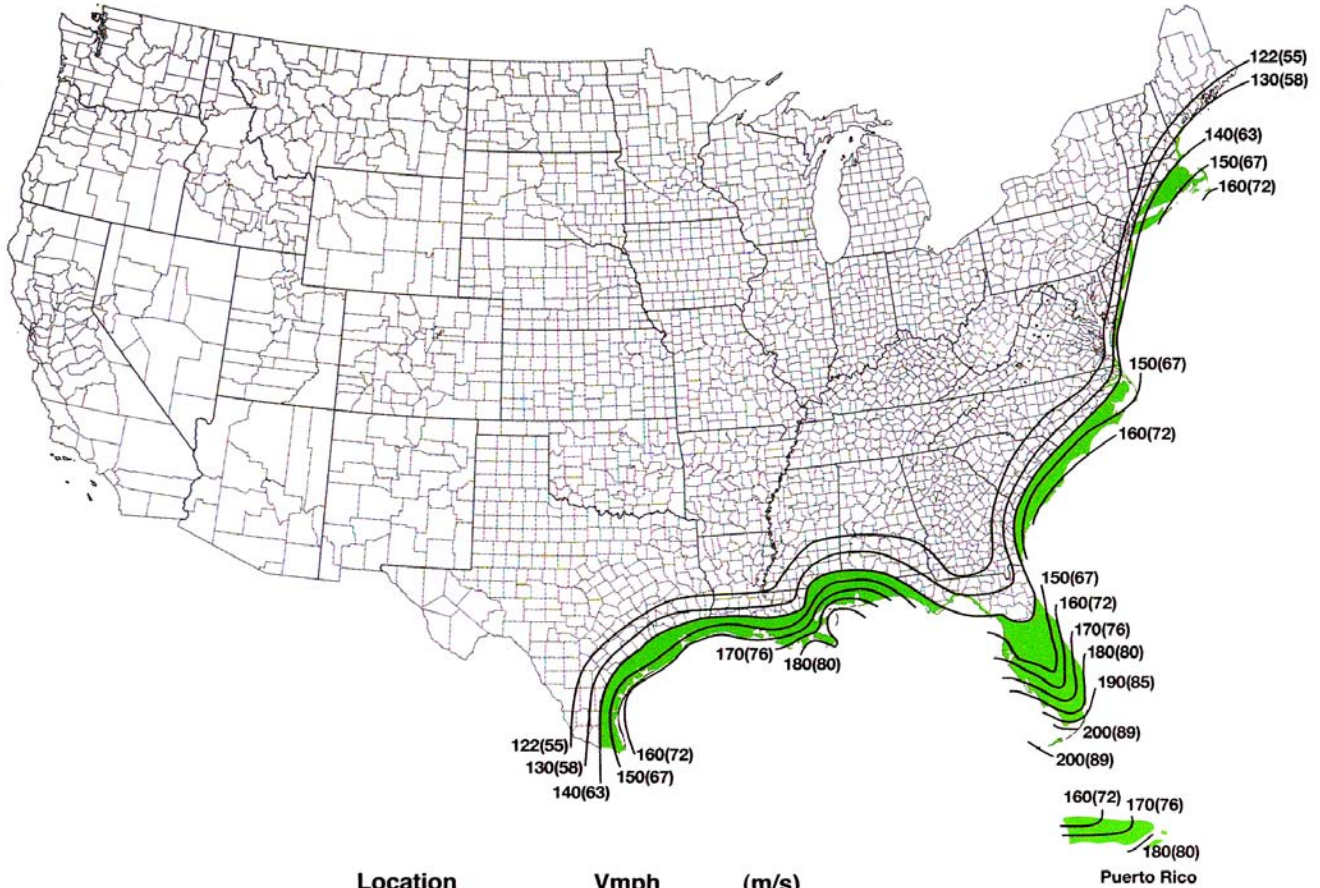
<b>BUILDING CATEGORIES</b>	
<b>Category</b>	<b>Nature of Occupancy</b>
I	Buildings and structures that represent a low hazard to human life in the event of failure, such as agricultural buildings, certain temporary facilities, and minor storage facilities.
II	Buildings and structures where primary occupancy is one in which more than 300 people congregate in one area.
III	Buildings 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	Buildings and structures designated as essential facilities including, but not 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.

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



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

**WIND MAP (ASCE 7-10)**

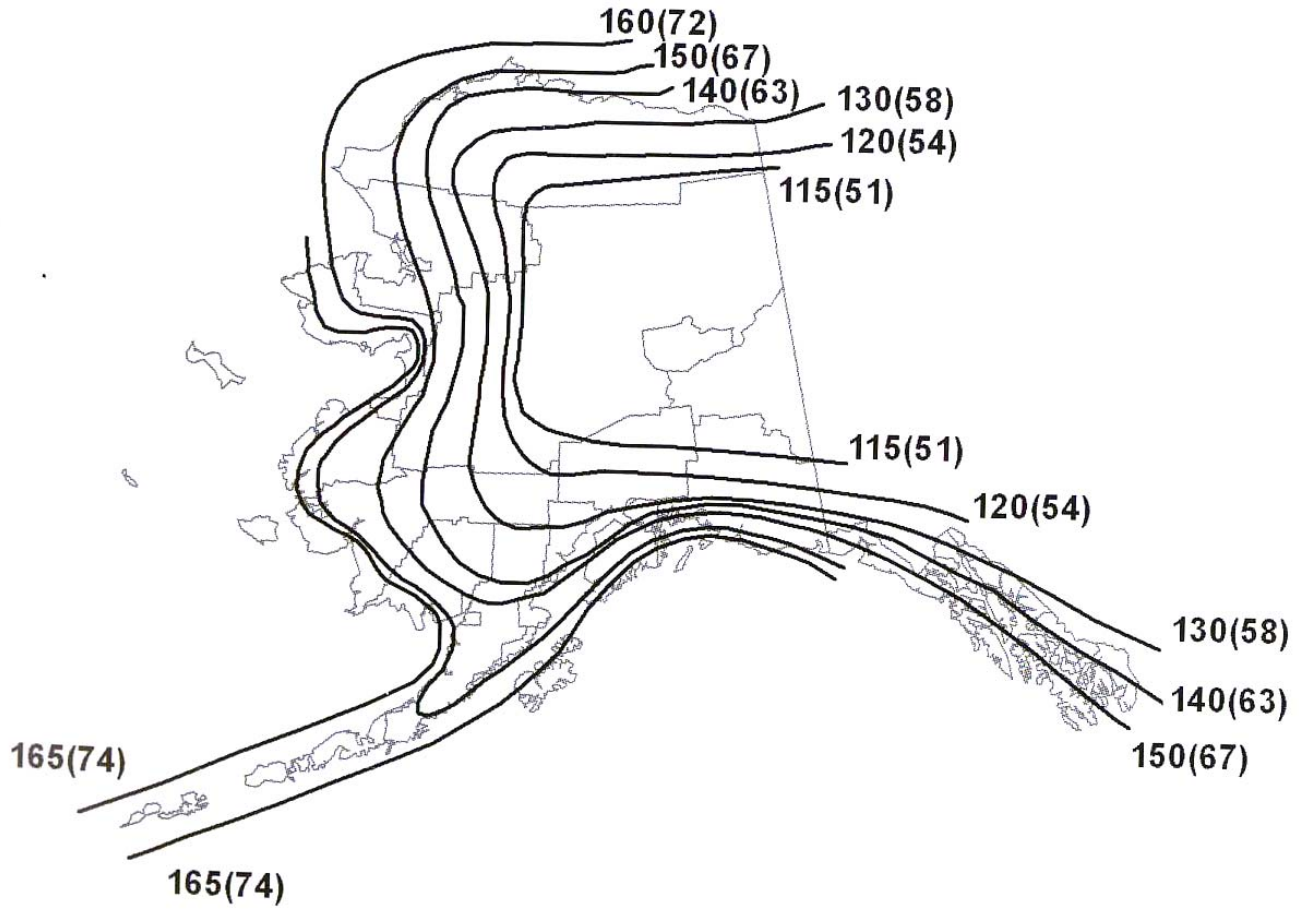


Location	Vmph	(m/s)
Hawaii	145	(65)
Guam	210	(94)
Virgin Islands	175	(78)
American Samoa	170	(76)

**WBDR for Risk Category IV and Risk Category III buildings health care facilities  
V ≥ 140 mph; and within 1 mile of the coastal mean high water line where V ≥ 130 mph**

## WIND MAP

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## PRODUCT DESIGN PRESSURES – WOOD-ULTREX – STANDARD PRODUCT

Integrity Wood-Ultrex Window and Door Product Values – Standard Product					
Product Type	Frame Size	AAMA/WDMA/CSA 101/I.S.2/A440-08	CSA-A440		
			Air	Water	Wind
Integrity Wood-Ultrex Casement – Operable	20" x 31 1/8" – 36" x 71 1/8"	LC-PG50	A3	B3	C3
Integrity Wood-Ultrex Casement – Stationary Units	20" x 31 1/8" – 36" x 71 1/8"	LC-PG50-FW	A3	B3	C3
Integrity Wood-Ultrex Casement Transom	20" x 15 3/4" – 36" x 15 3/4"	LC-PG50-FW	FIXED	B4	C3
Integrity Wood-Ultrex Casement Picture	36" x 39 1/8" – 72" x 59 1/8"	LC-PG50-FW	FIXED	B4	C3
Integrity Wood-Ultrex Awning – Operable	24" x 27 1/8" – 32" x 27 1/8"	LC-PG50	A3	B3	C3
Integrity Wood-Ultrex Awning – Operable	36" x 47 1/8" – 49" x 47 1/8"	LC-PG50	A3	B3	C3
Integrity Wood-Ultrex Awning – Stationary	24" x 27 1/8" – 32" x 27 1/8"	LC-PG50-FW	A3	B3	C3
Integrity Wood-Ultrex Awning – Stationary	36" x 47 1/8" – 49" x 47 1/8"	LC-PG50-FW	A3	B3	C3
Integrity Wood-Ultrex Double Hung – Operable	21 1/2" x 35 3/4" – 41 1/2" x 75 3/4"	LC-PG40	A3	B2	C2
Integrity Wood-Ultrex Double Hung – Transom	21 1/2" x 15 3/4" – 41 1/2" x 15 3/4"	LC-PG40-FW	FIXED		
Integrity Wood-Ultrex Double Hung – Picture	37 1/2" x 39 3/4" – 61 1/2" x 63 3/4"	LC-PG40-FW	FIXED		
Integrity Wood-Ultrex Glider – OX / XO	35 1/2" x 23 3/4" – 71 1/2" x 59 3/4"	LC-PG30	A2	B4	C2
Integrity Wood-Ultrex Glider – XOX	71 1/2" x 23 3/4" – 95 1/2" x 59 3/4"	LC-PG30	A2	B4	C2
Integrity Wood-Ultrex Polygon	84" x 84"	LC-PG50	A4	B4	C4
Integrity Wood-Ultrex Round Top	3602 DH, 2503 CA	LC-PG50	A4	B4	C4
Integrity Wood-Ultrex Round Top by Marvin	56" x 31" – 76" x 38"	LC-PG50	A4	B2	C4
Integrity Wood-Ultrex Sliding Patio Door	107" x 82"	LC-PG30	A2	B2	
Integrity Wood-Ultrex Inswing Door	71" x 95 1/2"	LC-PG30			
Integrity Wood-Ultrex Inswing Door – High Performance	71" x 95 1/2"	LC-PG50			
Integrity Wood-Ultrex Outswing Door	71" x 96"	LC-PG50	A3		
Integrity Wood-Ultrex Sliding French Door	95" x 82"	LC-PG40		B2	C1
Integrity Wood-Ultrex Insert Double Hung	42" x 84"	LC-PG40-H	A2	B2	C2
	54" x 84"	LC-PG35-H	A2	B2	C2
Integrity Wood-Ultrex Insert Double Hung Transom	62" x 24"	LC-PG40-FW	Fixed	B2	C2
Integrity Wood-Ultrex Insert Double Hung Picture	58" x 80"	LC-PG40-FW	Fixed	B2	C2
	62" x 84"	LC-PG40-FW	Fixed	B2	C2

## PRODUCT DESIGN PRESSURES – WOOD-ULTREX IMPACT ZONE 3

Integrity Wood-Ultrex Window and Door Products – Impact Zone (IZ3)		
Product Type	Frame Size	AAMA/WDMA/CSA 101/I.S.2/A440-08
Integrity Wood-Ultrex Casement – Operable	20" x 31 1/8" – 36" x 71 1/8"	LC-PG +55/ –65
Integrity Wood-Ultrex Casement – Stationary Units	20" x 31 1/8" – 36" x 71 1/8"	LC-PG +55/ –65
Integrity Wood-Ultrex Casement Transom	20" x 15 3/4" – 36" x 15 3/4"	LC-PG +55/ –65
Integrity Wood-Ultrex Casement Picture	36" x 39 1/8" – 72" x 59 1/8"	LC-PG +55/ –65
Integrity Wood-Ultrex Awning – Operable	24" x 27 1/8" – 32" x 27 1/8"	LC-PG +55/ –65
Integrity Wood-Ultrex Awning – Operable	36" x 47 1/8" – 49" x 47 1/8"	LC-PG +55/ –65
Integrity Wood-Ultrex Double Hung – Operable	21 1/2" x 35 3/4" – 41 1/2" x 67 3/4"	LC-PG +55/ –65
Integrity Wood-Ultrex Double Hung – Transom	21 1/2" x 15 3/4" – 41 1/2" x 15 3/4"	LC-PG +55/ –65
Integrity Wood-Ultrex Double Hung – Picture	37 1/2" x 39 3/4" – 61 1/2" x 63 3/4"	LC-PG +55/ –65
Integrity Wood-Ultrex Outswing French Door – O, X	36 5/16" x 95 1/2"	LC-PG +55/ –65
Integrity Wood-Ultrex Outswing French Door – XX	71" x 95 1/2"	LC-PG +55/ –55
Integrity Wood-Ultrex Inswing French Door – O, X	36 5/16" x 95 1/2"	LC-PG +55/ –65
Integrity Wood-Ultrex Inswing French Door – XO/OX, XX	71" x 95 1/2"	LC-PG +55/ –55

## PRODUCT DESIGN PRESSURE RATINGS – ALL ULTREX

Integrity All Ultrex Window and Door Product Values – Standard Product					
Product Type	Max Frame Size	AAMA/WDMA/CSA 101/I.S.2/A440-08	CSA-A440		
			Air	Water	Wind
Integrity All Ultrex Casement	all sizes	LC-PG 40	A3	B2	C2
Integrity All Ultrex Awning	all sizes	LC-PG 40	A3	B2	C2
Integrity All Ultrex Double Hung	17 1/2" x 47 1/2" 23 1/2" x 47 1/2" 29 1/2" x 47 1/2" 31 1/2" x 47 1/2" 35 1/2" x 47 1/2" 41 1/2" x 35 1/2" 47 1/2" x 35 1/2"	LC-PG 50	A3	B2	C1
Integrity All Ultrex Double Hung	17 1/2" x 65 1/2" 23 1/2" x 65 1/2" 29 1/2" x 65 1/2" 31 1/2" x 65 1/2" 35 1/2" x 65 1/2" 41 1/2" x 53 1/2" 47 1/2" x 47 1/2"	LC-PG 40	A3	B2	C1
Integrity All Ultrex Double Hung	41 1/2" x 65 1/2" 47 1/2" x 65 1/2"	LC-PG 30	A3	B2	C1
Integrity All Ultrex Single Hung	17 1/2" x 59 1/2" 23 1/2" x 59 1/2" 29 1/2" x 59 1/2" 31 1/2" x 59 1/2" 35 1/2" x 59 1/2" 41 1/2" x 47 1/2" 47 1/2" x 47 1/2"	LC-PG 50	A3	B2	C1
Integrity All Ultrex Single Hung	17 1/2" x 77 1/2" 23 1/2" x 77 1/2" 29 1/2" x 77 1/2" 31 1/2" x 77 1/2" 35 1/2" x 77 1/2" 41 1/2" x 65 1/2" 47 1/2" x 59 1/2"	LC-PG 40	A3	B2	C1
Integrity All Ultrex Single Hung	41 1/2" x 77 1/2" 47 1/2" x 77 1/2"	LC-PG 30	A3	B2	C1
Integrity All Ultrex Glider – OX/XO	29 1/2" x 59 1/2" 35 1/2" x 59 1/2" 41 1/2" x 59 1/2" 47 1/2" x 59 1/2" 53 1/2" x 59 1/2" 59 1/2" x 41 1/2" 71 1/2" x 41 1/2"	LC-PG 40	A3	B2	C1
Integrity All Ultrex Glider – OX/XO	59 1/2" x 59 1/2" 71 1/2" x 71 1/2"	LC-PG 30	A3	B2	C1
Integrity All Ultrex Glider – XOX	95 1/2" x 59 1/2"	LC-PG 25	A3	B2	C1
Integrity All Ultrex Round Top	all sizes	LC-PG 50	Fixed		
Integrity All Ultrex Sliding Patio Door	all sizes	LC-PG 30	A3	B2	
Integrity All Ultrex Swinging Window Picture	all sizes	LC-PG 40	Fixed	B2	C2
Integrity All Ultrex Swinging Window Transom	all sizes	LC-PG 40	Fixed	B2	C2
Integrity All Ultrex Sliding Window Picture	all sizes	LC-PG 50	Fixed	B2	C2
Integrity All Ultrex Sliding Window Transom	all sizes	LC-PG 50	Fixed	B2	C2
Integrity All Ultrex Direct Glaze Polygon	all sizes	LC-PG 50	A3		



## WDMA PERFORMANCE RATINGS

<b>AAMA/WDMA/CSA 101/I.S. 2/A440-08 Performance Ratings</b>							
<b>Design Pressure – Rating</b>	<b>DP15</b>	<b>DP20</b>	<b>DP25</b>	<b>DP30</b>	<b>DP35</b>	<b>DP40</b>	<b>DP50</b>
Design Pressure (psf)	15	20	25	30	35	40	50
Structural Test Pressure (psf)	22.5	30	37.5	45	52.5	60	75
Water Penetration (psf)	2.86	3.00	3.75	4.50	5.25	6.00	7.50
Air Infiltration @ 1.57 psf (cfm/ft <sup>2</sup> )	< .3	< .3	< .3	< .3	< .3	< .3	< .3
Note: If air infiltration numbers are to be used for energy impact, they should be tested and reported at 1.57 psf.							
<b>Metric Values</b>							
Design Pressure (Pa)	720	960	1200	1400	1680	1920	2394
Structural Test Pressure (Pa)	1080	1440	1800	2160	2520	2880	3591
Water Penetration (Pa)	140	144	180	220	252	290	359
Air Infiltration @ 75 (Pa)	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Note: If air infiltration numbers are to be used for energy impact, they should be tested and reported at 75 Pa.							

## STC/OITC GLASS VALUES – WOOD-ULTREX

Integrity Sound Transmission Class and Outdoor-Indoor Transmission Class Values						
Product Type	Exterior Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>Casement and Awning</b>						
ICA	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)	28	24	
	1/8" (3.1)	5/16" (7.5)	1/4" (6.9) PVB laminate	33	29	
	1/8" (3.9)	1/4" (7)	1/4" (6.9) SGP laminate	30	27	
IAWN	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)	30	24	
	1/8" (3.1)	5/16" (7.5)	1/4" (6.9) PVB laminate	32	28	
	1/8" (3.9)	1/4" (7)	1/4" (6.9) SGP laminate	31	27	
ICAP	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)	28	21	
	1/8" (3.1)	5/16" (7.5)	1/4" (6.9) PVB laminate	32	27	
	1/8" (3.9)	1/4" (7)	1/4" (6.9) SGP laminate	30	27	
<b>Wood-Ultrex Double Hung</b>						
ITDH	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)	1/4" (6.9) PVB laminate	32	28	
ITDHP	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)	1/4" (6.9) PVB laminate	32	27	
	1/8" (3.9)	1/4" (7)	1/4" (6.9) SGP laminate	31	27	
<b>Wood-Ultrex Glider</b>						
ITGL	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>Wood-Ultrex Direct Glaze</b>						
IDG-CA	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	28	23	
	1/8" (3.1)	1/2" (13)	3/16" (4.7)	32	27	
	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	28	23	
	1/8" (3.9)	1/2" (13)	1/4" (6.9) PVB laminate	33	28	
	1/4" (5.7)	13/32" (9.8)	3/8" (10.1) SGP laminate	35	31	
IDG-DH/Door	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	27	22	
	1/8" (3.1)	1/2" (13)	3/16" (4.7)	32	27	
	1/8" (3.9)	1/2" (13)	1/4" (6.9) PVB laminate	34	28	
	1/4" (5.7)	13/32" (9.8)	3/8" (10.1) SGP laminate	34	30	

## STC/OITC GLASS VALUES – WOOD-ULTREX

Integrity Sound Transmission Class and Outdoor-Indoor Transmission Class Values						
Product Type	Exterior Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>Wood-Ultrex Sliding Patio Door</b>						
ISPD	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	26	22	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	28	25	
<b>Wood-Ultrex Sliding French Door</b>						
ISFD	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	
ISFD (OXXO)	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	
ISFD HP	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	29	24	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	30	26	
ISFD IZ3	5/32" (3.9)	5/16" (8.0)	9/32" (6.9) SGP Laminate	31	28	
<b>Wood-Ultrex Inswing French Door</b>						
IIFD	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	
IIFD HP	1/8" (3.1)	17/32" (13.0)	1/8" (3.1)	29	25	
	1/8" (3.1)	15/32" (11.5)	3/16" (4.7)	33	28	
IIFD IZ3	5/32" (3.9)	5/16" (8.0)	9/32" (6.9) SGP Laminate	32	29	
<b>Wood-Ultrex Outswing French Door</b>						
IOFD	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	
<b>Wood-Ultrex Insert Double Hung</b>						
ITIDH	1/8" (3.1)	15/32" (11.5)	1/8" (3.1)	26	23	
	1/8" (3.1)	13/32" (9.8)	3/16" (4.7)	30	27	
ITIDHP	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	



# PRODUCT PERFORMANCE AND INFORMATION

## STC/OITC GLASS VALUES – WOOD-ULTREX

Integrity Insert Casement Family Sound Transmission Class and Outdoor-Indoor Transmission Class Values						
Product Type	Exterior Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>Wood-Ultrex Insert Casement</b>						
IICA	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	
IIAWN	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	
IICAP	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	



# PRODUCT PERFORMANCE AND INFORMATION

## STC/OITC GLASS VALUES – WOOD-ULTREX – TRIPANE

Integrity Sound Transmission Class and Outdoor-Indoor Transmission Class Values								
Product Type	Exterior Glazing	Airspace	Center Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>Trip-pane Casement and Awning</b>								
ICA	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	28	24	
ICAP	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	28	21	
IAWN	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	30	24	
IDG-CA	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	13/32" (9.8)	1/8" (3.1)	28	23	





# PRODUCT PERFORMANCE AND INFORMATION

## STC/OITC GLASS VALUES – ALL ULTREX

Integrity Sound Transmission Class and Outdoor–Indoor Transmission Class Values						
Product Type	Exterior Glazing	Airspace	Interior Glazing	STC	OITC	Additional Information
<b>All Ultrex Casement and Awning</b>						
IFCA	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	
IFSWP	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	
IFAWN	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	
<b>All Ultrex Single Hung and Double Hung</b>						
IFSH	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	
IFDH	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	
IFSLP	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>All Ultrex Glider</b>						
IFGL	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)	28	25	
<b>All Ultrex Sliding Patio Door</b>						
IFSPD	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	25	
<b>Other</b>						
IFDGP	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	
IFRT	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	

**STC/OITC GLASS AVAILABILITY – WOOD-ULTREX CASEMENT and AWNING**

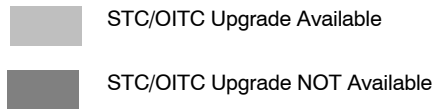
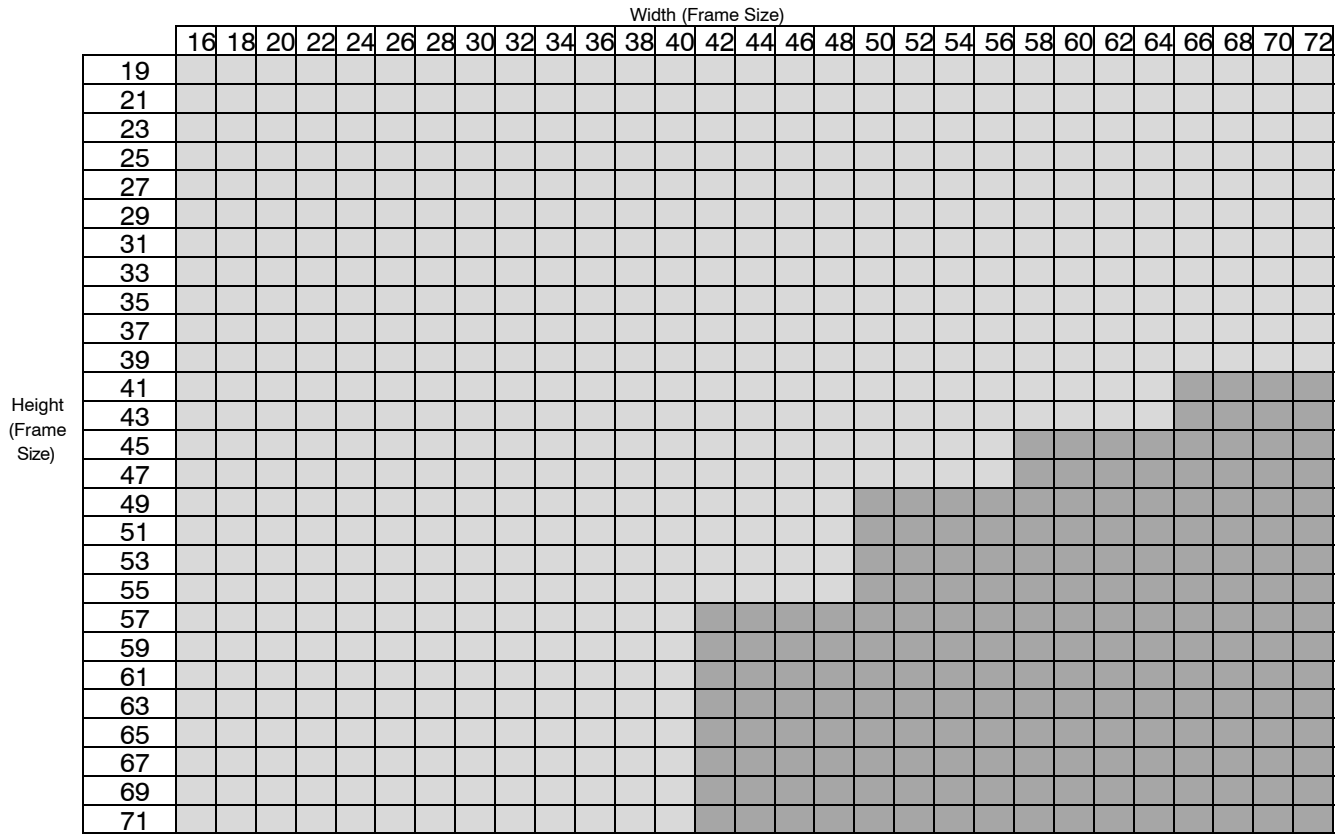
		Width (CN)										
		16	18	20	22	24	26	28	30	32	34	36
ICA	24											
	25											
	27											
	29											
	31											
	33											
	35											
	37											
	39											
	41											
43												
Height (CN)	45											
	47											
	49											
	51											
	53		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

-  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 an Integrity Sales & Support representative.

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

## STC/OITC GLASS AVAILABILITY – WOOD-ULTREX CASEMENT PICTURE



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





## STC/OITC GLASS AVAILABILITY – WOOD-ULTREX CASEMENT PICTURE TRIPANE

		Width (CN)																														
		17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65	67	69	71	73		
Height (CN)	19																															
	21																															
	23																															
	25																															
	27																															
	29																															
	31																															
	33																															
	35																															
	37																															
	39																															
	41																															
	43																															
	45																															
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	51																															
	53																															
	55																															
	57																															
59																																
61																																
63																																
65																																
67																																
69																																
71																																



 Tripane STC/OITC Available

 Tripane STC/OITC NOT Available

**NOTE:** This chart is for reference only. For exact limits of Tripane upgrade refer to OMS or contact an Integrity Sales & Support representative.

**STC/OITC GLASS AVAILABILITY – WOOD-ULTREX DOUBLE HUNG**

		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 an Integrity Sales & Support representative.

STC/OITC GLASS AVAILABILITY – WOOD-ULTREX DOUBLE HUNG PICTURE

		Width (CN)																				
		22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62
Height (CN)	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																						
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 an Integrity Sales & Support representative.

## STC/OITC GLASS AVAILABILITY – WOOD-ULTREX GLIDERS

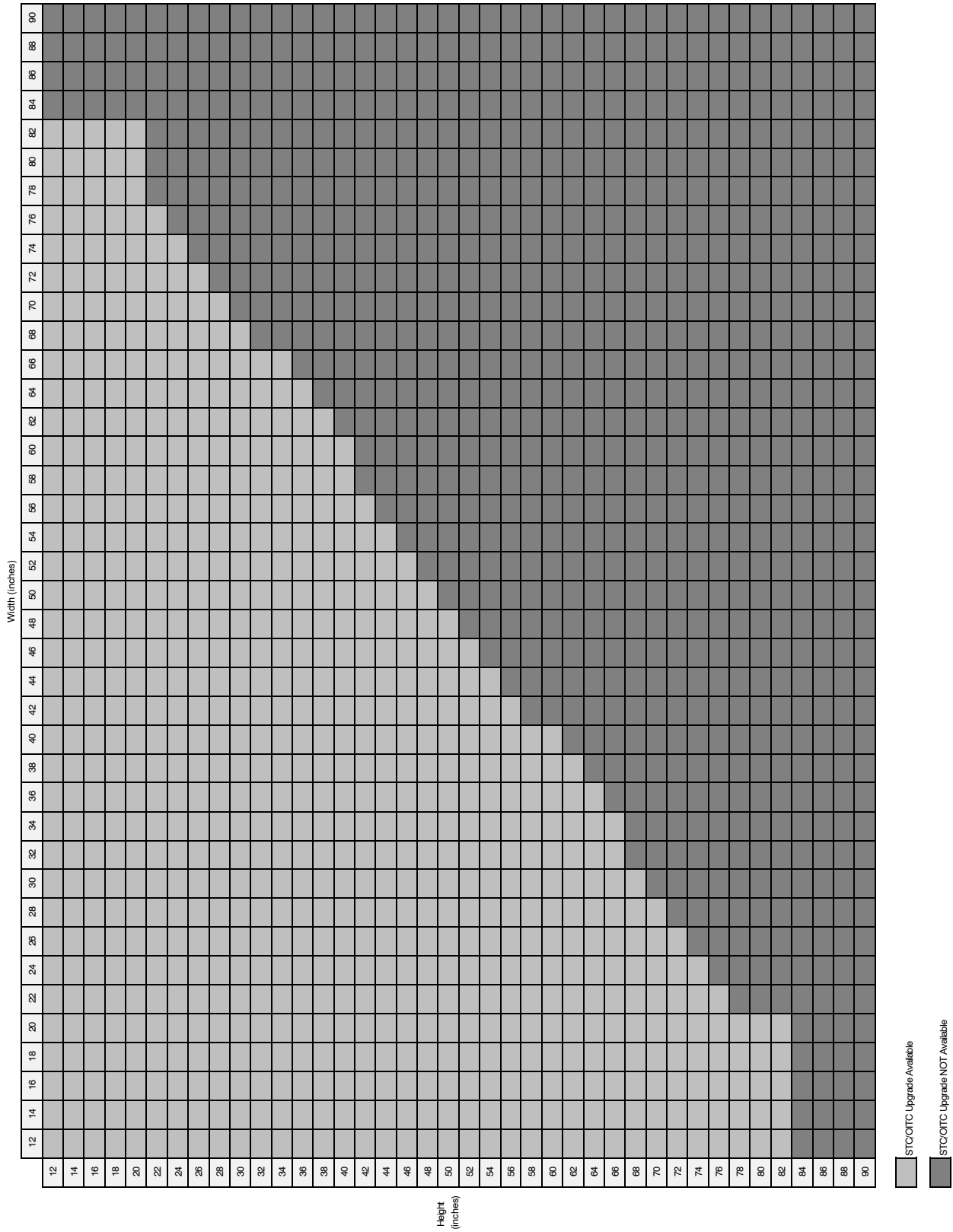
ITGL		Width (CN)																		
		36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72
Height (CN)	24																			
	26																			
	28																			
	30																			
	32																			
	34																			
	36																			
	38																			
	40								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

-  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 an Integrity Sales & Support representative.

ITGLTS		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 GLASS AVAILABILITY – WOOD-ULTREX POLYGON**



## STC/OITC GLASS AVAILABILITY – WOOD-ULTREX SLIDING AND SWINGING DOORS

### ISFD

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

### ISPD

		Width (CN)	
		5-0	6-0
Height (CN)	2-panel		
	6-5		
	6-8		

		Width (CN)
		9-0
Height (CN)	3-panel	
	6-5	
	6-8	
	7-0	
	8-0	

		Width (CN)	
		9-0	
Height (CN)	3-panel		
	6-8		

		Width (CN)		
		10-0	12-0	16-0
Height (CN)	4-panel			
	6-5			
	6-8			
	7-0			
	8-0			

### IOFD

### IIFD

		Width (CN)		
		2-6	2-8	3-0
Height (CN)	1-panel			
	6-5			
	6-8			
	7-0			
	8-0			

		Width (CN)		
		2-6	2-8	3-0
Height (CN)	1-panel			
	6-5			
	6-8			
	7-0			
	8-0			

		Width (CN)		
		5-0	5-4	6-0
Height (CN)	2-panel			
	6-5			
	6-8			
	7-0			
	8-0			

		Width (CN)		
		5-0	5-4	6-0
Height (CN)	2-panel			
	6-5			
	6-8			
	7-0			
	8-0			

 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 an Integrity Sales & Support representative.

## STC/OITC GLASS AVAILABILITY – WOOD-ULTREX INSERT CASEMENT AND AWNING

		IICA										
		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												
71.125												

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

 STC/OITC Upgrade Available


 STC/OITC Upgrade NOT Available

		IIAWN												
		Width (Frame Size)												
		24	26	28	30	32	34	36	38	40	42	44	46	48
Height (Frame Size)	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 GLASS AVAILABILITY – WOOD-ULTREX INSERT CASEMENT PICTURE AND TRANSOM

Height (Frame Size)	IICAP / IICATR 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																																
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37.125																																
39.125																																
41.125																																
43.25																																
45.125																																
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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 an Integrity Sales & Support representative.

## STC/OITC GLASS AVAILABILITY – WOOD-ULTREX INSERT DOUBLE HUNG



		Width (inches) (Frame Size)																		
		18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54
Height (inches) (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



## STC/OITC GLASS AVAILABILITY – WOOD-ULTREX INSERT DOUBLE HUNG PICTURE

		Width (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		
Height (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																									
	74																									
	76																									
	78																									
80																										
82																										
84																										

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

## STC/OITC GLASS AVAILABILITY – ALL ULTREX CASEMENT AND AWNING

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

-  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 an Integrity Sales & Support representative.

		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)	IFAWN																	
	1-6																	
	1-8																	
	1-10																	
	2-0																	
	2-2																	
	2-4																	
	2-6																	
	2-8																	
	2-10																	
	3-0																	

STC/OITC GLASS AVAILABILITY – ALL ULTREX SWINGING WINDOW PICTURE

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

STC/OITC GLASS AVAILABILITY – ALL ULTREX SWINGING WINDOW PICTURE

	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	5-2	5-4	5-6	5-8	5-10	6-0	
1-0																													
1-2																													
1-4																													
1-6																													
1-8																													
1-10																													
2-0																													



Width (CN)

Height (CN)

STC/OITC Upgrade Available  
 STC/OITC Upgrade NOT Available

## STC/OITC GLASS AVAILABILITY – ALL ULTREX SINGLE HUNG AND DOUBLE HUNG

		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 an Integrity Sales & Support representative.

## STC/OITC GLASS AVAILABILITY – ALL ULTREX SLIDING WINDOW PICTURE

		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																								
1-8																								
1-10																								
2-0																								

Height (CN)

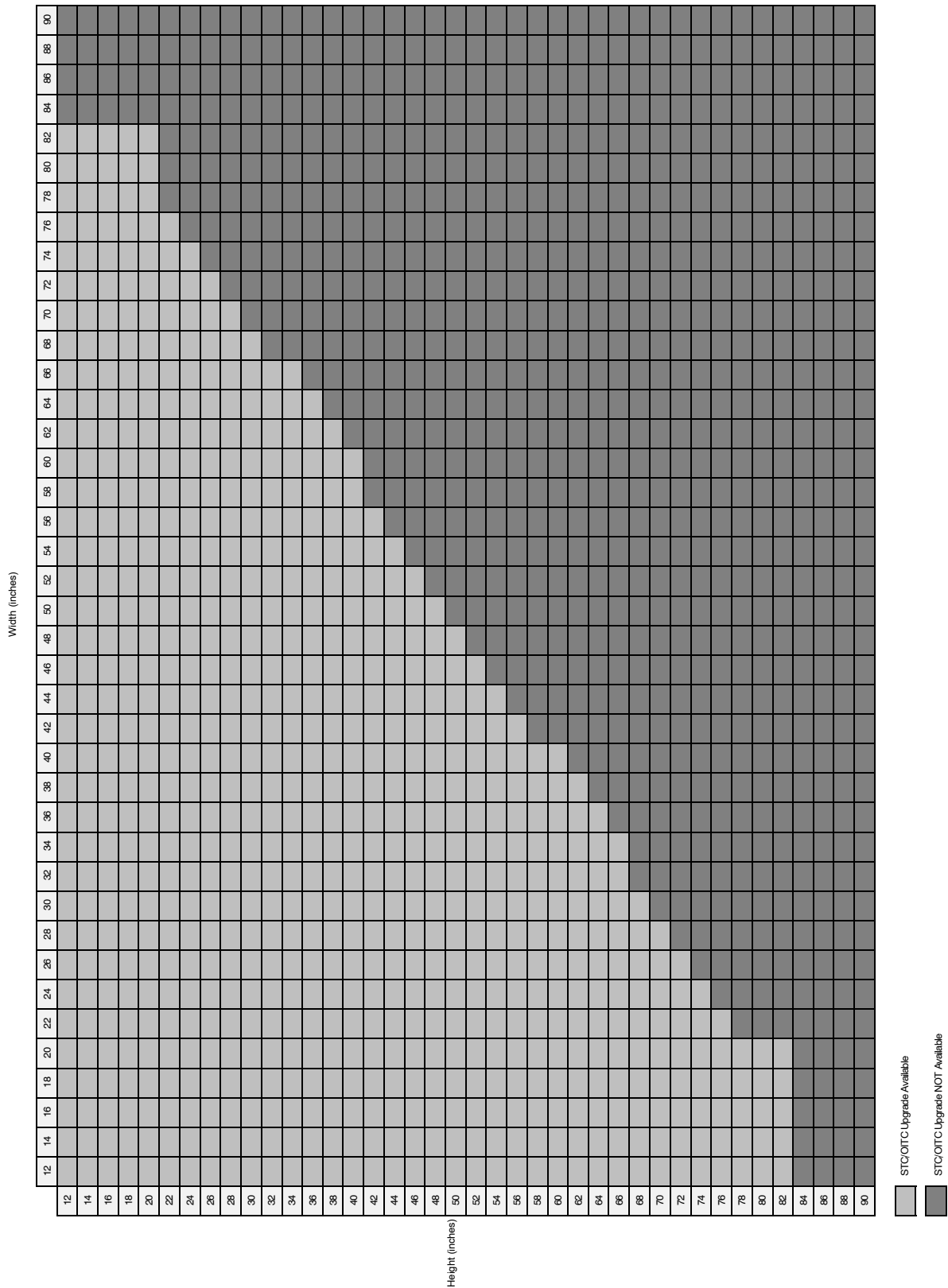
		Width (CN)																						
		1-6	2-0	2-2	2-4	2-6	2-8	2-10	3-0	3-2	3-4	3-6	3-8	3-10	4-0	4-2	4-4	4-6	4-8	4-10	5-0			
2-0																								
2-2																								
2-4																								
2-6																								
2-8																								
2-10																								
3-0																								
3-2																								
3-4																								
3-6																								
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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 an Integrity Sales & Support representative.



**STC/OITC GLASS AVAILABILITY – ALL ULTREX POLYGON**



## STC/OITC GLASS AVAILABILITY – ALL ULTREX GLIDERS

IFGL	Width (CN)																						
	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	
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																							

IFGLTS	Height (CN)	Width (CN)												
		6-0	6-2	6-4	6-6	6-8	6-10	7-0	7-2	7-4	7-6	7-8	7-10	8-0
	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													

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

## STC/OITC GLASS AVAILABILITY – ALL ULTREX SLIDING PATIO DOOR

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2-panel

		Width (CN)	
		5-0	6-0
Height (CN)	6-8		
	6-10		
	8-0		

3-panel

		Width (CN)
		9-0
Height (CN)	6-10	
	8-0	

 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 an Integrity Sales & Support representative.

## GLASS, ULTREX AND CAPILLARY TUBE INFORMATION

INSULATING GLASS PERFORMANCE COMPARISON												
Exterior Glass	Interior Glass	Visible Light			SHGC	SC	Center of Glass U-Factor (Btu/hr/ft <sup>2</sup> /°F)		Comfort		UV Trans 310-380 nm	Tdw ISO/CIE 300-700 nm
		Trans. %	Reflectance				Air	Argon	Indoor Glass Temp (°F)			
			% In	% Out					Winter	Summer		
<b>(3 mm / 13.0 / 3 mm)</b>												
Low E1 (#2)	Clear	79	14	14	0.70	0.80	0.32	0.28	54	96	24%	61%
Low E2 (#2)	Clear	72	11	12	0.41	0.47	0.30	0.25	56	84	16%	55%
Low E3 (#2)	Clear	65	11	12	0.27	0.31	0.29	0.24	56	83	5%	43%
<b>(6 mm / 13.0 / 6 mm)</b>												
Low E1 (#2)	Clear	77	13	14	0.65	0.75	0.32	0.27	55	100	21%	58%
Low E2 (#2)	Clear	70	11	11	0.40	0.45	0.29	0.25	56	87	14%	53%
Low E3 (#2)	Clear	63	11	11	0.27	0.31	0.29	0.24	56	85	4%	41%

Glass U & R values are calculated according to ASHREA's Handbook of Fundamentals and refer to center of glass only. Due to spacer edge and glazing condition – total glass values vary with size and glazing.

### ULTREX CLADDING CHARACTERISTICS

Integrity's 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 saltwater. 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 of 3,000 feet or more above sea level. Integrity 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

#### 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 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 Integrity windows and doors, 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.

## GENERAL PAINTING AND STAINING INSTRUCTIONS, WOOD PRESERVATIVE INFORMATION

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### 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: weatherstripping 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 Integrity products. Painters naphtha is recommended for removing excessive paint or stain.

The exterior surfaces of Integrity 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 of exposure to moisture by sanding lightly with 220 or 320 grit sandpaper and clean before applying your choice of 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 INTEGRITY FACTORY PREFINISH WITHOUT FIRST CONTACTING YOUR INTEGRITY 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, thus will not have cumulative harmful effects on the environment. It is not a restricted product.

The preservative complies with WDMA Standards I.S. 4-81 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

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<b>BAY</b> = Bay	<b>ITGL</b> = Integrity Wood–Ultrex Glider
<b>BOW</b> = Bow	<b>ITGLTS</b> = Integrity Wood–Ultrex Glider Triple Sash
<b>C</b> = Cottages Style	<b>IZ3</b> = A geographical location with potential wind–speeds of 10 mph and up to 140 mph, 120 mph and up to 140 mph and within 1–mile of the mean high tide line.
<b>CA</b> = Casement	<b>L</b> = Left Handed
<b>DH</b> = Double Hung	<b>MO</b> = Masonry Opening
<b>FS</b> = Frame Size	<b>MM</b> = Millimeters
<b>GBG</b> = Grille between glass	<b>N/A</b> = Not Available
<b>IAWN</b> = Integrity Awning	<b>O</b> = Stationary
<b>ICA</b> = Integrity Casement	<b>OM</b> = Outside measurement
<b>GL</b> = Glider	<b>POLY</b> = Polygon
<b>ICADG</b> = Integrity Casement Direct Glaze	<b>R</b> = Right Handed
<b>ICAP</b> = Integrity Casement / Awning Picture	<b>RECT</b> = Rectangle
<b>ICATR</b> = Integrity Casement / Awning Transom	<b>RO</b> = Rough Opening
<b>IDG</b> = Direct Glaze Polygon	<b>SDL</b> = Simulated Divided Lites
<b>IFAWN</b> = Integrity All Ultrex Awning	<b>Sq. Ft</b> = Square Feet
<b>IFCA</b> = Integrity All Ultrex Casement	<b>X</b> = Operating
<b>IFDGP</b> = Integrity All Ultrex Polygon	<b>2W</b> = 2 Units Wide
<b>IFDH</b> = Integrity All Ultrex Double Hung	<b>3W</b> = 3 Units Wide
<b>IFGL</b> = Integrity All Ultrex Glider	<b>4W</b> = 4 Units Wide
<b>IFGLTS</b> = Integrity All Ultrex Glider Triple Sash	
<b>IFRT</b> = Integrity All Ultrex Series Round Top	
<b>IFSH</b> = Integrity All Ultrex Single Hung	
<b>IFSLP</b> = Integrity All Ultrex Sliding Window Picture	
<b>IFSLT</b> = Integrity All Ultrex Sliding Window Transom	
<b>IFSPD</b> = Integrity All Ultrex Sliding Patio Door	
<b>IFSPDDG</b> = Integrity All Ultrex Sliding Patio Door Direct Glaze Transom	
<b>IFSWP</b> = Integrity All Ultrex Swinging Window Picture	
<b>IIFD</b> = Integrity Inswing French Door	
<b>IIFDDG</b> = Integrity Inswing French Door Direct Glaze	
<b>IOFD</b> = Integrity Outswing French Door	
<b>IOFDDG</b> = Integrity Outswing French Door Direct Glaze	
<b>IQCIR</b> = Integrity Quarter Circle	
<b>IRT</b> = Integrity Round Top	
<b>IRTM</b> = Integrity Round Top by Marvin	
<b>ISFD</b> = Integrity Sliding French Door	
<b>ISFDG</b> = Integrity Sliding French Door Transom	
<b>ISPD</b> = Integrity Sliding Patio Door	
<b>ISPDDG</b> = Integrity Sliding Patio Door Direct Glaze	
<b>ITIDH</b> = Integrity Wood–Ultrex Insert Double Hung	
<b>ITIDHP</b> = Integrity Wood–Ultrex Insert Double Hung Picture	
<b>ITIDHT</b> = Integrity Wood–Ultrex Insert Double Hung Transom	
<b>ITDH</b> = Integrity Wood–Ultrex Double Hung	
<b>ITDHP</b> = Integrity Wood–Ultrex Double Hung Picture	
<b>ITDHT</b> = Integrity Wood–Ultrex Double Hung Transom	

## GLOSSARY OF TERMS

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

**AAMA** – American Architectural Manufacturers Association. A national trade association that establishes voluntary standards for the window, and door industry.

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

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

**ASSEMBLY** – Single units muller 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 and doors, designed to permit the passage of air, light, and people.

**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.

**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.

**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.



## GLOSSARY OF TERMS

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**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 if 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 Integrity 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

**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 4”12 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.

**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.

## GLOSSARY OF TERMS

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**SNUBBER** – An interlocking metal bracket attached at the center of the hinge side of a Casemaster sash and frame with a call number height of 40" (1016) or more and both sides of an Awning sash and frame with a call number height of 48" (1219) or more. It pulls the sash tightly against the frame weatherstrip to maximize performance.

**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. This superior material is now being used in many Marvin products.

**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.