



This document contains the latest information for the new Casement product design.  
To see the previous design of the Casement, follow this [link](#).

## Size and Performance

## Glazing performance

## Grille Profiles and Patterns

## Size Tables

## Design Data

## Detailed Product Description

## Cross Sections

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The information published in this document is believed to be accurate at the time of publication. However, because we are constantly working to improve our products, specifications are subject to change without notice. Consult your local Pella representative for up-to-date product information.



# Impervia® Casement Windows

## Size and Performance Data

Sizes	
Standard Vent/Fixed	●
Standard Fixed Companion Sizes	●
Transom Sizes	●
Egress Sizes	●
Special Sizes	●
Performance <sup>1</sup>	
Meets or Exceeds AAMA/WDMA Ratings	C-LC45 - LC +50/-60 Hallmark Certified
Air Infiltration (cfm/ft <sup>2</sup> of frame @ 1.57 psf wind pressure)	0.05
Water Resistance	6.75 - 7.5 psf
Design Pressure	45 - 50 psf
Other Performance Criteria	
Forced Entry Resistance Level (Minimum Security Grade) <sup>2</sup>	40
Roto-Operator Maximum Operating Force (lb) Initiate Motion/Maintain Motion	15/6
Easy-Slide Operator Maximum Operating Force (lb) Initiate Motion/Maintain Motion	10/7

Sound Transmission Class and Outdoor-Indoor Transmission Class							
Product	Frame Size Tested <sup>3</sup>	Glazing System				STC Rating	OITC Rating
		Overall Glazing Thickness	Exterior Glass Thickness	Middle Glass Thickness	Interior Glass Thickness		
VENT	23-1/2" x 59"	11/16"	3mm	–	3mm	28	25
	23-1/2" x 59"	11/16"	4mm	–	4mm	31	26
	23-1/2" x 59"	1"	3mm	3mm	3mm	29	24
	23-1/2" x 59"	1"	4mm	–	6mm	34	28
	23-1/2" x 59"	1"	5mm	–	3mm	34	28
	23-1/2" x 59"	1"	5mm	–	5mm	30	24
	23-1/2" x 59"	1"	6mm	–	6mm	32	26
	23-1/2" x 59"	1"	4mm	–	7mm Laminated	36	29
	23-1/2" x 59"	1"	5mm	–	10mm Laminated	37	32
FIXED	47" x 59"	11/16"	3mm	–	3mm	28	24
	47" x 59"	11/16"	4mm	–	4mm	29	25
	47" x 59"	1"	3mm	3mm	3mm	29	24
	47" x 59"	1"	4mm	4mm	4mm	30	26
	47" x 59"	1"	4mm	–	6mm	33	28
	47" x 59"	1"	5mm	–	3mm	32	27
	47" x 59"	1"	5mm	–	5mm	30	25
	47" x 59"	1"	6mm	–	6mm	30	24
	47" x 59"	1"	4mm	–	7mm Laminated	34	29
	47" x 59"	1"	5mm	–	10mm Laminated	36	31

(1) See Design Data pages in this section for specific product performance class and grade values.

(2) The higher the level, the greater the product's ability to resist forced entry.

(3) ASTM E 1425 defines standard sizes for acoustical testing. Ratings achieved at that size are representative of all sizes of the same configuration.



# Impervia® Casement Windows

## Features and Options

	Block Frame	Integral Nailing Fin
<b>Glazing</b>		
<b>Glazing Type</b>		
Dual-pane Insulating Glass	S	S
Triple-pane Insulating Glass	O	O
<b>Insulated Glass Options / Low-E Types</b>		
Clear Insulating Glass (no Low-E coating)	S	S
Advanced Low-E Insulating Glass	O	O
SunDefense™ Low-E Insulating Glass	O	O
AdvancedComfort Low-E Insulating Glass	O	O
NaturalSun Low-E Insulating Glass	O	O
<b>Additional Glass Options</b>		
Annealed Glass	S	S
Tempered Glass	O	O
Noise reduction glass (5/3mm, 4/6mm combinations)	O	O
Noise Reduction laminated glass (non-impact)	O	O
Tinted glass (Bronze, Gray, Green) Advanced Low-E	O	O
Obscure Glass <sub>1</sub>	O	O
<b>Gas Fill / High Altitude</b>		
Argon	S	S
High Altitude	O	O
High Altitude with argon	O	O
<b>Exterior / Interior</b>		
Powder-Coat White	S	S
Powder-Coat Tan, Brown, Black, or Morning Sky Gray	O	O
Powder-Coat Dual-color (All exterior colors available with White interior)	O	–
<b>Hardware</b>		
Match interior finish	S	S
White, Tan Brown, Black, Morning Sky Gray, Satin Nickel <sub>2</sub>	O	O
<b>Operator</b>		
Easy-Slide Operator	S	S
Fold Away Crank	O	O
<b>Sash Locks</b>		
SureLock® System	S	S
Unison Lock System <sub>3</sub>	S	S
<b>Screens</b>		
Conventional Black Fiberglass	O	O
InView™ screen	O	O
<b>Grilles</b>		
<b>Grilles-Between-the-Glass</b>		
Traditional, Prairie, Top Row and Custom - Equally Divided	O	O

S = Standard; O = Optional; (–) = Not available

(1) Contact your local Pella sales representative for current offering.

(2) Satin Nickel is not available for Easy-Slide operator.

(3) Unit size determines availability.



# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>	
										Zone				ER	Zone
Vent										N	NC	SC	S	CA	
11/16"	Clear IG	PEL-N-277-00225-00001	3	3	air	0.44	0.55	0.58	44						
	with grilles-between-the-glass	PEL-N-277-00226-00001				0.45	0.50	0.52	44						
11/16"	Clear IG	PEL-N-277-00229-00001	4	4	air	0.45	0.53	0.57	43						
	with grilles-between-the-glass	PEL-N-277-00230-00001				0.46	0.49	0.52	43						
1"	Clear IG	PEL-N-277-00001-00001	5	5	air	0.43	0.53	0.57	44						
	with grilles-between-the-glass	PEL-N-277-00002-00001				0.43	0.48	0.51	44						
1"	Clear IG	PEL-N-277-00005-00001	6	6	air	0.43	0.51	0.56	44						
	with grilles-between-the-glass	PEL-N-277-00006-00001				0.43	0.46	0.50	44						
11/16"	Advanced Low-E IG	PEL-N-277-00235-00001	3	3	argon	0.28	0.26	0.49	60		NC				
	with grilles-between-the-glass	PEL-N-277-00236-00001				0.29	0.24	0.44	60		NC	SC	S		
11/16"	Advanced Low-E IG	PEL-N-277-00239-00001	4	4	argon	0.30	0.26	0.48	58		NC				
	with grilles-between-the-glass	PEL-N-277-00240-00001				0.31	0.24	0.44	58				S		
1"	Advanced Low-E IG	PEL-N-277-00019-00001	5	5	argon	0.28	0.26	0.48	59		NC				
	with grilles-between-the-glass	PEL-N-277-00020-00001				0.28	0.24	0.43	59		NC	SC	S		
1"	Advanced Low-E IG	PEL-N-277-00023-00001	6	6	argon	0.28	0.25	0.47	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00024-00001				0.28	0.23	0.43	58		NC	SC	S		
11/16"	SunDefense™ IG	PEL-N-277-00243-00001	3	3	argon	0.28	0.20	0.45	60		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00244-00001				0.29	0.18	0.41	60		NC	SC	S		
11/16"	SunDefense™ IG	PEL-N-277-00247-00001	4	4	argon	0.29	0.20	0.45	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00248-00001				0.30	0.18	0.41	58		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00059-00001	5	5	argon	0.28	0.20	0.44	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00060-00001				0.28	0.18	0.40	59		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00063-00001	6	6	argon	0.28	0.20	0.44	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00064-00001				0.28	0.18	0.40	59		NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00259-00001	3	3	argon	0.25	0.26	0.48	47	N	NC				
	with grilles-between-the-glass	PEL-N-277-00260-00001				0.26	0.24	0.43	47	N	NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00263-00001	4	4	argon	0.26	0.26	0.47	45	N	NC				
	with grilles-between-the-glass	PEL-N-277-00264-00001				0.27	0.23	0.43	45	N	NC	SC	S		
1"	AdvancedComfort Low-E IG	PEL-N-277-00091-00001	5	5	argon	0.25	0.25	0.47	47	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00092-00001				0.25	0.23	0.42	47	N	NC	SC	S		
1"	AdvancedComfort Low-E IG	PEL-N-277-00095-00001	6	6	argon	0.25	0.25	0.46	46	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00096-00001				0.25	0.23	0.42	46	N	NC	SC	S		
11/16"	NaturalSun Low-E IG	PEL-N-277-00251-00001	3	3	argon	0.29	0.48	0.55	59	N					
	with grilles-between-the-glass	PEL-N-277-00252-00001				0.30	0.44	0.50	59	N					
11/16"	NaturalSun Low-E IG	PEL-N-277-00255-00001	4	4	argon	0.30	0.47	0.55	57	N					
	with grilles-between-the-glass	PEL-N-277-00256-00001				0.32	0.43	0.50	57						
1"	NaturalSun Low-E IG	PEL-N-277-00075-00001	5	5	argon	0.29	0.47	0.54	58	N					
	with grilles-between-the-glass	PEL-N-277-00076-00001				0.29	0.43	0.49	58	N					
1"	NaturalSun Low-E IG	PEL-N-277-00079-00001	6	6	argon	0.29	0.45	0.54	58	N					
	with grilles-between-the-glass	PEL-N-277-00080-00001				0.29	0.41	0.49	58	N					

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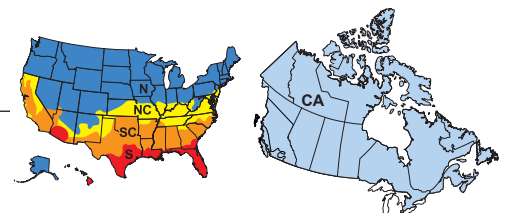
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ENERGY STAR® values are updated to 2016 (Version 6) criteria.

(2) The values shown are based on Canada's updated ENERGY STAR® 2020 initiative.

For center-glass values, see the Product Performance section.

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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>	
										Zone				ER	Zone
Vent – with Foam Insulation										N	NC	SC	S	CA	
11/16"	Advanced Low-E IG	PEL-N-277-00567-00001	3	3	argon	0.27	0.26	0.49	60	N	NC			21	
	with grilles-between-the-glass	PEL-N-277-00568-00001				0.28	0.24	0.44	60		NC	SC	S	18	
11/16"	Advanced Low-E IG	PEL-N-277-00571-00001	4	4	argon	0.29	0.26	0.48	58		NC			18	
	with grilles-between-the-glass	PEL-N-277-00572-00001				0.30	0.24	0.44	58		NC	SC	S	16	
1"	Advanced Low-E IG	PEL-N-277-00351-00001	5	5	argon	0.27	0.26	0.48	59	N	NC			21	
	with grilles-between-the-glass	PEL-N-277-00352-00001				0.27	0.24	0.43	59	N	NC	SC	S	19	
1"	Advanced Low-E IG	PEL-N-277-00355-00001	6	6	argon	0.27	0.25	0.47	58	N	NC	SC	S	20	
	with grilles-between-the-glass	PEL-N-277-00356-00001				0.27	0.23	0.43	58	N	NC	SC	S	19	
11/16"	SunDefense IG	PEL-N-277-00575-00001	3	3	argon	0.27	0.20	0.45	61	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00576-00001				0.28	0.18	0.41	61		NC	SC	S	15	
11/16"	SunDefense IG	PEL-N-277-00579-00001	4	4	argon	0.28	0.20	0.45	58		NC	SC	S	16	
	with grilles-between-the-glass	PEL-N-277-00580-00001				0.29	0.18	0.41	58		NC	SC	S	13	
1"	SunDefense IG	PEL-N-277-00391-00001	5	5	argon	0.27	0.20	0.44	59	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00392-00001				0.27	0.18	0.40	59	N	NC	SC	S	16	
1"	SunDefense IG	PEL-N-277-00395-00001	6	6	argon	0.27	0.20	0.44	59	N	NC	SC	S	17	
	with grilles-between-the-glass	PEL-N-277-00396-00001				0.27	0.18	0.40	59	N	NC	SC	S	16	
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00591-00001	3	3	argon	0.24	0.26	0.48	48	N	NC			24	
	with grilles-between-the-glass	PEL-N-277-00592-00001				0.25	0.24	0.43	48	N	NC	SC	S	22	
11/16"	AdvancedComfort Low-E IG	PEL-N-277-00595-00001	4	4	argon	0.25	0.26	0.47	45	N	NC			23	
	with grilles-between-the-glass	PEL-N-277-00596-00001				0.26	0.23	0.43	45	N	NC	SC	S	20	
1"	AdvancedComfort Low-E IG	PEL-N-277-00423-00001	5	5	argon	0.24	0.25	0.47	47	N	NC	SC	S	24	
	with grilles-between-the-glass	PEL-N-277-00424-00001				0.24	0.23	0.42	47	N	NC	SC	S	23	
1"	AdvancedComfort Low-E IG	PEL-N-277-00427-00001	6	6	argon	0.24	0.25	0.46	46	N	NC	SC	S	24	
	with grilles-between-the-glass	PEL-N-277-00428-00001				0.24	0.23	0.42	46	N	NC	SC	S	23	
11/16"	NaturalSun Low-E IG	PEL-N-277-00583-00001	3	3	argon	0.28	0.48	0.55	59	N				32	
	with grilles-between-the-glass	PEL-N-277-00584-00001				0.29	0.44	0.50	59	N				28	
11/16"	NaturalSun Low-E IG	PEL-N-277-00587-00001	4	4	argon	0.29	0.47	0.55	57	N				30	
	with grilles-between-the-glass	PEL-N-277-00588-00001				0.30	0.43	0.50	57	N				27	
1"	NaturalSun Low-E IG	PEL-N-277-00407-00001	5	5	argon	0.28	0.47	0.54	58	N				31	
	with grilles-between-the-glass	PEL-N-277-00408-00001				0.28	0.43	0.49	58	N				29	
1"	NaturalSun Low-E IG	PEL-N-277-00411-00001	6	6	argon	0.28	0.45	0.54	58	N				30	
	with grilles-between-the-glass	PEL-N-277-00412-00001				0.28	0.41	0.49	58	N				28	

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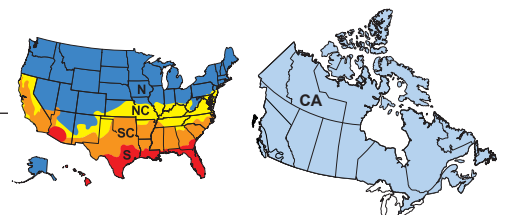
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# Impervia® Casement Windows

## Glazing Performance - Total Unit

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			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada <sup>2</sup>				
										Zone		ER	Zone			
Vent - High Altitude Glazing										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00233-00001	3	3	air	0.32	0.27	0.49	56							
	with grilles-between-the-glass	PEL-N-277-00234-00001				0.33	0.24	0.44	56				S			
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00237-00001	4	4	air	0.34	0.27	0.48	53							
	with grilles-between-the-glass	PEL-N-277-00238-00001				0.35	0.24	0.44	53				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00017-00001	5	5	air	0.32	0.26	0.48	56							
	with grilles-between-the-glass	PEL-N-277-00018-00001				0.32	0.24	0.43	56				S			
1"	(HA) Advanced Low-E IG	PEL-N-277-00021-00001	6	6	air	0.31	0.26	0.47	55							
	with grilles-between-the-glass	PEL-N-277-00022-00001				0.31	0.24	0.43	55				S			
11/16"	(HA) SunDefense IG	PEL-N-277-00241-00001	3	3	air	0.32	0.20	0.45	56							
	with grilles-between-the-glass	PEL-N-277-00242-00001				0.33	0.18	0.41	56				S			
11/16"	(HA) SunDefense IG	PEL-N-277-00245-00001	4	4	air	0.33	0.20	0.45	54							
	with grilles-between-the-glass	PEL-N-277-00246-00001				0.35	0.19	0.41	54				S			
1"	(HA) SunDefense IG	PEL-N-277-00057-00001	5	5	air	0.31	0.20	0.44	56							
	with grilles-between-the-glass	PEL-N-277-00058-00001				0.31	0.18	0.40	56				S			
1"	(HA) SunDefense IG	PEL-N-277-00061-00001	6	6	air	0.31	0.20	0.44	55							
	with grilles-between-the-glass	PEL-N-277-00062-00001				0.31	0.18	0.40	55				S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00257-00001	3	3	air	0.28	0.26	0.48	43		C					
	with grilles-between-the-glass	PEL-N-277-00258-00001				0.28	0.24	0.43	44		C	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00261-00001	4	4	air	0.29	0.26	0.47	41		C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00262-00001				0.30	0.24	0.43	41		C	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00089-00001	5	5	air	0.27	0.25	0.47	44	N	C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00090-00001				0.27	0.23	0.42	44	N	C	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00093-00001	6	6	air	0.27	0.25	0.46	43	N	C	SC	S			
	with grilles-between-the-glass	PEL-N-277-00094-00001				0.27	0.23	0.42	43	N	C	SC	S			
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00249-00001	3	3	air	0.33	0.48	0.55	55							
	with grilles-between-the-glass	PEL-N-277-00250-00001				0.33	0.44	0.50	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00253-00001	4	4	air	0.34	0.47	0.55	53							
	with grilles-between-the-glass	PEL-N-277-00254-00001				0.36	0.43	0.50	53							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00073-00001	5	5	air	0.32	0.47	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00074-00001				0.32	0.42	0.49	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00077-00001	6	6	air	0.32	0.45	0.54	54							
	with grilles-between-the-glass	PEL-N-277-00078-00001				0.32	0.41	0.49	54							

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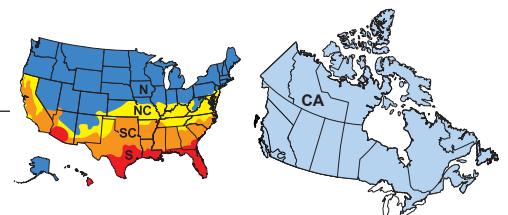
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										Zone				ER	Zone	
Vent – High Altitude Glazing with Foam Insulation										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00565-00001	3	3	air	0.31	0.27	0.49	56							
	with grilles-between-the-glass	PEL-N-277-00566-00001				0.32	0.24	0.44	56					S		
11/16"	(HA) Advanced Low-E IG	PEL-N-277-00569-00001	4	4	air	0.33	0.27	0.48	54							
	with grilles-between-the-glass	PEL-N-277-00570-00001				0.34	0.24	0.44	54					S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00349-00001	5	5	air	0.31	0.26	0.48	56							
	with grilles-between-the-glass	PEL-N-277-00350-00001				0.31	0.24	0.43	56					S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00353-00001	6	6	air	0.30	0.26	0.47	55		NC					
	with grilles-between-the-glass	PEL-N-277-00354-00001				0.30	0.24	0.43	55		NC	SC	S			
11/16"	(HA) SunDefense IG	PEL-N-277-00573-00001	3	3	air	0.31	0.20	0.45	57						S	
	with grilles-between-the-glass	PEL-N-277-00574-00001				0.32	0.18	0.41	57						S	
11/16"	(HA) SunDefense IG	PEL-N-277-00577-00001	4	4	air	0.32	0.20	0.45	54						S	
	with grilles-between-the-glass	PEL-N-277-00578-00001				0.34	0.19	0.41	54						S	
1"	(HA) SunDefense IG	PEL-N-277-00389-00001	5	5	air	0.30	0.20	0.44	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00390-00001				0.30	0.18	0.40	56		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-277-00393-00001	6	6	air	0.30	0.20	0.44	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00394-00001				0.30	0.18	0.40	56		NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00589-00001	3	3	air	0.27	0.26	0.48	44	N	NC					
	with grilles-between-the-glass	PEL-N-277-00590-00001				0.27	0.24	0.43	44	N	NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00593-00001	4	4	air	0.28	0.26	0.47	41		NC					
	with grilles-between-the-glass	PEL-N-277-00594-00001				0.29	0.24	0.43	41		NC	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00421-00001	5	5	air	0.26	0.25	0.47	44	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00422-00001				0.26	0.23	0.42	44	N	NC	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00425-00001	6	6	air	0.26	0.25	0.46	44	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00426-00001				0.26	0.23	0.42	44	N	NC	SC	S			
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00581-00001	3	3	air	0.32	0.48	0.55	55							
	with grilles-between-the-glass	PEL-N-277-00582-00001				0.32	0.44	0.50	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-277-00585-00001	4	4	air	0.33	0.47	0.55	53							
	with grilles-between-the-glass	PEL-N-277-00586-00001				0.35	0.43	0.50	53							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00405-00001	5	5	air	0.31	0.47	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00406-00001				0.31	0.42	0.49	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00409-00001	6	6	air	0.31	0.45	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00410-00001				0.31	0.41	0.49	55							

R-Value = 1/U-Factor  
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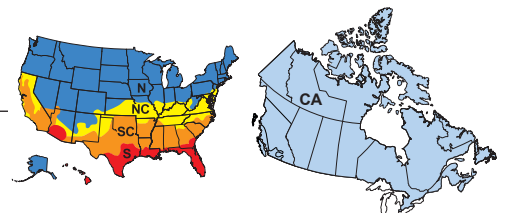
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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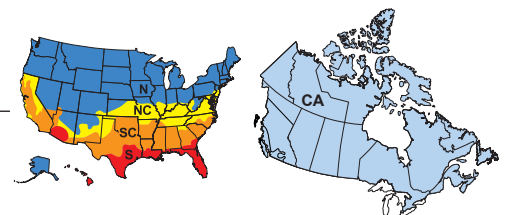
# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>
										Zone				ER
<b>Vent - 5 mm/3 mm Glass</b>										<b>N</b>	<b>NC</b>	<b>SC</b>	<b>S</b>	<b>CA</b>
1"	Clear IG	PEL-N-277-00009-00001	5	3	air	0.43	0.53	0.57	45					
	with grilles-between-the-glass	PEL-N-277-00010-00001				0.43	0.48	0.52	45					
1"	Advanced Low-E IG	PEL-N-277-00051-00001	5	3	argon	0.29	0.26	0.48	60		NC			
	with grilles-between-the-glass	PEL-N-277-00052-00001				0.29	0.24	0.44	60		NC	SC	S	
1"	SunDefense™ IG	PEL-N-277-00067-00001	5	3	argon	0.28	0.20	0.45	60		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00068-00001				0.28	0.18	0.41	60		NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00099-00001	5	3	argon	0.25	0.25	0.47	48	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00100-00001				0.25	0.23	0.43	48	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00083-00001	5	3	argon	0.29	0.47	0.55	59	N				
	with grilles-between-the-glass	PEL-N-277-00084-00001				0.29	0.43	0.50	59	N				
<b>Vent - 5 mm/3 mm Glass with Foam Insulation</b>											NC			
1"	Advanced Low-E IG	PEL-N-277-00383-00001	5	3	argon	0.28	0.26	0.48	60		NC			
	with grilles-between-the-glass	PEL-N-277-00384-00001				0.28	0.24	0.44	60		NC	SC	S	
1"	SunDefense IG	PEL-N-277-00399-00001	5	3	argon	0.27	0.20	0.45	61	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00400-00001				0.27	0.18	0.41	61	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-277-00431-00001	5	3	argon	0.24	0.25	0.47	48	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00432-00001				0.24	0.23	0.43	48	N	NC	SC	S	
1"	NaturalSun Low-E IG	PEL-N-277-00415-00001	5	3	argon	0.28	0.47	0.55	60	N				
	with grilles-between-the-glass	PEL-N-277-00416-00001				0.28	0.43	0.50	60	N				
<b>Vent - 5 mm/3 mm Glass High Altitude Glazing</b>														
1"	(HA) Advanced Low-E IG	PEL-N-277-00049-00001	5	3	air	0.32	0.26	0.48	57					
	with grilles-between-the-glass	PEL-N-277-00050-00001				0.32	0.24	0.44	57				S	
1"	(HA) SunDefense IG	PEL-N-277-00065-00001	5	3	air	0.31	0.20	0.45	57				S	
	with grilles-between-the-glass	PEL-N-277-00066-00001				0.31	0.18	0.41	57				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00097-00001	5	3	air	0.27	0.25	0.47	45	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00098-00001				0.27	0.23	0.43	45	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00081-00001	5	3	air	0.32	0.47	0.55	56					
	with grilles-between-the-glass	PEL-N-277-00082-00001				0.32	0.43	0.50	56					
<b>Vent - 5 mm/3 mm Glass High Altitude Glazing - with Foam Insulation</b>														
1"	(HA) Advanced Low-E IG	PEL-N-277-00381-00001	5	3	air	0.31	0.26	0.48	57					
	with grilles-between-the-glass	PEL-N-277-00382-00001				0.31	0.24	0.44	57				S	
1"	(HA) SunDefense IG	PEL-N-277-00397-00001	5	3	air	0.30	0.20	0.45	57		NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00398-00001				0.30	0.18	0.41	57		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00429-00001	5	3	air	0.26	0.25	0.47	45	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-277-00430-00001				0.26	0.23	0.43	45	N	NC	SC	S	
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00413-00001	5	3	air	0.31	0.47	0.55	56					
	with grilles-between-the-glass	PEL-N-277-00414-00001				0.31	0.43	0.50	56					

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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.						
										Zone				Canada <sup>2</sup>		
										N	NC	SC	S	CA		
<b>Vent - 4 mm/6 mm Glass</b>																
1"	Clear IG	PEL-N-277-00013-00001	4	6	air	0.43	0.53	0.56	44							
	with grilles-between-the-glass	PEL-N-277-00014-00001				0.43	0.48	0.51	44							
1"	Advanced Low-E IG	PEL-N-277-00055-00001	4	6	argon	0.28	0.26	0.48	58		NC					
	with grilles-between-the-glass	PEL-N-277-00056-00001				0.28	0.24	0.43	58		NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00071-00001	4	6	argon	0.28	0.20	0.44	59		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00072-00001				0.28	0.18	0.40	59		NC	SC	S			
1"	AdvancedComfort Low-E IG	PEL-N-277-00103-00001	4	6	argon	0.25	0.25	0.47	47	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00104-00001				0.25	0.23	0.42	47	N	NC	SC	S			
1"	NaturalSun Low-E IG	PEL-N-277-00087-00001	4	6	argon	0.29	0.47	0.54	58	N						
	with grilles-between-the-glass	PEL-N-277-00088-00001				0.29	0.43	0.49	58	N						
<b>Vent - 4 mm/6 mm Glass with Foam Insulation</b>																
1"	Advanced Low-E IG	PEL-N-277-00387-00001	4	6	argon	0.27	0.26	0.48	59	N	NC					
	with grilles-between-the-glass	PEL-N-277-00388-00001				0.27	0.24	0.43	59	N	NC	SC	S			
1"	SunDefense IG	PEL-N-277-00403-00001	4	6	argon	0.27	0.20	0.44	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00404-00001				0.27	0.18	0.40	59	N	NC	SC	S			
1"	AdvancedComfort Low-E IG	PEL-N-277-00435-00001	4	6	argon	0.24	0.25	0.47	47	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00436-00001				0.24	0.23	0.42	47	N	NC	SC	S			
1"	NaturalSun Low-E IG	PEL-N-277-00419-00001	4	6	argon	0.28	0.47	0.54	58	N						
	with grilles-between-the-glass	PEL-N-277-00420-00001				0.28	0.43	0.49	58	N						
<b>Vent - 4 mm/6 mm Glass High Altitude Glazing</b>																
1"	(HA) Advanced Low-E IG	PEL-N-277-00053-00001	4	6	air	0.32	0.26	0.48	55							
	with grilles-between-the-glass	PEL-N-277-00054-00001				0.32	0.24	0.43	55				S			
1"	(HA) SunDefense IG	PEL-N-277-00069-00001	4	6	air	0.31	0.20	0.44	55				S			
	with grilles-between-the-glass	PEL-N-277-00070-00001				0.31	0.18	0.40	55				S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00101-00001	4	6	air	0.27	0.25	0.47	44	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00102-00001				0.27	0.23	0.42	44	N	NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00085-00001	4	6	air	0.32	0.47	0.54	54							
	with grilles-between-the-glass	PEL-N-277-00086-00001				0.32	0.43	0.49	54							
<b>Vent - 4 mm/6 mm Glass High Altitude Glazing - with Foam Insulation</b>																
1"	(HA) Advanced Low-E IG	PEL-N-277-00385-00001	4	6	air	0.31	0.26	0.48	55							
	with grilles-between-the-glass	PEL-N-277-00386-00001				0.31	0.24	0.43	55				S			
1"	(HA) SunDefense IG	PEL-N-277-00401-00001	4	6	air	0.30	0.20	0.44	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00402-00001				0.30	0.18	0.40	56		NC	SC	S			
1"	(HA) AdvancedComfort Low-E IG	PEL-N-277-00433-00001	4	6	air	0.26	0.25	0.47	44	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00434-00001				0.26	0.23	0.42	44	N	NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00417-00001	4	6	air	0.31	0.47	0.54	55							
	with grilles-between-the-glass	PEL-N-277-00418-00001				0.31	0.43	0.49	55							

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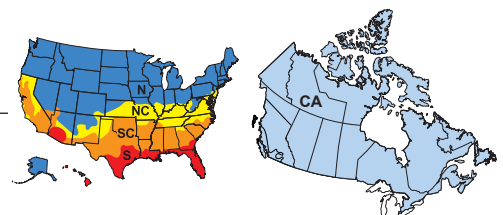
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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>	
										Zone				ER	Zone
Vent - with Tinted Glazing										N	NC	SC	S	CA	
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00275-00001	5	3	argon	0.30	0.24	0.32	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00276-00001				0.31	0.22	0.29	59				S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00027-00001	5	5	argon	0.28	0.23	0.31	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00028-00001				0.28	0.21	0.28	59		NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00039-00001	6	6	argon	0.28	0.22	0.28	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00040-00001				0.28	0.20	0.25	58		NC	SC	S		
11/16"	Gray Advanced Low-E IG	PEL-N-277-00279-00001	5	3	argon	0.30	0.22	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00280-00001				0.31	0.20	0.25	59				S		
1"	Gray Advanced Low-E IG	PEL-N-277-00031-00001	5	5	argon	0.28	0.21	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00032-00001				0.28	0.19	0.24	59		NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00043-00001	6	6	argon	0.28	0.19	0.24	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00044-00001				0.28	0.18	0.21	58		NC	SC	S		
11/16"	Green Advanced Low-E IG	PEL-N-277-00283-00001	5	3	argon	0.30	0.27	0.43	59		NC				
	with grilles-between-the-glass	PEL-N-277-00284-00001				0.31	0.24	0.39	59				S		
1"	Green Advanced Low-E IG	PEL-N-277-00035-00001	5	5	argon	0.28	0.26	0.42	59		NC				
	with grilles-between-the-glass	PEL-N-277-00036-00001				0.28	0.24	0.38	59		NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00047-00001	6	6	argon	0.28	0.25	0.41	58		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00048-00001				0.28	0.23	0.37	58		NC	SC	S		
Vent - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA	
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00607-00001	5	3	argon	0.29	0.24	0.32	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00608-00001				0.30	0.22	0.29	59		NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00359-00001	5	5	argon	0.27	0.23	0.31	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00360-00001				0.27	0.21	0.28	59	N	NC	SC	S		
1"	Bronze Advanced Low-E IG	PEL-N-277-00371-00001	6	6	argon	0.27	0.22	0.28	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00372-00001				0.27	0.20	0.25	59	N	NC	SC	S		
11/16"	Gray Advanced Low-E IG	PEL-N-277-00611-00001	5	3	argon	0.29	0.22	0.27	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00612-00001				0.30	0.20	0.25	59		NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00363-00001	5	5	argon	0.27	0.21	0.27	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00364-00001				0.27	0.19	0.24	59	N	NC	SC	S		
1"	Gray Advanced Low-E IG	PEL-N-277-00375-00001	6	6	argon	0.27	0.19	0.24	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00376-00001				0.27	0.18	0.21	59	N	NC	SC	S		
11/16"	Green Advanced Low-E IG	PEL-N-277-00615-00001	5	3	argon	0.29	0.27	0.43	59		NC				
	with grilles-between-the-glass	PEL-N-277-00616-00001				0.30	0.24	0.39	59		NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00367-00001	5	5	argon	0.27	0.26	0.42	59	N	NC				
	with grilles-between-the-glass	PEL-N-277-00368-00001				0.27	0.24	0.38	59	N	NC	SC	S		
1"	Green Advanced Low-E IG	PEL-N-277-00379-00001	6	6	argon	0.27	0.25	0.41	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00380-00001				0.27	0.23	0.37	59	N	NC	SC	S		

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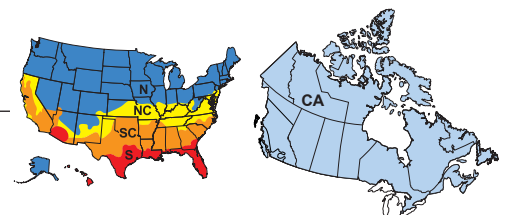
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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada <sup>2</sup>				
										Zone		ER	Zone			
<b>Vent - High Altitude Glazing - with Tinted Glazing</b>										<b>N</b>	<b>NC</b>	<b>SC</b>	<b>S</b>			
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00273-00001	5	3	air	0.34	0.24	0.32	54				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00274-00001				0.35	0.22	0.29	54				<b>S</b>			
1"	Bronze Advanced Low-E IG	PEL-N-277-00025-00001	5	5	air	0.32	0.24	0.31	56				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00026-00001				0.32	0.22	0.28	56				<b>S</b>			
1"	Bronze Advanced Low-E IG	PEL-N-277-00037-00001	6	6	air	0.31	0.22	0.28	55				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00038-00001				0.31	0.20	0.25	55				<b>S</b>			
11/16"	Gray Advanced Low-E IG	PEL-N-277-00277-00001	5	3	air	0.34	0.22	0.27	54				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00278-00001				0.35	0.21	0.25	54				<b>S</b>			
1"	Gray Advanced Low-E IG	PEL-N-277-00029-00001	5	5	air	0.32	0.22	0.27	56				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00030-00001				0.32	0.20	0.24	56				<b>S</b>			
1"	Gray Advanced Low-E IG	PEL-N-277-00041-00001	6	6	air	0.31	0.20	0.24	55				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00042-00001				0.31	0.18	0.21	55				<b>S</b>			
11/16"	Green Advanced Low-E IG	PEL-N-277-00281-00001	5	3	air	0.34	0.27	0.43	54							
	with grilles-between-the-glass	PEL-N-277-00282-00001				0.35	0.25	0.39	54				<b>S</b>			
1"	Green Advanced Low-E IG	PEL-N-277-00033-00001	5	5	air	0.32	0.26	0.42	56							
	with grilles-between-the-glass	PEL-N-277-00034-00001				0.32	0.24	0.38	56				<b>S</b>			
1"	Green Advanced Low-E IG	PEL-N-277-00045-00001	6	6	air	0.31	0.25	0.41	55				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00046-00001				0.31	0.23	0.37	55				<b>S</b>			
<b>Vent - High Altitude Glazing - with Foam Insulation and Tinted Glazing</b>																
11/16"	Bronze Advanced Low-E IG	PEL-N-277-00605-00001	5	3	air	0.33	0.24	0.32	54				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00606-00001				0.34	0.22	0.29	54				<b>S</b>			
1"	Bronze Advanced Low-E IG	PEL-N-277-00357-00001	5	5	air	0.31	0.24	0.31	56				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00358-00001				0.31	0.22	0.28	56				<b>S</b>			
1"	Bronze Advanced Low-E IG	PEL-N-277-00369-00001	6	6	air	0.30	0.22	0.28	55		<b>NC</b>	<b>SC</b>	<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00370-00001				0.30	0.20	0.25	55		<b>NC</b>	<b>SC</b>	<b>S</b>			
11/16"	Gray Advanced Low-E IG	PEL-N-277-00609-00001	5	3	air	0.33	0.22	0.27	54				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00610-00001				0.34	0.21	0.25	54				<b>S</b>			
1"	Gray Advanced Low-E IG	PEL-N-277-00361-00001	5	5	air	0.31	0.22	0.27	56				<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00362-00001				0.31	0.20	0.24	56				<b>S</b>			
1"	Gray Advanced Low-E IG	PEL-N-277-00373-00001	6	6	air	0.30	0.20	0.24	55		<b>NC</b>	<b>SC</b>	<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00374-00001				0.30	0.18	0.21	55		<b>NC</b>	<b>SC</b>	<b>S</b>			
11/16"	Green Advanced Low-E IG	PEL-N-277-00613-00001	5	3	air	0.33	0.27	0.43	54							
	with grilles-between-the-glass	PEL-N-277-00614-00001				0.34	0.25	0.39	54				<b>S</b>			
1"	Green Advanced Low-E IG	PEL-N-277-00365-00001	5	5	air	0.31	0.26	0.42	56							
	with grilles-between-the-glass	PEL-N-277-00366-00001				0.31	0.24	0.38	56				<b>S</b>			
1"	Green Advanced Low-E IG	PEL-N-277-00377-00001	6	6	air	0.30	0.25	0.41	55		<b>NC</b>	<b>SC</b>	<b>S</b>			
	with grilles-between-the-glass	PEL-N-277-00378-00001				0.30	0.23	0.37	55		<b>NC</b>	<b>SC</b>	<b>S</b>			

R-Value = 1/U-Factor  
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 VLT % = Visible Light Transmission  
 CR = Condensation Resistance  
 ER = Canadian Energy Rating

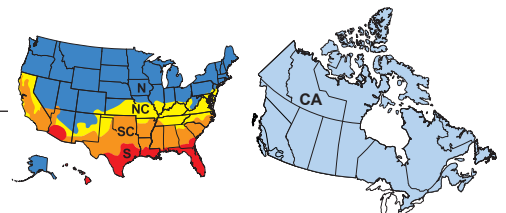
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>	
										Zone				ER	Zone
<b>Vent – with Laminated Glazing</b>										N	NC	SC	S	CA	
1"	Advanced Low-E IG	PEL-N-277-00139-00001	4	7	argon	0.28	0.26	0.48	59		NC				
	with grilles-between-the-glass	PEL-N-277-00140-00001				0.28	0.24	0.43	59		NC	SC	S		
1"	Advanced Low-E IG	PEL-N-277-00151-00001	5	10	argon	0.28	0.26	0.47	58		NC				
	with grilles-between-the-glass	PEL-N-277-00152-00001				0.28	0.23	0.42	58		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00135-00001	4	7	argon	0.28	0.20	0.44	59		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00136-00001				0.28	0.18	0.40	59		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00147-00001	5	10	argon	0.27	0.20	0.44	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00148-00001				0.27	0.18	0.39	58	N	NC	SC	S		
<b>Vent – with Foam insulation and Laminated Glazing</b>															
1"	Advanced Low-E IG	PEL-N-277-00471-00001	4	7	argon	0.27	0.26	0.48	59	N	NC				
	with grilles-between-the-glass	PEL-N-277-00472-00001				0.27	0.24	0.43	59	N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-277-00483-00001	5	10	argon	0.27	0.26	0.47	58	N	NC				
	with grilles-between-the-glass	PEL-N-277-00484-00001				0.27	0.23	0.42	58	N	NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00467-00001	4	7	argon	0.27	0.20	0.44	60	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00468-00001				0.27	0.18	0.40	60	N	NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00479-00001	5	10	argon	0.26	0.20	0.44	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00480-00001				0.26	0.18	0.39	58	N	NC	SC	S		

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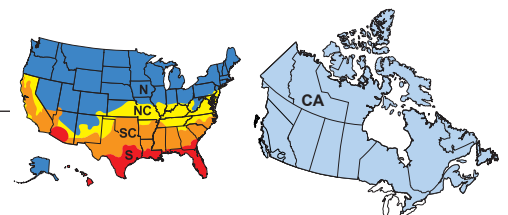
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## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.			Canada <sup>2</sup>		
										Zone	ER	Zone	ER		
<b>Vent - High Altitude Glazing - with Laminated Glazing</b>											N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-277-00137-00001	4	7	air	0.31	0.26	0.48	56						
	with grilles-between-the-glass	PEL-N-277-00138-00001				0.31	0.24	0.43	56				S		
1"	Advanced Low-E IG	PEL-N-277-00149-00001	5	10	air	0.31	0.26	0.47	54						
	with grilles-between-the-glass	PEL-N-277-00150-00001				0.31	0.24	0.42	54				S		
1"	SunDefense™ IG	PEL-N-277-00133-00001	4	7	air	0.31	0.20	0.44	56						
	with grilles-between-the-glass	PEL-N-277-00134-00001				0.31	0.18	0.40	56				S		
1"	SunDefense™ IG	PEL-N-277-00145-00001	5	10	air	0.31	0.20	0.44	55						
	with grilles-between-the-glass	PEL-N-277-00146-00001				0.31	0.18	0.39	55				S		
<b>Vent - High Altitude Glazing – with Foam Insulation and Laminated Glazing</b>															
1"	Advanced Low-E IG	PEL-N-277-00469-00001	4	7	air	0.30	0.26	0.48	56		NC				
	with grilles-between-the-glass	PEL-N-277-00470-00001				0.30	0.24	0.43	56		NC	SC	S		
1"	Advanced Low-E IG	PEL-N-277-00481-00001	5	10	air	0.30	0.26	0.47	55		NC				
	with grilles-between-the-glass	PEL-N-277-00482-00001				0.30	0.24	0.42	55		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00465-00001	4	7	air	0.30	0.20	0.44	56		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00466-00001				0.30	0.18	0.40	56		NC	SC	S		
1"	SunDefense™ IG	PEL-N-277-00477-00001	5	10	air	0.30	0.20	0.44	55		NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00478-00001				0.30	0.18	0.39	55		NC	SC	S		

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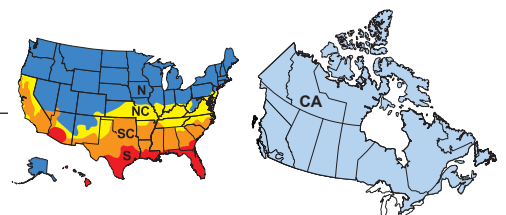
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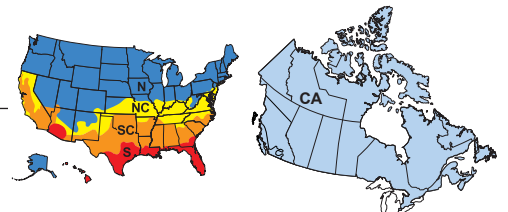




Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>		
											Zone				ER	Zone	
<b>Vent -Triple Pane</b>											N	NC	SC	S			CA
1"	Advanced Low-E IG	PEL-N-277-00167-00001	3	3	3	argon	0.23	0.24	0.43	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00168-00001					0.24	0.22	0.39	67	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00169-00001	3	3	3	Krypton	0.19	0.24	0.43	72	N	NC	SC	S	29	CA	
	with grilles-between-the-glass	PEL-N-277-00170-00001					0.20	0.22	0.39	72	N	NC	SC	S	27	CA	
1"	SunDefense™ IG	PEL-N-277-00179-00001	3	3	3	argon	0.23	0.18	0.40	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00180-00001					0.23	0.17	0.36	67	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-277-00181-00001	3	3	3	Krypton	0.19	0.18	0.40	72	N	NC	SC	S	26	CA	
	with grilles-between-the-glass	PEL-N-277-00182-00001					0.19	0.16	0.36	72	N	NC	SC	S	25	CA	
1"	NaturalSun Low-E IG	PEL-N-277-00155-00001	3	3	3	argon	0.23	0.40	0.49	66	N	NC					
	with grilles-between-the-glass	PEL-N-277-00156-00001					0.24	0.36	0.44	66	N	NC					
1"	NaturalSun Low-E IG	PEL-N-277-00157-00001	3	3	3	Krypton	0.20	0.40	0.49	71	N	NC			37	CA	
	with grilles-between-the-glass	PEL-N-277-00158-00001					0.20	0.36	0.44	71	N	NC			35	CA	
<b>Vent - Triple Pane with Foam Insulation</b>																	
1"	Advanced Low-E IG	PEL-N-277-00499-00001	3	3	3	argon	0.22	0.24	0.43	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00500-00001					0.23	0.22	0.39	67	N	NC	SC	S			
1"	Advanced Low-E IG	PEL-N-277-00501-00001	3	3	3	Krypton	0.18	0.24	0.43	72	N	NC	SC	S	31	CA	
	with grilles-between-the-glass	PEL-N-277-00502-00001					0.19	0.22	0.39	72	N	NC	SC	S	28	CA	
1"	SunDefense IG	PEL-N-277-00511-00001	3	3	3	argon	0.22	0.18	0.40	67	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-277-00512-00001					0.22	0.17	0.36	67	N	NC	SC	S			
1"	SunDefense IG	PEL-N-277-00513-00001	3	3	3	Krypton	0.18	0.18	0.40	72	N	NC	SC	S	27	CA	
	with grilles-between-the-glass	PEL-N-277-00514-00001					0.18	0.16	0.36	72	N	NC	SC	S	26	CA	
1"	NaturalSun Low-E IG	PEL-N-277-00487-00001	3	3	3	argon	0.22	0.40	0.49	67	N	NC			35	CA	
	with grilles-between-the-glass	PEL-N-277-00488-00001					0.23	0.36	0.44	67	N	NC					
1"	NaturalSun Low-E IG	PEL-N-277-00489-00001	3	3	3	Krypton	0.19	0.40	0.49	72	N	NC			38	CA	
	with grilles-between-the-glass	PEL-N-277-00490-00001					0.19	0.36	0.44	72	N	NC			36	CA	

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## Glazing Performance - Total Unit

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			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>	
											Zone				ER	Zone
<b>Vent - Triple Pane with High Altitude Glazing</b>											N	NC	SC	S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00165-00001	3	3	3	air	0.26	0.24	0.43	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00166-00001					0.27	0.22	0.39	63	N	NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-277-00177-00001	3	3	3	air	0.26	0.18	0.40	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00178-00001					0.27	0.17	0.36	63	N	NC	SC	S		
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00153-00001	3	3	3	air	0.27	0.40	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-277-00154-00001					0.27	0.36	0.44	63	N	NC				
<b>Vent - Triple Pane with High Altitude Glazing and Foam Insulation</b>											N	NC	SC	S		
1"	(HA) Advanced Low-E IG	PEL-N-277-00497-00001	3	3	3	air	0.25	0.24	0.43	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00498-00001					0.26	0.22	0.39	63	N	NC	SC	S		
1"	(HA) SunDefense IG	PEL-N-277-00509-00001	3	3	3	air	0.25	0.18	0.40	63	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-277-00510-00001					0.26	0.17	0.36	63	N	NC	SC	S		
1"	(HA) NaturalSun Low-E IG	PEL-N-277-00485-00001	3	3	3	air	0.26	0.40	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-277-00486-00001					0.26	0.36	0.44	63	N	NC				

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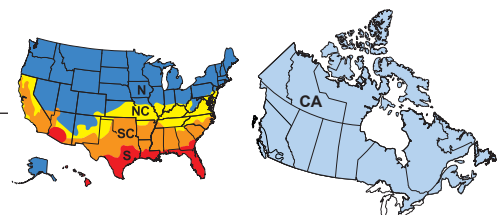
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			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>		
										Zone				ER	Zone	
Fixed										N	NC	SC	S		CA	
11/16"	Clear IG	PEL-N-276-00225-00001	3	3	air	0.46	0.63	0.66	44							
	with grilles-between-the-glass	PEL-N-276-00226-00001				0.46	0.56	0.59	44							
11/16"	Clear IG	PEL-N-276-00229-00001	4	4	air	0.47	0.61	0.66	43							
	with grilles-between-the-glass	PEL-N-276-00230-00001				0.48	0.55	0.59	43							
1"	Clear IG	PEL-N-276-00001-00001	5	5	air	0.45	0.60	0.65	44							
	with grilles-between-the-glass	PEL-N-276-00002-00001				0.45	0.54	0.58	44							
1"	Clear IG	PEL-N-276-00005-00001	6	6	air	0.44	0.58	0.64	44							
	with grilles-between-the-glass	PEL-N-276-00006-00001				0.44	0.52	0.57	44							
11/16"	Advanced Low-E IG	PEL-N-276-00235-00001	3	3	argon	0.27	0.30	0.56	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00236-00001				0.28	0.27	0.50	59		NC					
11/16"	Advanced Low-E IG	PEL-N-276-00239-00001	4	4	argon	0.28	0.30	0.56	57		NC					
	with grilles-between-the-glass	PEL-N-276-00240-00001				0.30	0.27	0.50	57		NC					
1"	Advanced Low-E IG	PEL-N-276-00019-00001	5	5	argon	0.27	0.29	0.55	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00020-00001				0.27	0.26	0.49	59	N	NC					
1"	Advanced Low-E IG	PEL-N-276-00023-00001	6	6	argon	0.27	0.29	0.54	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00024-00001				0.27	0.26	0.48	58	N	NC					
11/16"	SunDefense™ IG	PEL-N-276-00243-00001	3	3	argon	0.27	0.22	0.52	60	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00244-00001				0.28	0.20	0.46	60		NC	SC	S			
11/16"	SunDefense™ IG	PEL-N-276-00247-00001	4	4	argon	0.28	0.23	0.52	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00248-00001				0.29	0.21	0.46	58		NC	SC	S			
1"	SunDefense™ IG	PEL-N-276-00059-00001	5	5	argon	0.27	0.22	0.51	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00060-00001				0.27	0.20	0.46	59	N	NC	SC	S			
1"	SunDefense™ IG	PEL-N-276-00063-00001	6	6	argon	0.27	0.22	0.50	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00064-00001				0.27	0.20	0.45	58	N	NC	SC	S			
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00259-00001	3	3	argon	0.23	0.29	0.55	47	N	NC					
	with grilles-between-the-glass	PEL-N-276-00260-00001				0.24	0.27	0.49	47	N	NC					
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00263-00001	4	4	argon	0.24	0.29	0.54	45	N	NC					
	with grilles-between-the-glass	PEL-N-276-00264-00001				0.26	0.26	0.48	45	N	NC					
1"	AdvancedComfort Low-E IG	PEL-N-276-00091-00001	5	5	argon	0.23	0.29	0.54	47	N	NC					
	with grilles-between-the-glass	PEL-N-276-00092-00001				0.23	0.26	0.48	47	N	NC					
1"	AdvancedComfort Low-E IG	PEL-N-276-00095-00001	6	6	argon	0.23	0.28	0.53	46	N	NC					
	with grilles-between-the-glass	PEL-N-276-00096-00001				0.23	0.26	0.47	46	N	NC					
11/16"	NaturalSun Low-E IG	PEL-N-276-00251-00001	3	3	argon	0.28	0.55	0.64	59	N					37	CA
	with grilles-between-the-glass	PEL-N-276-00252-00001				0.29	0.50	0.57	59	N						
11/16"	NaturalSun Low-E IG	PEL-N-276-00255-00001	4	4	argon	0.29	0.54	0.63	57	N					35	CA
	with grilles-between-the-glass	PEL-N-276-00256-00001				0.31	0.48	0.56	57							
1"	NaturalSun Low-E IG	PEL-N-276-00075-00001	5	5	argon	0.28	0.53	0.63	58	N					36	CA
	with grilles-between-the-glass	PEL-N-276-00076-00001				0.28	0.48	0.56	58	N						
1"	NaturalSun Low-E IG	PEL-N-276-00079-00001	6	6	argon	0.28	0.52	0.62	57	N					35	CA
	with grilles-between-the-glass	PEL-N-276-00080-00001				0.28	0.47	0.55	57	N						

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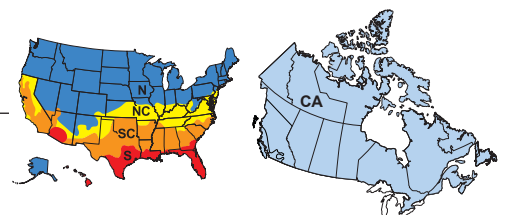
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>	
										Zone				ER	Zone
Fixed – with Foam Insulation										N	NC	SC	S	CA	
11/16"	Advanced Low-E IG	PEL-N-276-00567-00001	3	3	argon	0.26	0.30	0.56	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00568-00001				0.27	0.27	0.50	59	N	NC				
11/16"	Advanced Low-E IG	PEL-N-276-00571-00001	4	4	argon	0.28	0.30	0.56	57		NC				
	with grilles-between-the-glass	PEL-N-276-00572-00001				0.29	0.27	0.50	57		NC				
1"	Advanced Low-E IG	PEL-N-276-00351-00001	5	5	argon	0.27	0.29	0.55	59	N	NC				
	with grilles-between-the-glass	PEL-N-276-00352-00001				0.27	0.26	0.49	59	N	NC				
1"	Advanced Low-E IG	PEL-N-276-00355-00001	6	6	argon	0.27	0.29	0.54	58	N	NC				
	with grilles-between-the-glass	PEL-N-276-00356-00001				0.27	0.26	0.48	58	N	NC				
11/16"	SunDefense IG	PEL-N-276-00575-00001	3	3	argon	0.26	0.22	0.52	60	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00576-00001				0.27	0.20	0.46	60	N	NC	SC	S		
11/16"	SunDefense IG	PEL-N-276-00579-00001	4	4	argon	0.27	0.23	0.52	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00580-00001				0.29	0.21	0.46	58		NC	SC	S		
1"	SunDefense IG	PEL-N-276-00391-00001	5	5	argon	0.26	0.22	0.51	59	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00392-00001				0.26	0.20	0.46	59	N	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00395-00001	6	6	argon	0.26	0.22	0.50	58	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00396-00001				0.26	0.20	0.45	58	N	NC	SC	S		
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00591-00001	3	3	argon	0.23	0.29	0.55	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00592-00001				0.23	0.27	0.49	47	N	NC				
11/16"	AdvancedComfort Low-E IG	PEL-N-276-00595-00001	4	4	argon	0.24	0.29	0.54	45	N	NC				
	with grilles-between-the-glass	PEL-N-276-00596-00001				0.25	0.26	0.48	45	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00423-00001	5	5	argon	0.22	0.29	0.54	47	N	NC				
	with grilles-between-the-glass	PEL-N-276-00424-00001				0.22	0.26	0.48	47	N	NC				
1"	AdvancedComfort Low-E IG	PEL-N-276-00427-00001	6	6	argon	0.22	0.28	0.53	46	N	NC				
	with grilles-between-the-glass	PEL-N-276-00428-00001				0.22	0.26	0.47	46	N	NC				
11/16"	NaturalSun Low-E IG	PEL-N-276-00583-00001	3	3	argon	0.27	0.55	0.64	59	N				38	CA
	with grilles-between-the-glass	PEL-N-276-00584-00001				0.28	0.50	0.57	59	N				34	CA
11/16"	NaturalSun Low-E IG	PEL-N-276-00587-00001	4	4	argon	0.29	0.54	0.63	57	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00588-00001				0.30	0.48	0.56	57	N					
1"	NaturalSun Low-E IG	PEL-N-276-00407-00001	5	5	argon	0.28	0.53	0.63	58	N				36	CA
	with grilles-between-the-glass	PEL-N-276-00408-00001				0.28	0.48	0.56	58	N					
1"	NaturalSun Low-E IG	PEL-N-276-00411-00001	6	6	argon	0.28	0.52	0.62	58	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00412-00001				0.28	0.47	0.55	58	N					

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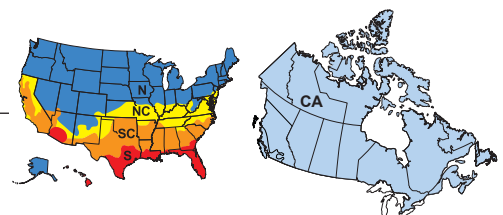
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Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>		
										Zone				ER	Zone	
Fixed - High Altitude Glazing										N	NC	SC	S	CA		
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00233-00001	3	3	air	0.31	0.30	0.56	55							
	with grilles-between-the-glass	PEL-N-276-00234-00001				0.33	0.27	0.50	55							
11/16"	(HA) Advanced Low-E IG	PEL-N-276-00237-00001	4	4	air	0.33	0.30	0.56	53							
	with grilles-between-the-glass	PEL-N-276-00238-00001				0.35	0.27	0.50	53							
1"	(HA) Advanced Low-E IG	PEL-N-276-00017-00001	5	5	air	0.31	0.30	0.55	55							
	with grilles-between-the-glass	PEL-N-276-00018-00001				0.31	0.27	0.49	55							
1"	(HA) Advanced Low-E IG	PEL-N-276-00021-00001	6	6	air	0.31	0.29	0.54	55							
	with grilles-between-the-glass	PEL-N-276-00022-00001				0.31	0.27	0.48	55							
11/16"	(HA) SunDefense IG	PEL-N-276-00241-00001	3	3	air	0.31	0.23	0.52	56							S
	with grilles-between-the-glass	PEL-N-276-00242-00001				0.32	0.21	0.46	56							S
11/16"	(HA) SunDefense IG	PEL-N-276-00245-00001	4	4	air	0.33	0.23	0.52	53							S
	with grilles-between-the-glass	PEL-N-276-00246-00001				0.35	0.21	0.46	53							S
1"	(HA) SunDefense IG	PEL-N-276-00057-00001	5	5	air	0.31	0.22	0.51	56							S
	with grilles-between-the-glass	PEL-N-276-00058-00001				0.31	0.20	0.46	56							S
1"	(HA) SunDefense IG	PEL-N-276-00061-00001	6	6	air	0.30	0.23	0.50	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00062-00001				0.30	0.20	0.45	55		NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00257-00001	3	3	air	0.26	0.30	0.55	43	N	NC					
	with grilles-between-the-glass	PEL-N-276-00258-00001				0.27	0.27	0.49	43	N	NC					
11/16"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00261-00001	4	4	air	0.28	0.29	0.54	41		NC					
	with grilles-between-the-glass	PEL-N-276-00262-00001				0.29	0.26	0.48	41		NC					
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00089-00001	5	5	air	0.26	0.29	0.54	44	N	NC					
	with grilles-between-the-glass	PEL-N-276-00090-00001				0.26	0.26	0.48	44	N	NC					
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00093-00001	6	6	air	0.25	0.28	0.53	43	N	NC					
	with grilles-between-the-glass	PEL-N-276-00094-00001				0.25	0.26	0.47	43	N	NC					
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00249-00001	3	3	air	0.32	0.55	0.64	55							
	with grilles-between-the-glass	PEL-N-276-00250-00001				0.32	0.50	0.57	55							
11/16"	(HA) NaturalSun Low-E IG	PEL-N-276-00253-00001	4	4	air	0.34	0.54	0.63	52							
	with grilles-between-the-glass	PEL-N-276-00254-00001				0.36	0.48	0.56	52							
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00073-00001	5	5	air	0.32	0.53	0.63	55							
	with grilles-between-the-glass	PEL-N-276-00074-00001				0.32	0.48	0.56	55							
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00077-00001	6	6	air	0.32	0.52	0.62	54							
	with grilles-between-the-glass	PEL-N-276-00078-00001				0.32	0.47	0.55	54							

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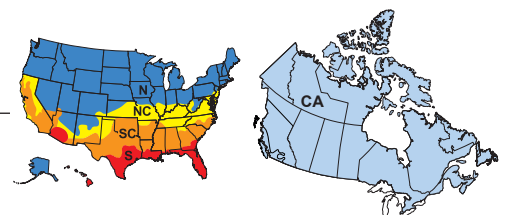
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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada <sup>2</sup>			
										Zone		ER	Zone		
Fixed – High Altitude Glazing with Foam Insulation										N	NC	SC	S	CA	
11/16"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00565-00001 PEL-N-276-00566-00001	3	3	air	0.31 0.32	0.30 0.27	0.56 0.50	55 55						
11/16"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00569-00001 PEL-N-276-00570-00001	4	4	air	0.33 0.34	0.30 0.27	0.56 0.50	53 53						
1"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00349-00001 PEL-N-276-00350-00001	5	5	air	0.30 0.30	0.30 0.27	0.55 0.49	55 55	NC					
1"	(HA) Advanced Low-E IG with grilles-between-the-glass	PEL-N-276-00353-00001 PEL-N-276-00354-00001	6	6	air	0.30 0.30	0.29 0.27	0.54 0.48	55 55	NC					
11/16"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00573-00001 PEL-N-276-00574-00001	3	3	air	0.30 0.32	0.23 0.21	0.52 0.46	56 56	NC	SC	S			
11/16"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00577-00001 PEL-N-276-00578-00001	4	4	air	0.32 0.34	0.23 0.21	0.52 0.46	53 53				S		
1"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00389-00001 PEL-N-276-00390-00001	5	5	air	0.30 0.30	0.22 0.20	0.51 0.46	56 56	NC	SC	S			
1"	(HA) SunDefense IG with grilles-between-the-glass	PEL-N-276-00393-00001 PEL-N-276-00394-00001	6	6	air	0.30 0.30	0.23 0.20	0.50 0.45	55 55	NC	SC	S			
11/16"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00589-00001 PEL-N-276-00590-00001	3	3	air	0.26 0.27	0.30 0.27	0.55 0.49	43 43	N	NC				
11/16"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00593-00001 PEL-N-276-00594-00001	4	4	air	0.27 0.28	0.29 0.26	0.54 0.48	41 41	N	NC				
1"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00421-00001 PEL-N-276-00422-00001	5	5	air	0.25 0.25	0.29 0.26	0.54 0.48	44 44	N	NC				
1"	(HA) AdvancedComfort Low-E IG with grilles-between-the-glass	PEL-N-276-00425-00001 PEL-N-276-00426-00001	6	6	air	0.25 0.25	0.28 0.26	0.53 0.47	43 43	N	NC				
11/16"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00581-00001 PEL-N-276-00582-00001	3	3	air	0.32 0.32	0.55 0.50	0.64 0.57	55 55						
11/16"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00585-00001 PEL-N-276-00586-00001	4	4	air	0.33 0.35	0.54 0.48	0.63 0.56	52 52						
1"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00405-00001 PEL-N-276-00406-00001	5	5	air	0.31 0.31	0.53 0.48	0.63 0.56	55 55						
1"	(HA) NaturalSun Low-E IG with grilles-between-the-glass	PEL-N-276-00409-00001 PEL-N-276-00410-00001	6	6	air	0.31 0.31	0.52 0.47	0.62 0.55	54 54						

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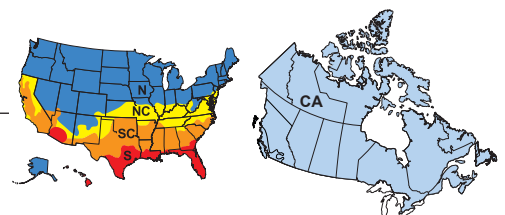
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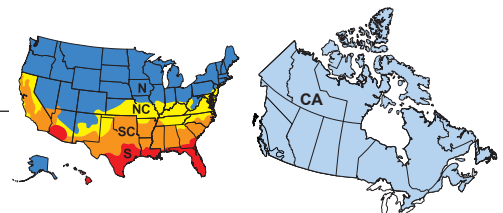
# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>
										Zone	ER	Zone	Zone	
<b>Fixed - 5 mm/3 mm Glass</b>										N	NC	SC	S	CA
1"	Clear IG	PEL-N-276-00009-00001	5	3	air	0.45	0.61	0.66	45					
	with grilles-between-the-glass	PEL-N-276-00010-00001				0.45	0.55	0.59	45					
1"	Advanced Low-E IG	PEL-N-276-00051-00001	5	3	argon	0.28	0.29	0.55	60		NC			
	with grilles-between-the-glass	PEL-N-276-00052-00001				0.28	0.27	0.50	60		NC			
1"	SunDefense™ IG	PEL-N-276-00067-00001	5	3	argon	0.27	0.22	0.52	60	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00068-00001				0.27	0.20	0.46	60	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00099-00001	5	3	argon	0.23	0.29	0.54	48	N	NC			
	with grilles-between-the-glass	PEL-N-276-00100-00001				0.23	0.26	0.48	48	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00083-00001	5	3	argon	0.29	0.54	0.63	60	N				35 CA
	with grilles-between-the-glass	PEL-N-276-00084-00001				0.29	0.48	0.56	60	N				
<b>Fixed - 5 mm/3 mm Glass with Foam Insulation</b>														
1"	Advanced Low-E IG	PEL-N-276-00383-00001	5	3	argon	0.27	0.29	0.55	60	N	NC			
	with grilles-between-the-glass	PEL-N-276-00384-00001				0.27	0.27	0.50	60	N	NC			
1"	SunDefense IG	PEL-N-276-00399-00001	5	3	argon	0.27	0.22	0.52	61	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00400-00001				0.27	0.20	0.46	61	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00431-00001	5	3	argon	0.23	0.29	0.54	48	N	NC			
	with grilles-between-the-glass	PEL-N-276-00432-00001				0.23	0.26	0.48	48	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00415-00001	5	3	argon	0.28	0.54	0.63	60	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00416-00001				0.28	0.48	0.56	60	N				
<b>Fixed - 5 mm/3 mm Glass High Altitude Glazing</b>														
1"	(HA) Advanced Low-E IG	PEL-N-276-00049-00001	5	3	air	0.31	0.30	0.55	56					
	with grilles-between-the-glass	PEL-N-276-00050-00001				0.31	0.27	0.50	56					
1"	(HA) SunDefense IG	PEL-N-276-00065-00001	5	3	air	0.31	0.22	0.52	57				S	
	with grilles-between-the-glass	PEL-N-276-00066-00001				0.31	0.20	0.46	57				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00097-00001	5	3	air	0.26	0.29	0.54	45	N	NC			
	with grilles-between-the-glass	PEL-N-276-00098-00001				0.26	0.26	0.48	45	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00081-00001	5	3	air	0.32	0.54	0.63	56					
	with grilles-between-the-glass	PEL-N-276-00082-00001				0.32	0.48	0.56	56					
<b>Fixed - 5 mm/3 mm Glass High Altitude Glazing – with Foam Insulation</b>														
1"	(HA) Advanced Low-E IG	PEL-N-276-00381-00001	5	3	air	0.31	0.30	0.55	57					
	with grilles-between-the-glass	PEL-N-276-00382-00001				0.31	0.27	0.50	57					
1"	(HA) SunDefense IG	PEL-N-276-00397-00001	5	3	air	0.30	0.22	0.52	57		NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00398-00001				0.30	0.20	0.46	57		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00429-00001	5	3	air	0.25	0.29	0.54	45	N	NC			
	with grilles-between-the-glass	PEL-N-276-00430-00001				0.25	0.26	0.48	45	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00413-00001	5	3	air	0.32	0.54	0.63	56					
	with grilles-between-the-glass	PEL-N-276-00414-00001				0.32	0.48	0.56	56					

R-Value = 1/U-Factor  
 SHGC = Solar Heat Gain Coefficient  
 VLT % = Visible Light Transmission  
 CR = Condensation Resistance  
 ER = Canadian Energy Rating

(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500. ENERGY STAR® values are updated to 2016 (Version 6) criteria.  
 (2) The values shown are based on Canada's updated ENERGY STAR® 2020 initiative. For center-glass values, see the Product Performance section.  
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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada <sup>2</sup>		
										Zone	ER	Zone	ER	Zone
<b>Fixed - 4 mm/6 mm Glass</b>										N	NC	SC	S	CA
1"	Clear IG	PEL-N-276-00013-00001	4	6	air	0.45	0.60	0.65	44					
	with grilles-between-the-glass	PEL-N-276-00014-00001				0.45	0.54	0.58	44					
1"	Advanced Low-E IG	PEL-N-276-00055-00001	4	6	argon	0.27	0.29	0.55	58	N	NC			
	with grilles-between-the-glass	PEL-N-276-00056-00001				0.27	0.27	0.49	58	N	NC			
1"	SunDefense™ IG	PEL-N-276-00071-00001	4	6	argon	0.27	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00072-00001				0.27	0.20	0.46	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00103-00001	4	6	argon	0.23	0.29	0.54	46	N	NC			
	with grilles-between-the-glass	PEL-N-276-00104-00001				0.23	0.26	0.48	46	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00087-00001	4	6	argon	0.28	0.54	0.62	58	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00088-00001				0.28	0.49	0.56	58	N				
<b>Fixed - 4 mm/6 mm Glass with Foam Insulation</b>														
1"	Advanced Low-E IG	PEL-N-276-00387-00001	4	6	argon	0.27	0.29	0.55	58	N	NC			
	with grilles-between-the-glass	PEL-N-276-00388-00001				0.27	0.27	0.49	58	N	NC			
1"	SunDefense IG	PEL-N-276-00403-00001	4	6	argon	0.26	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00404-00001				0.26	0.20	0.46	59	N	NC	SC	S	
1"	AdvancedComfort Low-E IG	PEL-N-276-00435-00001	4	6	argon	0.22	0.29	0.54	47	N	NC			
	with grilles-between-the-glass	PEL-N-276-00436-00001				0.22	0.26	0.48	47	N	NC			
1"	NaturalSun Low-E IG	PEL-N-276-00419-00001	4	6	argon	0.28	0.54	0.62	58	N				36 CA
	with grilles-between-the-glass	PEL-N-276-00420-00001				0.28	0.49	0.56	58	N				
<b>Fixed - 4 mm/6 mm Glass High Altitude Glazing</b>														
1"	(HA) Advanced Low-E IG	PEL-N-276-00053-00001	4	6	air	0.31	0.30	0.55	55					
	with grilles-between-the-glass	PEL-N-276-00054-00001				0.31	0.27	0.49	55					
1"	(HA) SunDefense IG	PEL-N-276-00069-00001	4	6	air	0.31	0.22	0.51	55				S	
	with grilles-between-the-glass	PEL-N-276-00070-00001				0.31	0.20	0.46	55				S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00101-00001	4	6	air	0.26	0.29	0.54	43	N	NC			
	with grilles-between-the-glass	PEL-N-276-00102-00001				0.26	0.26	0.48	43	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00085-00001	4	6	air	0.32	0.54	0.62	54					
	with grilles-between-the-glass	PEL-N-276-00086-00001				0.32	0.48	0.56	54					
<b>Fixed - 4 mm/6 mm Glass High Altitude Glazing – with Foam Insulation</b>														
1"	(HA) Advanced Low-E IG	PEL-N-276-00385-00001	4	6	air	0.30	0.30	0.55	55		NC			
	with grilles-between-the-glass	PEL-N-276-00386-00001				0.30	0.27	0.49	55		NC			
1"	(HA) SunDefense IG	PEL-N-276-00401-00001	4	6	air	0.30	0.22	0.51	55		NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00402-00001				0.30	0.20	0.46	55		NC	SC	S	
1"	(HA) AdvancedComfort Low-E IG	PEL-N-276-00433-00001	4	6	air	0.25	0.29	0.54	44	N	NC			
	with grilles-between-the-glass	PEL-N-276-00434-00001				0.25	0.26	0.48	44	N	NC			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00417-00001	4	6	air	0.31	0.54	0.62	55					
	with grilles-between-the-glass	PEL-N-276-00418-00001				0.31	0.48	0.56	55					

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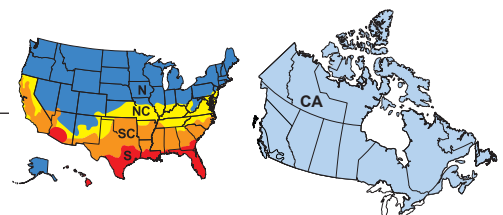
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>		
										Zone				ER	Zone	
Fixed - with Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00275-00001	5	3	argon	0.28	0.27	0.36	58		NC					
	with grilles-between-the-glass	PEL-N-276-00276-00001				0.30	0.24	0.32	58		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00027-00001	5	5	argon	0.27	0.26	0.36	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00028-00001				0.27	0.24	0.32	59	N	NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00039-00001	6	6	argon	0.27	0.25	0.32	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00040-00001				0.27	0.22	0.29	58	N	NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00279-00001	5	3	argon	0.28	0.25	0.31	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00280-00001				0.30	0.22	0.28	58		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00031-00001	5	5	argon	0.27	0.24	0.31	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00032-00001				0.27	0.22	0.28	59	N	NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00043-00001	6	6	argon	0.27	0.22	0.27	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00044-00001				0.27	0.20	0.24	58	N	NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00283-00001	5	3	argon	0.28	0.30	0.49	58		NC					
	with grilles-between-the-glass	PEL-N-276-00284-00001				0.30	0.27	0.44	58		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00035-00001	5	5	argon	0.27	0.30	0.49	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00036-00001				0.27	0.27	0.44	59	N	NC					
1"	Green Advanced Low-E IG	PEL-N-276-00047-00001	6	6	argon	0.27	0.28	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00048-00001				0.27	0.26	0.42	58	N	NC					
Fixed - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00607-00001	5	3	argon	0.28	0.27	0.36	58		NC					
	with grilles-between-the-glass	PEL-N-276-00608-00001				0.29	0.24	0.32	58		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00359-00001	5	5	argon	0.27	0.26	0.36	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00360-00001				0.27	0.24	0.32	59	N	NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00371-00001	6	6	argon	0.27	0.25	0.32	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00372-00001				0.27	0.22	0.29	58	N	NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00611-00001	5	3	argon	0.28	0.25	0.31	58		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00612-00001				0.29	0.22	0.28	58		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00363-00001	5	5	argon	0.27	0.24	0.31	59	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00364-00001				0.27	0.22	0.28	59	N	NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00375-00001	6	6	argon	0.27	0.22	0.27	58	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00376-00001				0.27	0.20	0.24	58	N	NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00615-00001	5	3	argon	0.28	0.30	0.49	58		NC					
	with grilles-between-the-glass	PEL-N-276-00616-00001				0.29	0.27	0.44	58		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00367-00001	5	5	argon	0.27	0.30	0.49	59	N	NC					
	with grilles-between-the-glass	PEL-N-276-00368-00001				0.27	0.27	0.44	59	N	NC					
1"	Green Advanced Low-E IG	PEL-N-276-00379-00001	6	6	argon	0.27	0.28	0.47	58	N	NC					
	with grilles-between-the-glass	PEL-N-276-00380-00001				0.27	0.26	0.42	58	N	NC					

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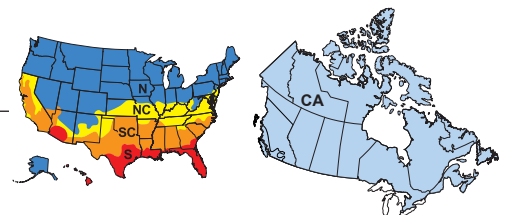
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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>		
										Zone				ER	Zone	
Fixed - High Altitude Glazing - with Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00273-00001	5	3	air	0.33	0.27	0.36	54							
	with grilles-between-the-glass	PEL-N-276-00274-00001				0.35	0.25	0.32	54					S		
1"	Bronze Advanced Low-E IG	PEL-N-276-00025-00001	5	5	air	0.31	0.27	0.36	56					S		
	with grilles-between-the-glass	PEL-N-276-00026-00001				0.31	0.24	0.32	56					S		
1"	Bronze Advanced Low-E IG	PEL-N-276-00037-00001	6	6	air	0.31	0.25	0.32	55					S		
	with grilles-between-the-glass	PEL-N-276-00038-00001				0.31	0.23	0.29	55					S		
11/16"	Gray Advanced Low-E IG	PEL-N-276-00277-00001	5	3	air	0.33	0.25	0.31	54					S		
	with grilles-between-the-glass	PEL-N-276-00278-00001				0.35	0.23	0.28	54					S		
1"	Gray Advanced Low-E IG	PEL-N-276-00029-00001	5	5	air	0.31	0.24	0.31	56					S		
	with grilles-between-the-glass	PEL-N-276-00030-00001				0.31	0.22	0.28	56					S		
1"	Gray Advanced Low-E IG	PEL-N-276-00041-00001	6	6	air	0.31	0.22	0.27	55					S		
	with grilles-between-the-glass	PEL-N-276-00042-00001				0.31	0.20	0.24	55					S		
11/16"	Green Advanced Low-E IG	PEL-N-276-00281-00001	5	3	air	0.33	0.31	0.49	54							
	with grilles-between-the-glass	PEL-N-276-00282-00001				0.35	0.28	0.44	54							
1"	Green Advanced Low-E IG	PEL-N-276-00033-00001	5	5	air	0.31	0.30	0.49	56							
	with grilles-between-the-glass	PEL-N-276-00034-00001				0.31	0.27	0.44	56							
1"	Green Advanced Low-E IG	PEL-N-276-00045-00001	6	6	air	0.31	0.29	0.47	55							
	with grilles-between-the-glass	PEL-N-276-00046-00001				0.31	0.26	0.42	55							
Fixed - High Altitude Glazing - with Foam Insulation and Tinted Glazing										N	NC	SC	S	CA		
11/16"	Bronze Advanced Low-E IG	PEL-N-276-00605-00001	5	3	air	0.33	0.27	0.36	54							
	with grilles-between-the-glass	PEL-N-276-00606-00001				0.34	0.25	0.32	54					S		
1"	Bronze Advanced Low-E IG	PEL-N-276-00357-00001	5	5	air	0.30	0.27	0.36	56		NC					
	with grilles-between-the-glass	PEL-N-276-00358-00001				0.30	0.24	0.32	56		NC	SC	S			
1"	Bronze Advanced Low-E IG	PEL-N-276-00369-00001	6	6	air	0.30	0.25	0.32	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00370-00001				0.30	0.23	0.29	55		NC	SC	S			
11/16"	Gray Advanced Low-E IG	PEL-N-276-00609-00001	5	3	air	0.33	0.25	0.31	54					S		
	with grilles-between-the-glass	PEL-N-276-00610-00001				0.34	0.23	0.28	54					S		
1"	Gray Advanced Low-E IG	PEL-N-276-00361-00001	5	5	air	0.30	0.24	0.31	56		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00362-00001				0.30	0.22	0.28	56		NC	SC	S			
1"	Gray Advanced Low-E IG	PEL-N-276-00373-00001	6	6	air	0.30	0.22	0.27	55		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00374-00001				0.30	0.20	0.24	55		NC	SC	S			
11/16"	Green Advanced Low-E IG	PEL-N-276-00613-00001	5	3	air	0.33	0.31	0.49	54							
	with grilles-between-the-glass	PEL-N-276-00614-00001				0.34	0.28	0.44	54							
1"	Green Advanced Low-E IG	PEL-N-276-00365-00001	5	5	air	0.30	0.30	0.49	56		NC					
	with grilles-between-the-glass	PEL-N-276-00366-00001				0.30	0.27	0.44	56		NC					
1"	Green Advanced Low-E IG	PEL-N-276-00377-00001	6	6	air	0.30	0.29	0.47	55		NC					
	with grilles-between-the-glass	PEL-N-276-00378-00001				0.30	0.26	0.42	55		NC					

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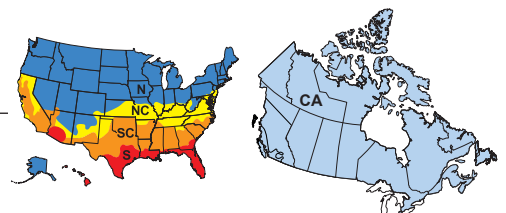
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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>
										Zone				ER
<b>Fixed – with Laminated Glazing</b>										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00139-00001	4	7	argon	0.27	0.29	0.55	59	N	NC			
	with grilles-between-the-glass	PEL-N-276-00140-00001				0.27	0.26	0.49	59	N	NC			
1"	Advanced Low-E IG	PEL-N-276-00151-00001	5	10	argon	0.26	0.29	0.54	57	N	NC			
	with grilles-between-the-glass	PEL-N-276-00152-00001				0.26	0.26	0.48	57	N	NC			
1"	SunDefense™ IG	PEL-N-276-00135-00001	4	7	argon	0.27	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00136-00001				0.27	0.20	0.46	59	N	NC	SC	S	
1"	SunDefense™ IG	PEL-N-276-00147-00001	5	10	argon	0.26	0.22	0.50	58	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00148-00001				0.26	0.20	0.45	58	N	NC	SC	S	
<b>Fixed – with Foam insulation and Laminated Glazing</b>										N	NC			
1"	Advanced Low-E IG	PEL-N-276-00471-00001	4	7	argon	0.26	0.29	0.55	59	N	NC			
	with grilles-between-the-glass	PEL-N-276-00472-00001				0.26	0.26	0.49	59	N	NC			
1"	Advanced Low-E IG	PEL-N-276-00483-00001	5	10	argon	0.26	0.29	0.54	57	N	NC			
	with grilles-between-the-glass	PEL-N-276-00484-00001				0.26	0.26	0.48	57	N	NC			
1"	SunDefense™ IG	PEL-N-276-00467-00001	4	7	argon	0.26	0.22	0.51	59	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00468-00001				0.26	0.20	0.46	59	N	NC	SC	S	
1"	SunDefense™ IG	PEL-N-276-00479-00001	5	10	argon	0.25	0.22	0.50	58	N	NC	SC	S	
	with grilles-between-the-glass	PEL-N-276-00480-00001				0.25	0.20	0.45	58	N	NC	SC	S	

R-Value = 1/U-Factor  
 SHGC = Solar Heat Gain Coefficient  
 VLT % = Visible Light Transmission  
 CR = Condensation Resistance  
 ER = Canadian Energy Rating

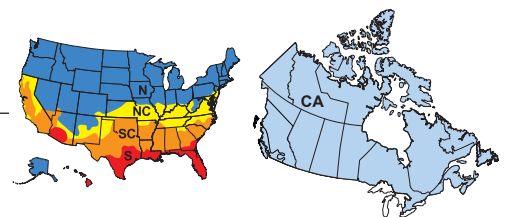
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

ENERGY STAR® values are updated to 2016 (Version 6) criteria.

(2) The values shown are based on Canada's updated ENERGY STAR® 2020 initiative.

For center-glass values, see the Product Performance section.

See the Product Performance section for more detailed information or visit [www.energystar.gov](http://www.energystar.gov) for Energy Star guidelines.







# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)		Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown				
			Ext.	Int.		U-Factor	SHGC	VLT	CR	U. S.				Canada <sup>2</sup>
										Zone				ER
<b>Fixed - High Altitude Glazing - with Laminated Glazing</b>										N	NC	SC	S	CA
1"	Advanced Low-E IG	PEL-N-276-00137-00001	4	7	air	0.31	0.30	0.55	55					
	with grilles-between-the-glass	PEL-N-276-00138-00001				0.31	0.27	0.49	55					
1"	Advanced Low-E IG	PEL-N-276-00149-00001	5	10	air	0.30	0.29	0.54	54	NC				
	with grilles-between-the-glass	PEL-N-276-00150-00001				0.30	0.27	0.48	54	NC				
1"	SunDefense IG	PEL-N-276-00133-00001	4	7	air	0.30	0.22	0.51	56	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00134-00001				0.30	0.20	0.46	56	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00145-00001	5	10	air	0.30	0.23	0.50	54	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00146-00001				0.30	0.20	0.45	54	NC	SC	S		
<b>Fixed - High Altitude Glazing - with Foam Insulation and Laminated Glazing</b>														
1"	Advanced Low-E IG	PEL-N-276-00469-00001	4	7	air	0.30	0.30	0.55	56	NC				
	with grilles-between-the-glass	PEL-N-276-00470-00001				0.30	0.27	0.49	56	NC				
1"	Advanced Low-E IG	PEL-N-276-00481-00001	5	10	air	0.30	0.29	0.54	54	NC				
	with grilles-between-the-glass	PEL-N-276-00482-00001				0.30	0.27	0.48	54	NC				
1"	SunDefense IG	PEL-N-276-00465-00001	4	7	air	0.30	0.22	0.51	56	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00466-00001				0.30	0.20	0.46	56	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00477-00001	5	10	air	0.29	0.23	0.50	54	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00478-00001				0.29	0.20	0.45	54	NC	SC	S		

R-Value = 1/U-Factor  
 SHGC = Solar Heat Gain Coefficient  
 VLT % = Visible Light Transmission  
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 ER = Canadian Energy Rating

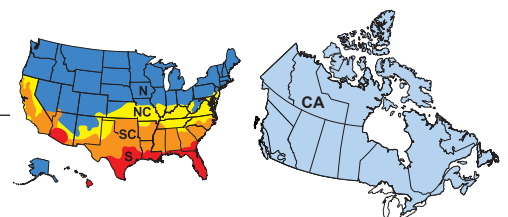
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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# Impervia® Casement Windows

## Glazing Performance - Total Unit

Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown					
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada <sup>2</sup>			
											Zone			ER	Zone	
<b>Fixed -Triple Pane</b>											N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00167-00001	3	3	3	argon	0.21	0.27	0.50	67	N	NC			29	CA
	with grilles-between-the-glass	PEL-N-276-00168-00001					0.22	0.25	0.44	67	N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00169-00001	3	3	3	Krypton	0.17	0.27	0.50	72	N	NC			34	CA
	with grilles-between-the-glass	PEL-N-276-00170-00001					0.17	0.24	0.44	72	N	NC	SC	S	32	CA
1"	Advanced Low-E IG	PEL-N-276-00173-00001	4	4	4	argon	0.24	0.27	0.49	63	N	NC				
	with grilles-between-the-glass	PEL-N-276-00174-00001					0.25	0.24	0.43	63	N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00175-00001	4	4	4	Krypton	0.18	0.27	0.49	69	N	NC			33	CA
	with grilles-between-the-glass	PEL-N-276-00176-00001					0.20	0.24	0.43	69	N	NC	SC	S	29	CA
1"	SunDefense™ IG	PEL-N-276-00179-00001	3	3	3	argon	0.21	0.20	0.46	67	N	NC	SC	S	25	CA
	with grilles-between-the-glass	PEL-N-276-00180-00001					0.22	0.19	0.41	67	N	NC	SC	S		
1"	SunDefense™ IG	PEL-N-276-00181-00001	3	3	3	Krypton	0.17	0.20	0.46	72	N	NC	SC	S	30	CA
	with grilles-between-the-glass	PEL-N-276-00182-00001					0.17	0.18	0.41	72	N	NC	SC	S	29	CA
1"	SunDefense™ IG	PEL-N-276-00185-00001	4	4	4	argon	0.24	0.21	0.45	64	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00186-00001					0.25	0.19	0.40	64	N	NC	SC	S		
1"	SunDefense™ IG	PEL-N-276-00187-00001	4	4	4	Krypton	0.18	0.20	0.45	69	N	NC	SC	S	29	CA
	with grilles-between-the-glass	PEL-N-276-00188-00001					0.19	0.18	0.40	69	N	NC	SC	S	27	CA
1"	NaturalSun Low-E IG	PEL-N-276-00155-00001	3	3	3	argon	0.22	0.45	0.56	67	N				38	CA
	with grilles-between-the-glass	PEL-N-276-00156-00001					0.22	0.41	0.50	67	N				36	CA
1"	NaturalSun Low-E IG	PEL-N-276-00157-00001	3	3	3	Krypton	0.17	0.45	0.56	71	N				45	CA
	with grilles-between-the-glass	PEL-N-276-00158-00001					0.18	0.41	0.50	71	N				41	CA
1"	NaturalSun Low-E IG	PEL-N-276-00161-00001	4	4	4	argon	0.24	0.44	0.55	63	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00162-00001					0.26	0.40	0.50	63	N	NC				
1"	NaturalSun Low-E IG	PEL-N-276-00163-00001	4	4	4	Krypton	0.19	0.44	0.55	68	N				42	CA
	with grilles-between-the-glass	PEL-N-276-00164-00001					0.20	0.40	0.50	68	N	NC			38	CA
<b>Fixed - Triple Pane with Foam Insulation</b>																
1"	Advanced Low-E IG	PEL-N-276-00499-00001	3	3	3	argon	0.21	0.27	0.50	67	N	NC			29	CA
	with grilles-between-the-glass	PEL-N-276-00500-00001					0.21	0.25	0.44	67	N	NC	SC	S	28	CA
1"	Advanced Low-E IG	PEL-N-276-00501-00001	3	3	3	Krypton	0.16	0.27	0.50	72	N	NC			35	CA
	with grilles-between-the-glass	PEL-N-276-00502-00001					0.17	0.24	0.44	72	N	NC	SC	S	32	CA
1"	Advanced Low-E IG	PEL-N-276-00505-00001	4	4	4	argon	0.23	0.27	0.49	64	N	NC				
	with grilles-between-the-glass	PEL-N-276-00506-00001					0.25	0.24	0.43	64	N	NC	SC	S		
1"	Advanced Low-E IG	PEL-N-276-00507-00001	4	4	4	Krypton	0.18	0.27	0.49	69	N	NC			33	CA
	with grilles-between-the-glass	PEL-N-276-00508-00001					0.19	0.24	0.43	69	N	NC	SC	S	30	CA
1"	SunDefense IG	PEL-N-276-00511-00001	3	3	3	argon	0.21	0.20	0.46	68	N	NC	SC	S	25	CA
	with grilles-between-the-glass	PEL-N-276-00512-00001					0.21	0.19	0.41	68	N	NC	SC	S	25	CA
1"	SunDefense IG	PEL-N-276-00513-00001	3	3	3	Krypton	0.16	0.20	0.46	72	N	NC	SC	S	31	CA
	with grilles-between-the-glass	PEL-N-276-00514-00001					0.16	0.18	0.41	72	N	NC	SC	S	30	CA
1"	SunDefense IG	PEL-N-276-00517-00001	4	4	4	argon	0.23	0.21	0.45	64	N	NC	SC	S		
	with grilles-between-the-glass	PEL-N-276-00518-00001					0.24	0.19	0.40	64	N	NC	SC	S		
1"	SunDefense IG	PEL-N-276-00519-00001	4	4	4	Krypton	0.18	0.20	0.45	69	N	NC	SC	S	29	CA
	with grilles-between-the-glass	PEL-N-276-00520-00001					0.19	0.18	0.40	69	N	NC	SC	S	27	CA
1"	NaturalSun Low-E IG	PEL-N-276-00487-00001	3	3	3	argon	0.21	0.45	0.56	67	N				40	CA
	with grilles-between-the-glass	PEL-N-276-00488-00001					0.22	0.41	0.50	67	N				36	CA
1"	NaturalSun Low-E IG	PEL-N-276-00489-00001	3	3	3	Krypton	0.17	0.45	0.56	72	N				45	CA
	with grilles-between-the-glass	PEL-N-276-00490-00001					0.17	0.41	0.50	72	N				42	CA
1"	NaturalSun Low-E IG	PEL-N-276-00493-00001	4	4	4	argon	0.24	0.44	0.55	63	N				35	CA
	with grilles-between-the-glass	PEL-N-276-00494-00001					0.25	0.40	0.50	63	N	NC				
1"	NaturalSun Low-E IG	PEL-N-276-00495-00001	4	4	4	Krypton	0.18	0.44	0.55	69	N				43	CA
	with grilles-between-the-glass	PEL-N-276-00496-00001					0.19	0.40	0.50	69	N	NC			39	CA

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 VLT % = Visible Light Transmission CR = Condensation Resistance  
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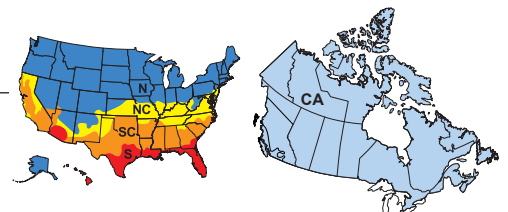
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Glazing Thickness	Type of Glazing	NFRC Certified Product #	Glass (mm)			Gap Fill	Performance Values <sup>1</sup>				Shaded Areas Meet ENERGY STAR® Performance Criteria in Zones Shown						
			Ext.	Middle	Int.		U-Factor	SHGC	VLT	CR	U. S.		Canada <sup>2</sup>				
											Zone		ER	Zone			
<b>Fixed - Triple Pane with High Altitude Glazing</b>											N	NC	SC	S			CA
1"	(HA) Advanced Low-E IG	PEL-N-276-00165-00001	3	3	3	air	0.25	0.27	0.50	63	N	NC					
	with grilles-between-the-glass	PEL-N-276-00166-00001					0.26	0.25	0.44	63	N	NC	SC	S			
1"	(HA) Advanced Low-E IG	PEL-N-276-00171-00001	4	4	4	air	0.28	0.27	0.49	60		NC					
	with grilles-between-the-glass	PEL-N-276-00172-00001					0.30	0.25	0.43	60		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00177-00001	3	3	3	air	0.25	0.21	0.46	63	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00178-00001					0.26	0.19	0.41	63	N	NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00183-00001	4	4	4	air	0.28	0.21	0.45	60		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00184-00001					0.30	0.19	0.40	60		NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00153-00001	3	3	3	air	0.26	0.45	0.56	63	N						
	with grilles-between-the-glass	PEL-N-276-00154-00001					0.26	0.41	0.50	63	N						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00159-00001	4	4	4	air	0.29	0.44	0.55	59	N						
	with grilles-between-the-glass	PEL-N-276-00160-00001					0.30	0.39	0.50	59		NC					
<b>Fixed - Triple Pane with High Altitude Glazing and Foam Insulation</b>																	
1"	(HA) Advanced Low-E IG	PEL-N-276-00497-00001	3	3	3	air	0.25	0.27	0.50	63	N	NC					
	with grilles-between-the-glass	PEL-N-276-00498-00001					0.25	0.25	0.44	63	N	NC	SC	S			
1"	(HA) Advanced Low-E IG	PEL-N-276-00503-00001	4	4	4	air	0.28	0.27	0.49	60		NC					
	with grilles-between-the-glass	PEL-N-276-00504-00001					0.29	0.25	0.43	60		NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00509-00001	3	3	3	air	0.24	0.21	0.46	64	N	NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00510-00001					0.25	0.19	0.41	64	N	NC	SC	S			
1"	(HA) SunDefense IG	PEL-N-276-00515-00001	4	4	4	air	0.28	0.21	0.45	60		NC	SC	S			
	with grilles-between-the-glass	PEL-N-276-00516-00001					0.29	0.19	0.40	60		NC	SC	S			
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00485-00001	3	3	3	air	0.25	0.45	0.56	63	N				35	CA	
	with grilles-between-the-glass	PEL-N-276-00486-00001					0.26	0.41	0.50	63	N						
1"	(HA) NaturalSun Low-E IG	PEL-N-276-00491-00001	4	4	4	air	0.28	0.44	0.55	60	N						
	with grilles-between-the-glass	PEL-N-276-00492-00001					0.29	0.39	0.50	60	N	NC					

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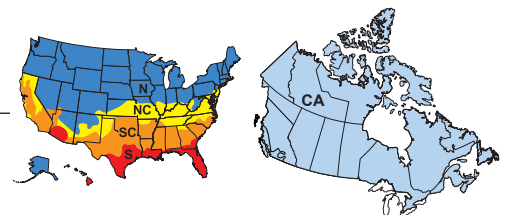
(1) Glazing performance values are calculated based on NFRC 100, NFRC 200 and NFRC 500.

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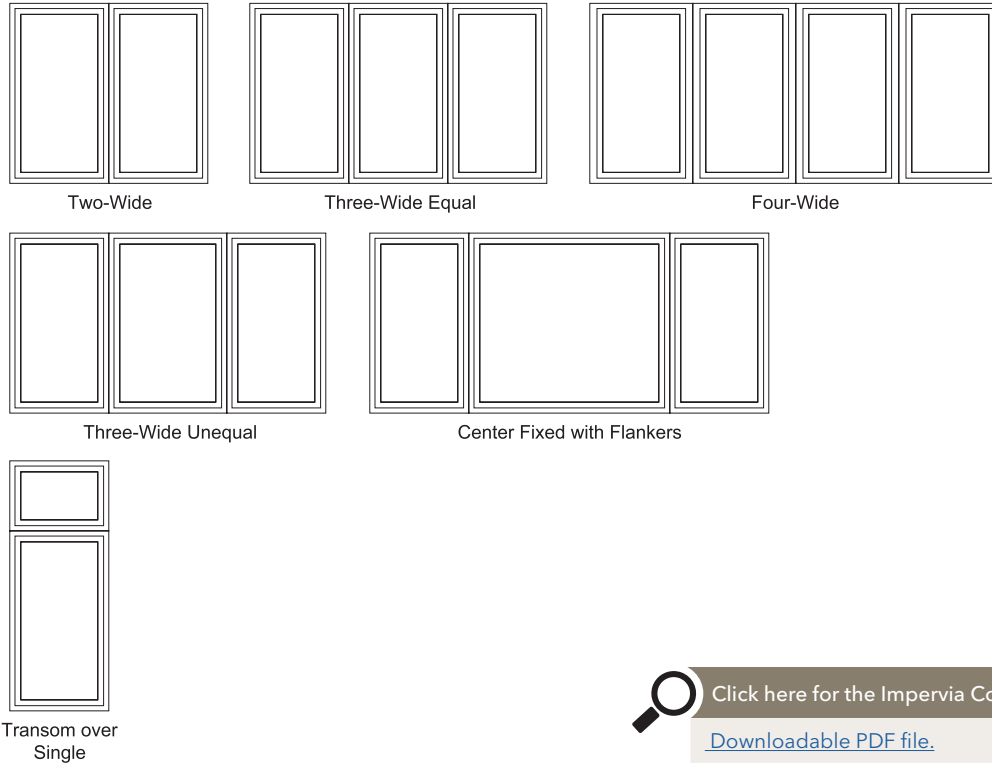
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A combination is defined as an assembly formed by two or more separate windows or doors whose frames are mullered together utilizing a combination mullion or reinforcing mullion.

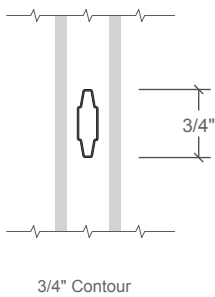
Below are available factory-assembled combinations. See the Combination section for requirements and limitations related to mulling various combinations plus configuration size range information.



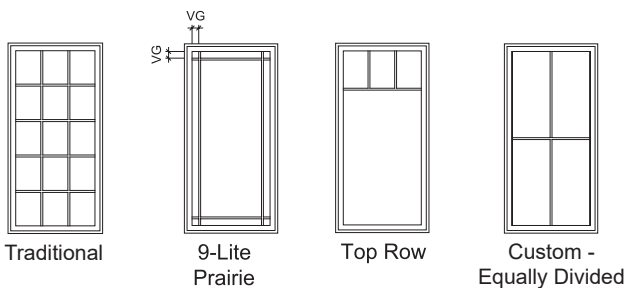
 [Click here for the Impervia Combinations Section](#)  
[Downloadable PDF file.](#)

### Grille Profiles

Grilles-Between-the-Glass



### Grille Patterns



Standard corner lite dimension for Prairie patterns = 4" visible glass (VG).

(1) Standard visible glass to center line of separator bar = 14" or half the total visible glass height, whichever is smaller. Multiple rows are available up to 50% glass size.

Pattern availability may vary depending on size of unit.

VG = Visible Glass  
Lite dimensions noted can vary.



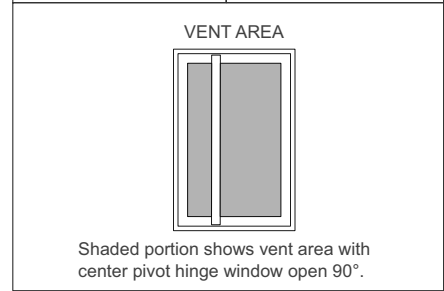
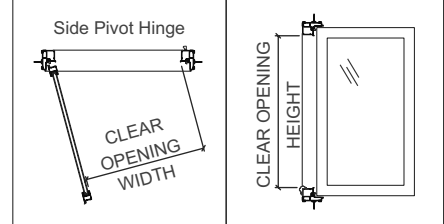
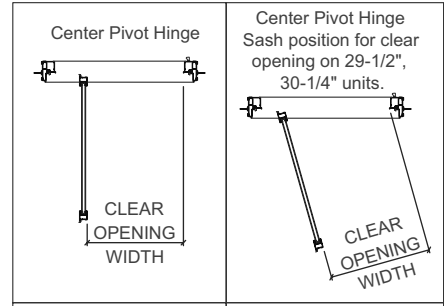
Size Tables

Transoms

	(457) (445)	(610) (597)	(711) (699)	(762) (749)	(813) (800)	(914) (902)
Opening	1' 6"	2' 0"	2' 4"	2' 6"	2' 8"	3' 0"
Frame	1' 5 1/2"	1' 11 1/2"	2' 3 1/2"	2' 5 1/2"	2' 7 1/2"	2' 11 1/2"

SPECIAL NARROWER AND WIDER SIZES AVAILABLE						
SPECIAL SIZES AVAILABLE	1-6/1-2	2-0/1-2	2-4/1-2	2-6/1-2	2-8/1-2	3-0/1-2
	1-6/1-6	2-0/1-6	2-4/1-6	2-6/1-6	2-8/1-6	3-0/1-6
	1-6/2-0	2-0/2-0	2-4/2-0	2-6/2-0	2-8/2-0	3-0/2-0



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

Vent and Fixed Units

	(762) (749)	(914) (902)	(1 067) (1 054)	(1 219) (1 207)	(1 372) (1 359)	(1 524) (1 511)	(1 676) (1 664)	(1 829) (1 816)
Opening	2' 6"	3' 0"	3' 6"	4' 0"	4' 6"	5' 0"	5' 6"	6' 0"
Frame	2' 5 1/2"	2' 11 1/2"	3' 5 1/2"	3' 11 1/2"	4' 5 1/2"	4' 11 1/2"	5' 5 1/2"	5' 11 1/2"

SPECIAL SHORTER AND TALLER SIZES AVAILABLE								
SPECIAL SHORTER AND TALLER SIZES AVAILABLE	1-6/2-6	2-0/2-6	2-4/2-6	2-6/2-6	2-8/2-6	3-0/2-6		
	1-6/3-0	2-0/3-0	2-4/3-0	2-6/3-0 E3	2-8/3-0 E3	3-0/3-0 E1		
	1-6/3-6	2-0/3-6	2-4/3-6 E3	2-6/3-6 E2	2-8/3-6 E2	3-0/3-6 E		
	1-6/4-0	2-0/4-0	2-4/4-0 E2	2-6/4-0 E	2-8/4-0 E	3-0/4-0 E		
	1-6/4-6	2-0/4-6	2-4/4-6 E2	2-6/4-6 E	2-8/4-6 E	3-0/4-6 E		
	1-6/5-0	2-0/5-0	2-4/5-0 E2	2-6/5-0 E	2-8/5-0 E	3-0/5-0 E		
	1-6/5-6	2-0/5-6	2-4/5-6 E2	2-6/5-6 E	2-8/5-6 E	3-0/5-6 E		
	1-6/6-0	2-0/6-0	2-4/6-0 E2	2-6/6-0 E	3-8/6-0 E	3-0/6-0 E		

Egress Notes:

Check all applicable local codes for emergency egress requirements.

- E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².
- E2 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.7 ft².
- E3 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.0 ft².

See Design Data pages in this section for clear opening dimensions.

☐ = Tempered glass.

Not to scale.

Any vent casement with frame height greater than 70" will have 3mm tempered glass to reduce sash weight.

All units are available as fixed in the Casement section.

Traditional grille patterns shown. See Grilles in the Overview section for additional patterns and profiles.



Size Tables

Transoms

Opening	(1 219)	(1 524)	(1 829)
	(1 207)	(1 511)	(1 816)
4' 0"	3' 11 1/2"	4' 11 1/2"	5' 11 1/2"
<b>SPECIAL NARROWER AND WIDER SIZES AVAILABLE</b>			
1' 2"	4-0/1-2	5-0/1-2	6-0/1-2
1' 6"	4-0/1-6	5-0/1-6	6-0/1-6
2' 0"	4-0/2-0	5-0/2-0	6-0/2-0

Fixed Units

(1 829)	(1 676)	(1 524)	(1 372)	(1 219)	(1 067)	(914)
(1 816)	(1 664)	(1 511)	(1 359)	(1 207)	(1 054)	(902)
6' 0"	5' 6"	5' 0"	4' 6"	4' 0"	3' 6"	3' 0"
5' 11 1/2"	5' 5 1/2"	4' 11 1/2"	4' 5 1/2"	3' 11 1/2"	3' 5 1/2"	2' 11 1/2"
<b>SPECIAL SHORTER AND TALLER SIZES AVAILABLE</b>						
	4-0/5-6	4-0/5-0	4-0/4-6	4-0/4-0	4-0/3-6	4-0/3-0
	5-0/5-6	5-0/5-0	5-0/4-6	5-0/4-0	5-0/3-6	5-0/3-0
	6-0/5-6	6-0/5-0	6-0/4-6	6-0/4-0	6-0/3-6	6-0/3-0
	4-0/6-0	5-0/6-0	6-0/6-0			

Not to scale.

Traditional grille patterns shown. See Grilles in the Overview section for additional patterns and profiles.



Special Size Frame Dimensions\*

	Minimum	Maximum
<b>Vent</b>	1' 5-1/2" W x 1' 8" H (17-1/2" x 20") (445 x 508)	3' 1-1/2" W x 6' 7-1/2" H (37-1/2" x 79-1/2") (953 x 2 019)
<b>Fixed</b>	1' 1-1/2" W x 11-1/2" H (13-1/2" x 11-1/2") (343 x 292)	5' 11-1/2" W x 6' 7-1/2" H (71-1/2" x 79-1/2") (1 816 x 2 019)

\* Available within size range shown.

Keep frame dimensions to the nearest 1/8" increment. Frame width cannot exceed frame height on special size vent units.

Miscellaneous Formulas

	Formula
<b>Visible Glass</b>	Width = Frame - 5-7/16" Height = Frame - 5-7/16"
<b>Actual Glass</b>	Width = Frame - 4-3/8" Height = Frame - 4-3/8"

Clear Opening Height

Frame Height - 4-3/4"

Clear Opening Width

Hinge	Frame Width	Formula	Angle
Center Pivot / Roto Operator	29-1/2" to 30-1/4"	FW - 9-1/2"	75°
Center Pivot / Roto Operator	30-1/4" to 37-1/2"	FW - 10-1/4"	90°
Side Pivot / Roto Operator	25-1/2" to 32"	FW - 5-1/2"	75°
Side Pivot / Easy Slide Operator	25-1/2" to 37-1/2"	FW - 5-1/2"	75° See chart
Side Pivot / Easy Slide Operator	30" to 37-1/2"	FW x 0.67	54° See chart

Vent Opening Area

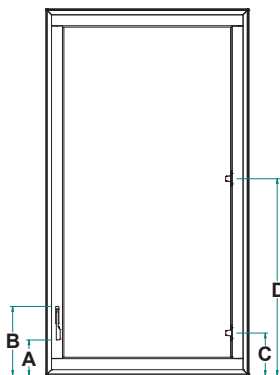
(Clear Opening Width) x (FH - 4.75) ÷ 144

Lock Handle Operator Height

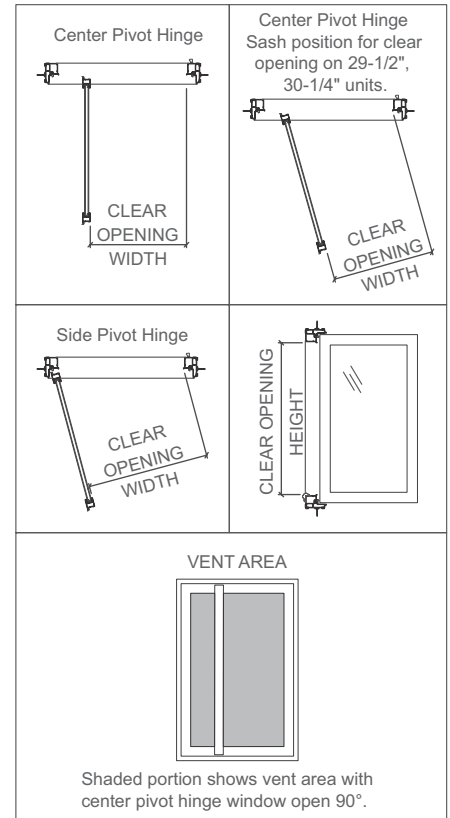
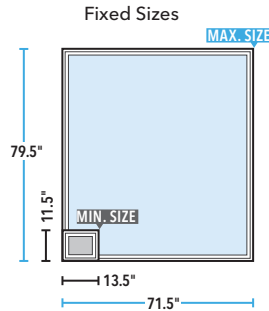
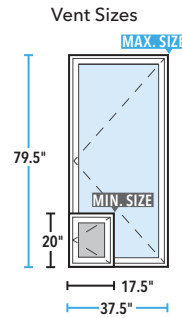
Frame Height	Locked Location (A)	Unlocked Location (B)
≥ 20" to ≤ 59.5"	4-5/8"	9-3/8"
> 59.5" to < 72.5"	9-5/8"	14-3/8"
≥ 72.5" to ≤ 79.5"	30-9/16"	35-5/16"

Easy-Slide Operator Height

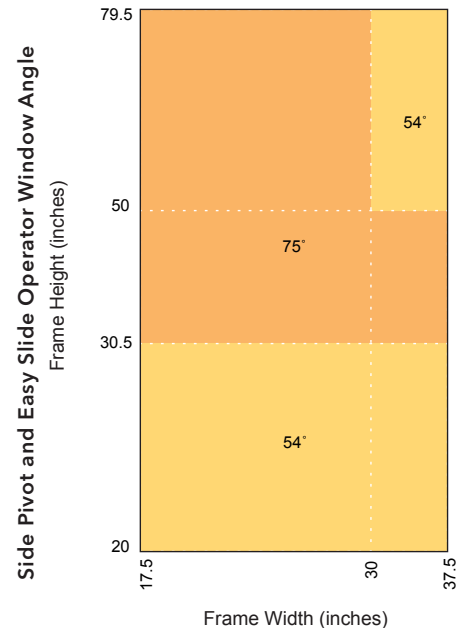
Frame Height	Closed Location (C)	Open Location (D)
≥ 20" to < 30.5"	5-1/2"	15-1/2"
≥ 30.5" to < 72.5"	5-1/2"	25-1/2"
≥ 72.5" to ≤ 79.5"	21-1/2"	41-1/2"



Height is measured from the bottom of the frame, proper installation height is required for ADA compliance.



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

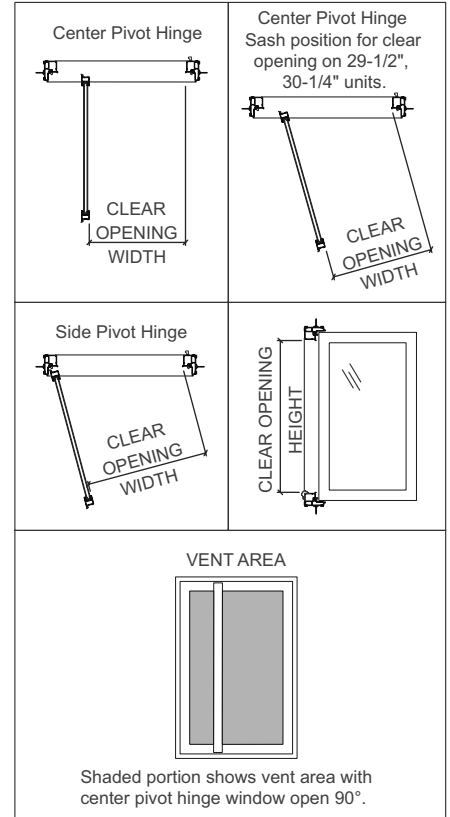




# Impervia® Casement Windows

## Design Data

Vent									
Unit	Egress	Clear Opening			Vent Area Ft <sup>2</sup>	Visible Glass Ft <sup>2</sup>	Standard Glass Thickness (mm)		Performance Class & Grade <sup>1</sup>
		Width (Inches)	Height (Inches)	Ft <sup>2</sup>			Annealed	Tempered	
1-6/2-6		7-1/4	24-3/4	1.2	1.7	2.0	3	3	LC+50/-60
1-6/3-0		7-1/4	30-3/4	1.5	2.1	2.5	3	3	LC+50/-60
1-6/3-6		7-1/4	36-3/4	1.9	2.5	3.0	3	3	LC+50/-60
1-6/4-0		7-1/4	42-3/4	2.2	2.9	3.5	3	3	LC+50/-60
1-6/4-6		7-1/4	48-3/4	2.5	3.3	4.0	3	3	LC+50/-60
1-6/5-0		7-1/4	54-3/4	2.8	3.8	4.5	3	3	LC+50/-60
1-6/5-6		7-1/4	60-3/4	3.1	4.2	5.0	3	3	LC50
1-6/6-0 T		7-1/4	66-3/4	3.4	4.6	5.5	-	3	LC50
2-0/2-6		13-1/4	24-3/4	2.3	2.6	3.0	3	3	LC+50/-60
2-0/3-0		13-1/4	30-3/4	2.8	3.3	3.7	3	3	LC+50/-60
2-0/3-6		13-1/4	36-3/4	3.4	4.0	4.5	3	3	LC+50/-60
2-0/4-0		13-1/4	42-3/4	3.9	4.6	5.2	3	3	LC+50/-60
2-0/4-6		13-1/4	48-3/4	4.5	5.3	6.0	3	3	LC+50/-60
2-0/5-0		13-1/4	54-3/4	5.0	6.0	6.7	3	3	LC+50/-60
2-0/5-6		13-1/4	60-3/4	5.6	6.7	7.5	3	3	LC50
2-0/6-0		13-1/4	66-3/4	6.1	7.3	8.2	3	3	LC50
2-4/2-6		17-1/4	24-3/4	3.0	3.3	3.6	3	3	LC+50/-60
2-4/3-0		17-1/4	30-3/4	3.7	4.1	4.6	3	3	LC+50/-60
2-4/3-6	E3	17-1/4	36-3/4	4.4	5.0	5.5	3	3	LC+50/-60
2-4/4-0	E2	17-1/4	42-3/4	5.1	5.8	6.4	3	3	LC+50/-60
2-4/4-6	E2	17-1/4	48-3/4	5.8	6.6	7.3	3	3	LC+50/-60
2-4/5-0	E2	17-1/4	54-3/4	6.6	7.5	8.2	3	3	LC+50/-60
2-4/5-6	E2	17-1/4	60-3/4	7.3	8.3	9.1	3	3	LC50
2-4/6-0	E2	17-1/4	66-3/4	8.0	9.1	10.1	4	3	LC50
2-6/2-6		20	24-3/4	3.4	3.6	4.0	3	3	LC+50/-60
2-6/3-0	E3	20	30-3/4	4.3	4.5	5.0	3	3	LC+50/-60
2-6/3-6	E2	20	36-3/4	5.1	5.5	6.0	3	3	LC+50/-60
2-6/4-0	E	20	42-3/4	5.9	6.4	7.0	3	3	LC+50/-60
2-6/4-6	E	20	48-3/4	6.8	7.3	8.0	3	3	LC+50/-60
2-6/5-0	E	20	54-3/4	7.6	8.2	9.0	3	3	LC+50/-60
2-6/5-6	E	20	60-3/4	8.4	9.1	10.0	3	3	LC50
2-6/6-0	E	20	66-3/4	9.3	10.1	11.0	4	3	LC50
2-8/2-6		21-1/4	24-3/4	3.7	3.9	4.3	3	3	LC+50/-60
2-8/3-0	E3	21-1/4	30-3/4	4.5	4.9	5.4	3	3	LC+50/-60
2-8/3-6	E2	21-1/4	36-3/4	5.4	5.9	6.5	3	3	LC+50/-60
2-8/4-0	E	21-1/4	42-3/4	6.3	7.0	7.6	3	3	LC+50/-60
2-8/4-6	E	21-1/4	48-3/4	7.2	8.0	8.6	3	3	LC+50/-60
2-8/5-0	E	21-1/4	54-3/4	8.1	9.0	9.7	3	3	LC+50/-60
2-8/5-6	E	21-1/4	60-3/4	9.0	10.0	10.8	3	3	LC50
2-8/6-0	E	21-1/4	66-3/4	9.9	11.0	11.9	4	3	LC50
3-0/2-6		25-1/4	24-3/4	4.3	4.6	5.0	3	3	LC+50/-60
3-0/3-0	E1	25-1/4	30-3/4	5.4	5.8	6.2	3	3	LC+50/-60
3-0/3-6	E	25-1/4	36-3/4	6.4	6.9	7.5	3	3	LC+50/-60
3-0/4-0	E	25-1/4	42-3/4	7.5	8.1	8.7	3	3	LC+50/-60
3-0/4-6	E	25-1/4	48-3/4	8.5	9.3	10.0	3	3	LC+50/-60
3-0/5-0	E	25-1/4	54-3/4	9.6	10.4	11.2	3	3	LC+50/-60
3-0/5-6	E	25-1/4	60-3/4	10.7	11.6	12.5	3	3	LC50
3-0/6-0	E	25-1/4	66-3/4	11.7	12.8	13.7	4	3	LC50



Center pivot hinge is available with crank operator only. Crank operator with side pivot hinge available in limited sizes. Side pivot hinge does not include wash feature.

### Egress Notes:

Check all applicable local codes for emergency egress requirements.

- E = Window meets minimum clear opening of 24" height, 20" width, and 5.7 ft<sup>2</sup>.
- E1 = Window meets minimum clear opening of 24" height, 20" width, and 5.0 ft<sup>2</sup>.
- E2 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.7 ft<sup>2</sup>.
- E3 = With optional side pivot hardware, window meets minimum clear opening of 24" height, 20" width, and 5.0 ft<sup>2</sup>.

(1) Maximum performance when glazed with the appropriate glass thickness. Second value, where shown, requires tempered glass.

To convert areas to square meters (m<sup>2</sup>), multiply square feet by 0.0929.





# Impervia® Casement Windows

## Design Data

Transom Units				
Unit	Visible Glass Ft <sup>2</sup>	Standard Glass Thickness (mm)		Performance Class & Grade <sup>1</sup>
		Annealed	Tempered	
1-6/1-2	0.6	3	3	LC+50/-60
1-6/1-6	1.0	3	3	LC+50/-60
1-6/2-0	1.5	3	3	LC+50/-60
2-0/1-2	1.0	3	3	LC+50/-60
2-0/1-6	1.5	3	3	LC+50/-60
2-0/2-0	2.2	3	3	LC+50/-60
2-4/1-2	1.2	3	3	LC+50/-60
2-4/1-6	1.8	3	3	LC+50/-60
2-4/2-0	2.7	3	3	LC+50/-60
2-6/1-2	1.3	3	3	LC+50/-60
2-6/1-6	2.0	3	3	LC+50/-60
2-6/2-0	3.0	3	3	LC+50/-60
2-8/1-2	1.4	3	3	LC+50/-60
2-8/1-6	2.1	3	3	LC+50/-60
2-8/2-0	3.2	3	3	LC+50/-60
3-0/1-2	1.6	3	3	LC+50/-60
3-0/1-6	2.5	3	3	LC+50/-60
3-0/2-0	3.7	3	3	LC+50/-60
4-0/1-2	2.3	3	3	LC+50/-60
4-0/1-6	3.5	3	3	LC+50/-60
4-0/2-0	5.2	3	3	LC+50/-60
5-0/1-2 T	3.0	–	3	LC+50/-60
5-0/1-6	4.5	3	3	LC+50/-60
5-0/2-0	6.7	3	3	LC+50/-60
6-0/1-2 T	3.6	–	3	LC45
6-0/1-6 T	5.5	–	3	LC45
6-0/2-0	8.2	3	3	LC45

Fixed Units				
Unit	Visible Glass Ft <sup>2</sup>	Standard Glass Thickness (mm)		Performance Class & Grade <sup>1</sup>
		Annealed	Tempered	
3-0/3-0	6.2	3	3	LC+50/-60
3-0/3-6	7.5	3	3	LC+50/-60
3-0/4-0	8.7	3	3	LC+50/-60
3-0/4-6	10.0	3	3	LC+50/-60
3-0/5-0	11.2	3	3	LC+50/-60
3-0/5-6	12.5	3	3	LC50
3-0/6-0	13.7	3	3	LC45/LC50
4-0/3-0	8.7	3	3	LC+50/-60
4-0/3-6	10.5	3	3	LC+50/-60
4-0/4-0	12.2	3	3	LC+50/-60
4-0/4-6	14.0	3	3	LC50/LC-60
4-0/5-0	15.7	3	3	LC45/LC50/LC-60
4-0/5-6	17.5	4	4	LC50
4-0/6-0	19.2	4	4	LC50
5-0/3-0	11.2	3	3	LC+50/-60
5-0/3-6	13.5	3	3	LC50/LC-60
5-0/4-0	15.7	3	3	LC45/LC50/LC-60
5-0/4-6	18.0	4	4	LC+50/-60
5-0/5-0	20.2	4	5	LC50/LC-60
5-0/5-6	22.5	4	5	LC50
5-0/6-0	24.7	5	5	LC50
6-0/3-0	13.7	3	3	LC45
6-0/3-6	16.5	3	3	LC45
6-0/4-0	19.2	4	4	LC45
6-0/4-6	22.0	4	4	LC45
6-0/5-0	24.7	4	5	LC45
6-0/5-6	27.5	5	5	LC45
6-0/6-0	30.2	5	6	LC45

(1) Maximum performance when glazed with the appropriate glass thickness. Second value, where shown, requires tempered glass.

To convert areas to square meters (m<sup>2</sup>), multiply square feet by 0.0929.



Detailed Product Description

Frame

- Frame is Duracast—five-layer pultruded fiberglass material [with optional foam insulation<sub>1</sub>] reinforced with a Pella patented interlocking mat.
- Overall frame depth is 3-1/4".
- Nominal wall thickness of Duracast® fiberglass composite members is .050" to .090" thick.
- Frame corners are mitered, joined and bonded with corner lock and injected with sealant.
- Jambs contain factory-drilled installation screw holes on block frame.

Sash

- Sash is Duracast fiberglass composite – five-layer pultruded fiberglass material, reinforced with a Pella patented interlocking mat.
- All sash members have mitered corners bonded with corner lock and sealed with injected sealant.

Exterior / Interior

- Duracast fiberglass composite surfaces with powder-coat paint finish.
  - Color is [White] [Tan] [Brown] [Black] [Morning Sky Gray].
  - or -
  - Dual-color option [Tan] [Brown] [Black] [Morning Sky Gray] exterior with White interior<sub>2</sub>.

Glazing System

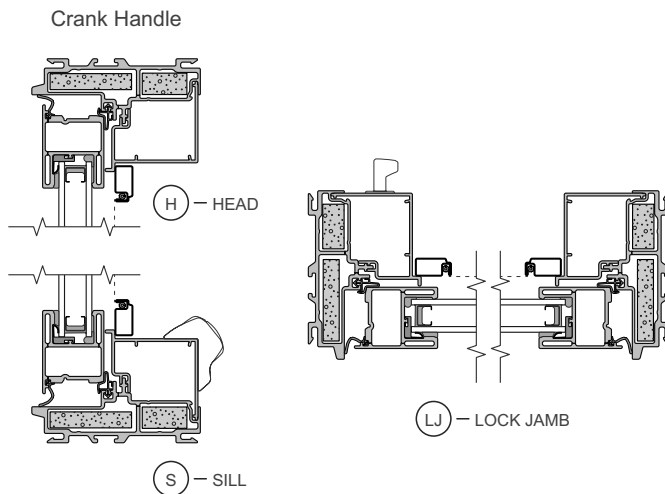
- Quality float glass complying with ASTM C 1036.
- 11/16" dual-pane insulating glass [[annealed] [tempered]] [obscure<sub>3</sub>] [[clear] [Advanced] [SunDefense™] [AdvancedComfort] [NaturalSun] Low-E coated, with argon]] sealed and bonded to sash.
- or -
- 1" Triple-pane insulating glass [annealed] [tempered] [obscure<sub>3</sub>] [clear] [[Advanced] [SunDefense™] [AdvancedComfort] [NaturalSun] Low-E coated, [with argon]] [[bronze] [gray] [green] Advanced Low-E [with Argon] [with Krypton]] sealed and bonded to sash.
- High altitude glazing available.

Weatherstripping

Dual weatherstripping.

- Continuous, flexible ThermoPlastic Vulcanizate material in dual durometer design, compressed between frame and sash for positive seal on all four sides.
- Secondary ThermoPlastic Vulcanizate leaf-type weatherstrip between edge of sash and frame.

Foam Insulation Inserts<sub>1</sub>



Hardware

- Easy-Slide operator assembly
  - Hardened, nickel-coated Steel worm and wheel gears.
  - Zinc-magnesium alloy hob and gearbox with corrosion-protecting ultra-clear finish.
  - 5 ball bearings.
  - Stainless steel swing arm and hinge pin for extra corrosion protection of exposed components.
  - Kevlar-reinforced drive belt.
  - Harsh environment approved – ASTM B 117 salt chamber and debris cycling, 20,000 life cycle test approved.
  - or -
- Roto operator assembly
  - Steel worm gear sash operator with hardened gears.
  - Operator base is zinc die cast with painted finish.
  - Operator linkage, hinge slide, and hinge arms are 300 series stainless steel.
  - Exposed fasteners are stainless steel.
  - Hardware shall exceed 1,000 hours salt spray exposure per ASTM B 117.
- Finish of integrated folding crank is [baked enamel [White] [Brown] [Tan] [Matte Black] [Morning Sky Gray]] [Satin Nickel (Roto operator only)]. All vent units are available with left- or right-hand hinging.
- Unison Locking System—A single handle locking system operates positive-acting arms that reach out and pull the sash into a locked position: one installed on units 27-1/2" and smaller frame height, two unison operating locks installed on units over 27-1/2" frame height, three unison operating locks over 72-1/2".
- Lock handle finish is [baked enamel [White] [Brown] [Tan] [Matte Black] [Morning Sky Gray]] [Satin Nickel (Roto operator only)].

Optional Products

Screens

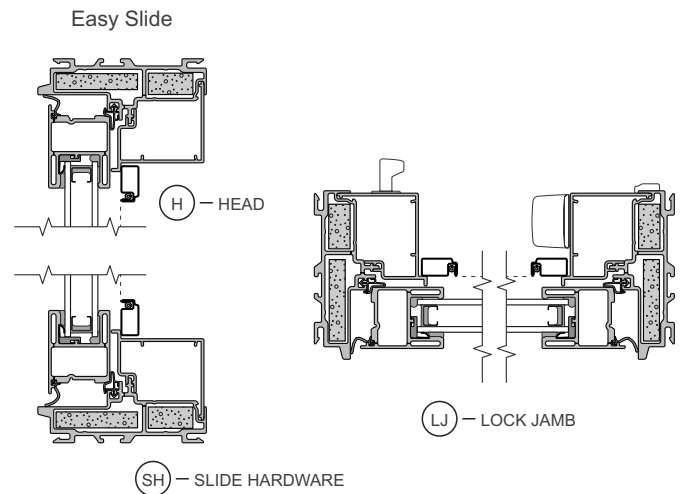
- Conventional Black Vinyl-coated 18/16 mesh fiberglass screen cloth complying with ASTM D 3656 and SMA 1201, set in aluminum frame fitted to inside of window, supplied complete with all necessary hardware.
- InView™ screens
  - Vinyl-coated 18/18 mesh fiberglass screen cloth complying with SMA 1201, set in aluminum frame fitted to inside of window, supplied complete with all necessary hardware.
  - Screen frame finish is baked enamel, color to match interior.

Grilles

- Grilles-Between-the-Glass
  - Insulating glass contains 3/4" contoured aluminum grilles permanently installed between two panes of glass.
  - Grilles are factory prefinished [White] [Tan] [Brown] [Black] [Morning Sky Gray] to match interior and exterior finish.

Hardware

- Optional factory applied limited opening hardware available for vent units in stainless steel; nominal 3" opening.
- Optional window opening control device available for field installation. Device allows window to open less than 4" with normal operation, with a release mechanism that allows the sash to open completely. Complies with ASTM F2090-10.



(1) Foam insulation inserts are not available with clear glazing.  
 (2) Dual-color finish is not available on products with integral nailing fin.  
 (3) Obscure glazing is not available when AdvancedComfort Low-E coated IG is specified.

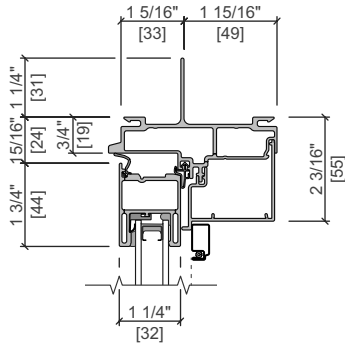


# Impervia® Casement Windows

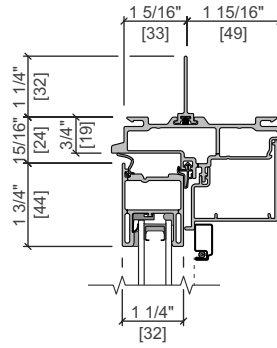
## Unit Sections - Frame Types

### NEW CONSTRUCTION FRAME

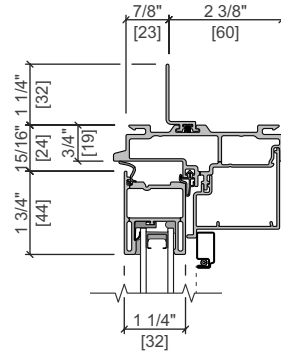
**Integral Nailing Fin**



**Standard Block Frame with Standard Fin**

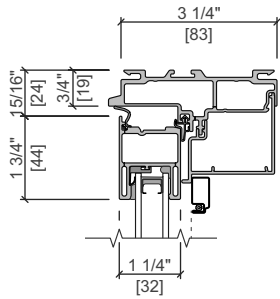


**Standard Block Frame with Off Set Fin**



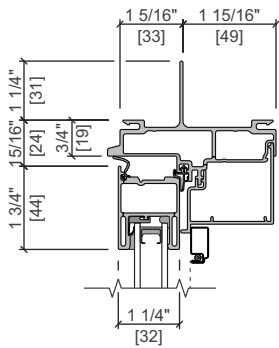
### REPLACEMENT FRAME

**Standard Block Frame**

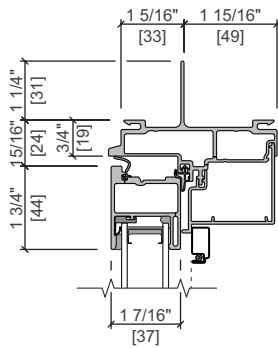


### GLAZING OPTIONS

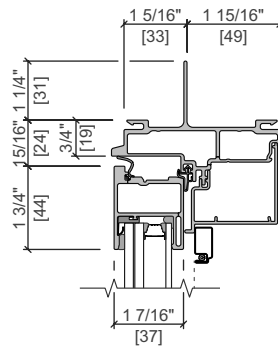
**1 1/16" IG**



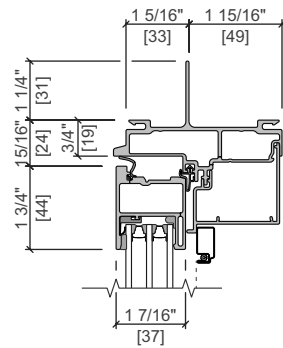
**1" IG**



**1" Sound IG**



**1" Triple IG**



Scale 3" = 1' 0"

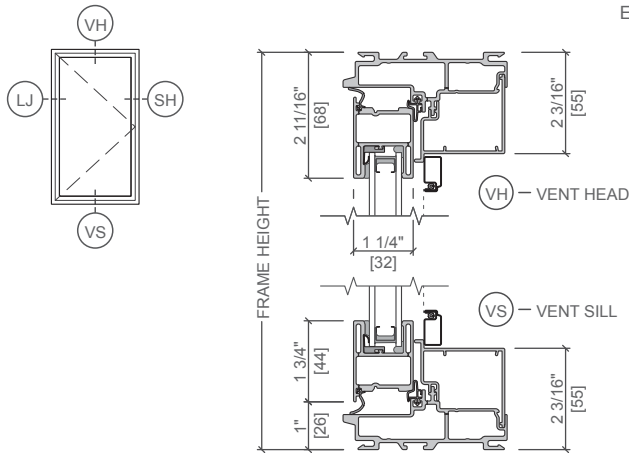
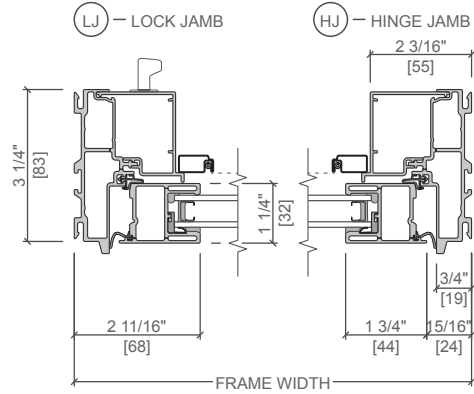
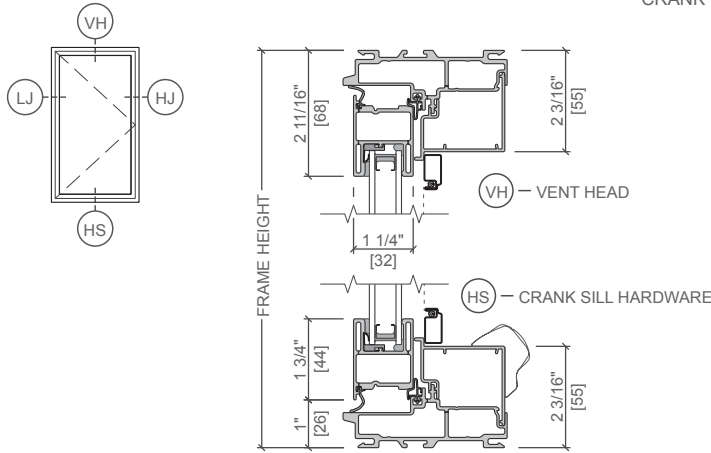
All dimensions are approximate.



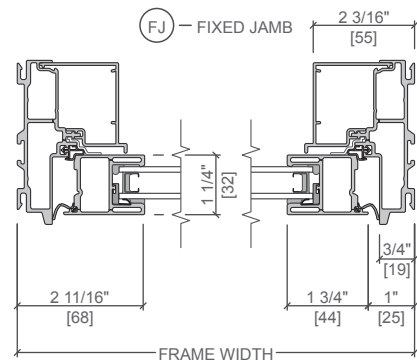
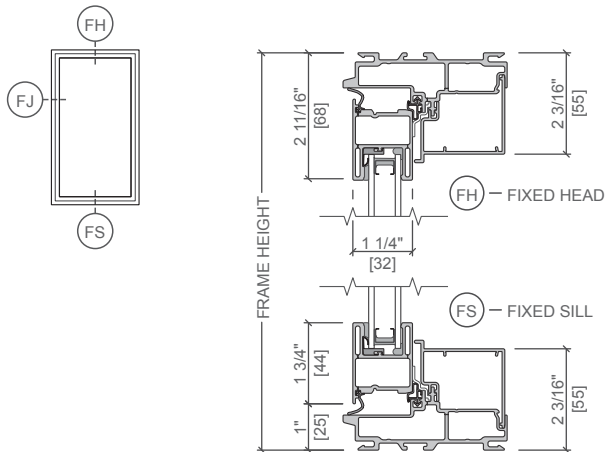
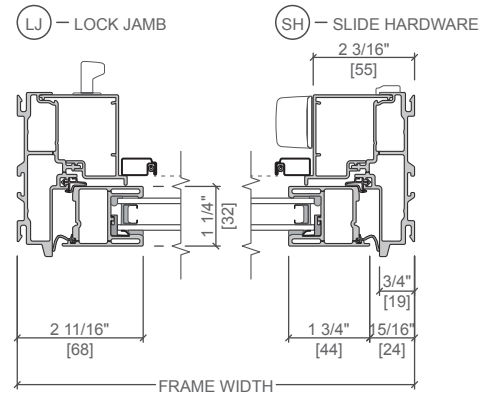
# Impervia® Casement Windows

## Unit Sections

### CRANK HARDWARE



### EASY SLIDE HARDWARE



Scale 3" = 1' 0"

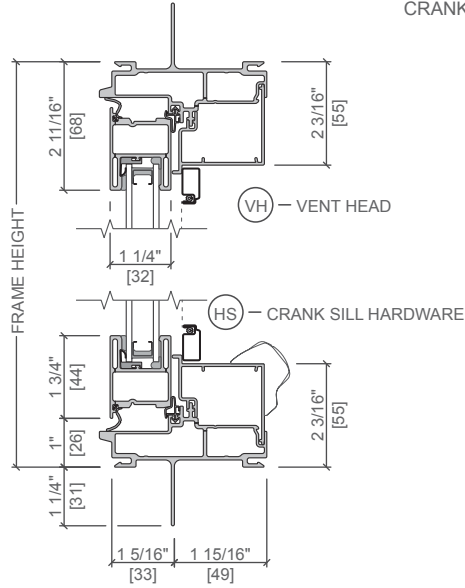
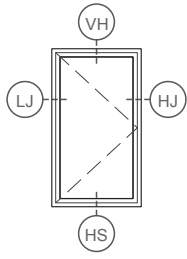
All dimensions are approximate.

See the Installation and Performance section on Pella.com for mullion applications and structural limitations.

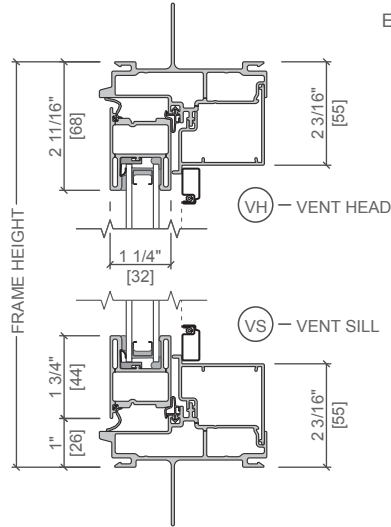
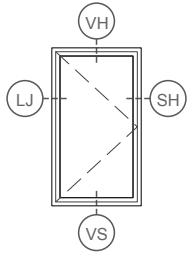
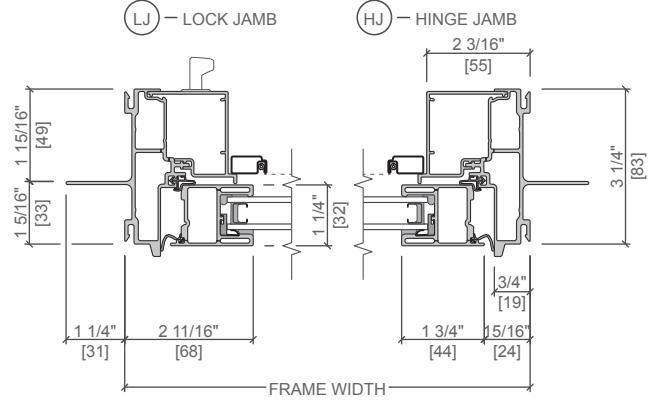


# Impervia® Casement Windows

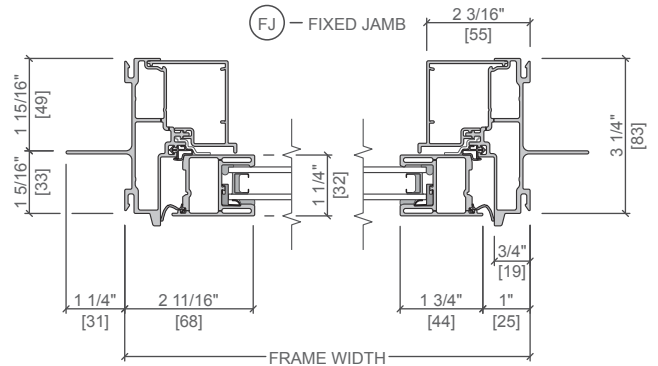
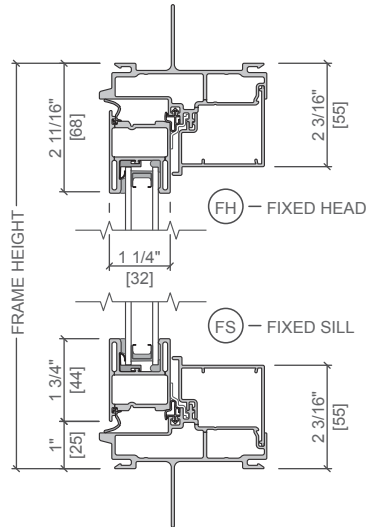
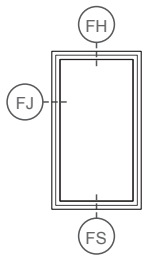
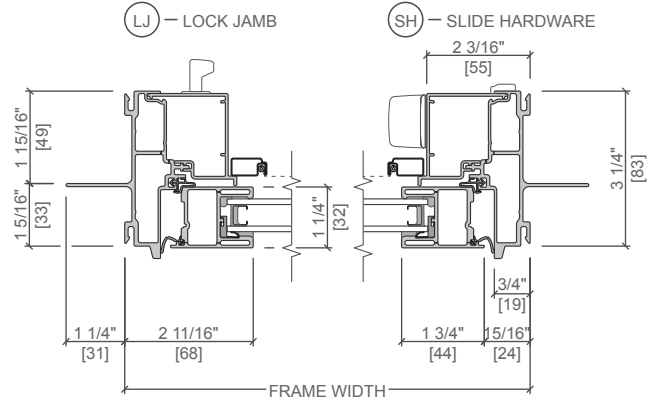
## Unit Sections - Integral Fin



CRANK HARDWARE



EASY SLIDE HARDWARE



Scale 3" = 1' 0"  
All dimensions are approximate.