

U-factor:

Also known as thermal transmittance. For U-factor, the lower the number the slower the rate of heat flow and the better the insulating quality. This is the heat transfer per time per area and per degree of temperature difference as calculated per ANSI/NFRC 100 Procedure for Determining Fenestration Product U-factors. This can be expressed in the Imperial System as BTU/h*ft²*°F (United States) or in the International System as W/m²K (Canada, Europe). Total product U-factor takes several variables into account including the frame, edge of glazing, and the center of glass values.

R-factor:

Also known as thermal resistance. R-factor is the inverse of U-factor. For example, 1 divided by a U-factor of 0.25 equates to a 4 R-factor.

SHGC:

SHGC stands for Solar Heat Gain Coefficient. This is the ratio of solar radiation that can pass through a window and released as heat inside the home. A SHGC rating of 0.30 means that 30% of the solar heat can pass through the window. A lower or higher rating is not necessarily beneficial and is dependent on the particular building and situation. While a relatively high SHGC used in certain conditions can warm a cold room in the winter, the same value can cause discomfort and added cooling costs during other seasons or conditions.

VT:

VT stands for Visible Transmittance. VT is the amount of visible light, expressed as a percentage, that can pass through a window. A 0.50 rating means that 50% of the visible light can pass through the window.

CR:

CR stands for Condensation Resistance. CR is the relative ability of a product to resist condensation with a higher value indicating a greater resistance to condensation. This is a unitless value.

IECC:

IECC stands for International Energy Conservation Code. This code sets minimum efficiency standards for commercial and residential construction for windows and doors as well as most other aspects of the structure.

Energy Star:

Energy Star is a voluntary program administered by the EPA (Environmental Protection Agency) that sets energy efficiency specifications. Products that meet the specifications can be labeled with the Energy Star logo.

ENERGY STAR® Certification Criteria for Residential Windows

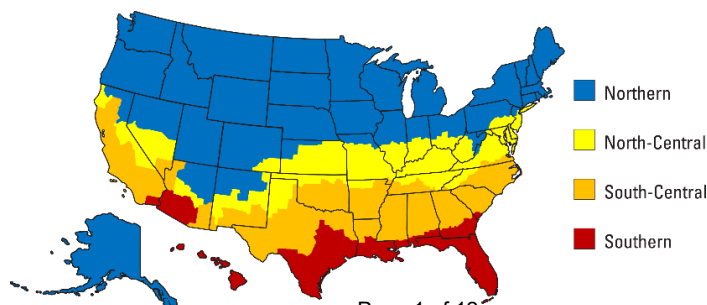
WINDOWS						
Climate Zone	U-Factor ¹	SHGC ²				
Northern	≤ 0.22	≥ 0.17	Prescriptive			
	= 0.23	≥ 0.35		Equivalent Energy Performance		
					= 0.24	
						= 0.25
North-Central	≤ 0.25	≤ 0.40				
South-Central	≤ 0.28	≤ 0.23				
Southern	≤ 0.32	≤ 0.23				

Air Leakage ≤ 0.3 cfm/ft²
¹ Btu/h-ft²-°F
² Solar Heat Gain Coefficient

ENERGY STAR® Certification Criteria for Residential Doors

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

Air Leakage for Sliding Doors ≤ 0.3 cfm/ft²
 Air Leakage for Swinging Doors ≤ 0.5 cfm/ft²
¹ Btu/h-ft²-°F
² Solar Heat Gain Coefficient



Performance Class:

The performance class is a designation given to windows and doors based on their air, water, and structural performance against a set of requirements specified in the North American Fenestration Standard/Specifications for windows, doors, and skylights.

The classes are: (excerpted from AAMA/WDMA/CSA 101/I.S./A440)

R: Commonly used in one and two-family dwellings.

LC: Commonly used in low-rise and mid-rise multi-family dwellings and other buildings where larger sizes and higher loading requirements are expected.

CW: Commonly used in low-rise and mid-rise buildings where larger sizes, higher loading requirements, limits on deflection, and heavy use are expected.

AW: Commonly used in high-rise and mid-rise buildings to meet increased loading requirements and limits on deflection, and in buildings where frequent and extreme use of the fenestration products is expected.

The performance class descriptions are intended to be a general guideline with the final determination of product being based on the performance requirements of the project.

Performance Grade (PG):

A window or a door achieves a performance grade based on it passing all of the required tests for the product type and performance class. These tests include operating force, air leakage, water penetration resistance, uniform load deflection, uniform load structural resistance, and forced-entry resistance. Each performance class will have their own criteria to achieve performance grade levels including minimum product test sizes and deflection limits.

Double Hung Window Thermal Performance

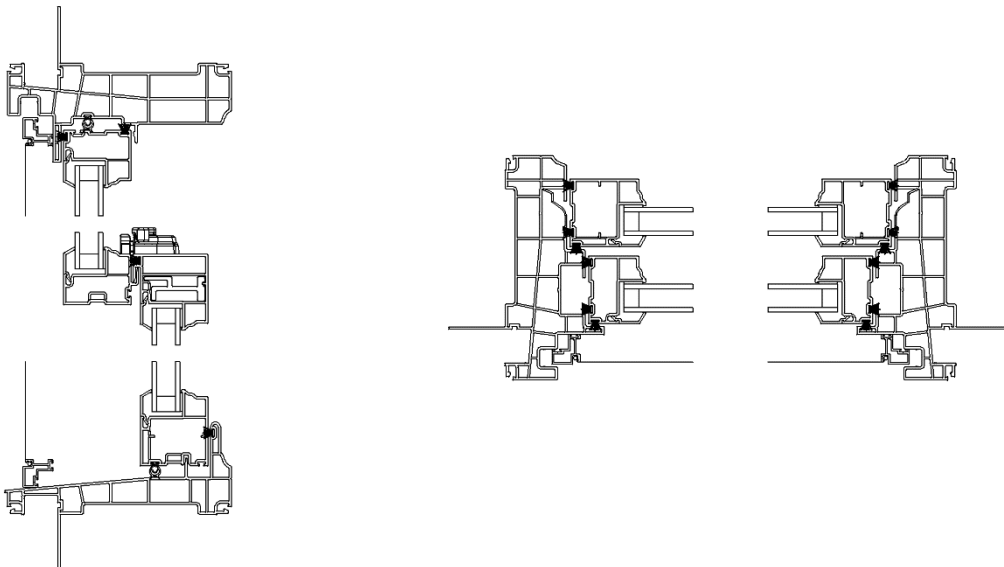
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
Dual Pane Low-E Argon (Cardinal 270)	0.27	0.27	0.50	58	Yes	-	-	-	-
Dual Pane Low-E (Cardinal 270)	0.30	0.27	0.50	54	Yes	-	-	-	-
Dual Pane Clear	0.43	0.57	0.59	48	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.27	0.27	0.50	56	Yes	-	-	-	-
Dual Pane Low-E Tempered (Cardinal 270)	0.31	0.27	0.50	53	-	-	-	-	-
Dual Pane Clear Tempered	0.43	0.57	0.59	43	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.26	0.44	0.55	59	Yes	N	-	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.26	0.44	0.55	59	Yes	N	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.23	0.25	0.46	67	Yes	-	NC	-	-
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.20	0.23	0.39	71	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.24	0.25	0.46	64	Yes	-	NC	-	-
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.20	0.23	0.39	68	Yes	N	NC	SC	S
Triple Pane E7 (Cardinal 270)	0.22	0.25	0.46	67	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 180)	0.24	0.43	0.52	64	Yes	N	-	-	-

¹ = Meets 2021 IECC and older in most northern zones

Thermal values are for standard glazing package offerings without grilles. Factors such as custom sizes, glass spacers, safety glass, grilles between the glass, and simulated divided lites (SDL) can affect the final values.

Double Hung Window Structural Performance (Dual and Triple Pane Glazing)

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Hidden Tilt Latches	48 x 84	Single	PG50	LC
Standard Tilt Latches	48 x 84	Single	PG50	LC
Hidden Tilt Latches	44 x 94	Single	PG40	LC
Standard Tilt Latches	44 x 94	Single	PG45	LC



Double Hung Transom Window Thermal Performance

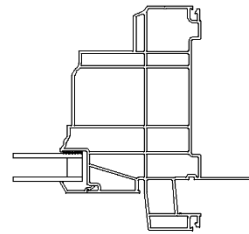
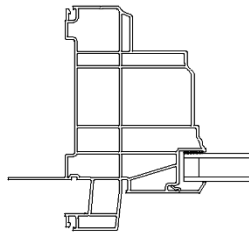
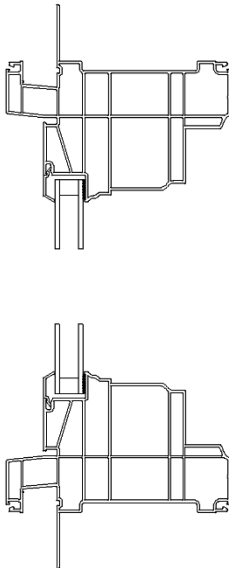
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
						-	NC	-	-
Dual Pane Low-E Argon (Cardinal 270)	0.25	0.27	0.51	60	Yes	-	NC	-	-
Dual Pane Low-E (Cardinal 270)	0.28	0.28	0.51	57	Yes	-	-	-	-
Dual Pane Clear	0.41	0.58	0.60	44	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.25	0.27	0.51	60	Yes	-	NC	-	-
Dual Pane Low-E Tempered (Cardinal 270)	0.28	0.28	0.51	56	Yes	-	-	-	-
Dual Pane Clear Tempered	0.41	0.58	0.60	44	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.25	0.46	0.56	61	Yes	N	-	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.25	0.46	0.56	61	Yes	N	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.20	0.25	0.47	70	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.18	0.23	0.40	75	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.21	0.25	0.47	66	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.17	0.23	0.40	72	Yes	N	NC	SC	S
Triple Pane E7 (Cardinal 270)	0.20	0.25	0.47	70	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 270)	0.21	0.25	0.47	66	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 180)	0.22	0.39	0.47	65	Yes	N	NC	-	-

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Thermal values are for standard glazing package offerings without grilles. Factors such as custom sizes, glass spacers, safety glass, grilles between the glass, and simulated divided lites (SDL) can affect the final values.

Double Hung Transom Structural Performance (Dual and Triple Pane Glazing)

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Double Hung Transom (Dual Pane)	60 x 44	Single	PG65	CW
Double Hung Transom (Dual Pane)	72 x 44	Single	PG50	LC
Double Hung Transom (Dual Pane)	36 x 44	Single	PG75	LC
Double Hung Transom (Triple Pane)	60 x 44	Single	PG70	LC
Double Hung Transom (Triple Pane)	72 x 44	Single	PG60	LC
Double Hung Transom (Triple Pane)	36 x 44	Single	PG80	LC



Double Hung Sash Glaze Picture Window Thermal Performance

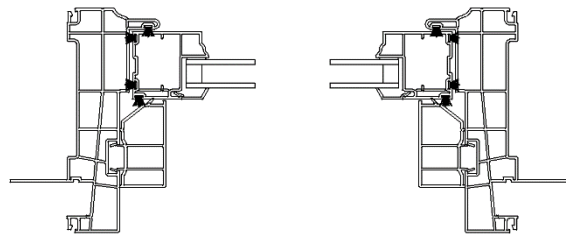
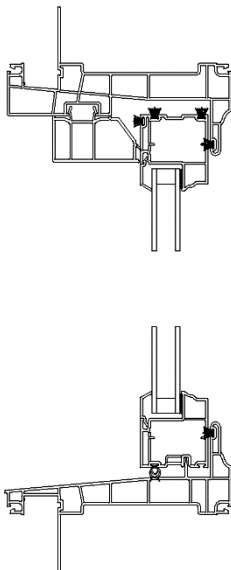
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
Dual Pane Low-E Argon (Cardinal 270)	0.26	0.28	0.52	61	Yes	-	-	-	-
Dual Pane Low-E (Cardinal 270)	0.29	0.28	0.52	58	Yes	-	-	-	-
Dual Pane Clear	0.43	0.59	0.61	45	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.26	0.28	0.52	61	Yes	-	-	-	-
Dual Pane Low-E Tempered (Cardinal 270)	0.29	0.28	0.52	57	Yes	-	-	-	-
Dual Pane Clear Tempered	0.43	0.59	0.61	45	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.26	0.46	0.57	62	Yes	N	-	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.26	0.46	0.57	62	Yes	N	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.21	0.26	0.48	70	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.19	0.24	0.41	75	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.22	0.26	0.48	68	Yes	-	NC	-	-
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.18	0.24	0.41	73	Yes	N	NC	-	-
Triple Pane E7 (Cardinal 270)	0.21	0.26	0.48	70	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 270)	0.22	0.26	0.48	68	Yes	-	NC	-	-
Triple Pane E7 Tempered (Cardinal 180)	0.24	0.45	0.54	65	Yes	N	-	-	-

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Double Hung Sash Glaze Picture Window Structural Performance (Dual and Triple Pane Glazing)

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Double Hung Sash Glaze Picture	60 x 60	Single	PG60	CW
Double Hung Sash Glaze Picture	72 x 72	Single	PG50	LC
Double Hung Sash Glaze Picture	72 x 84	Single	PG35	LC



Double Hung Direct Set

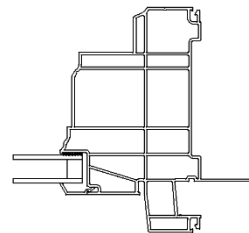
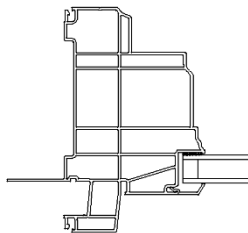
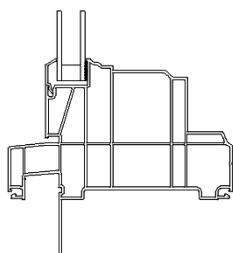
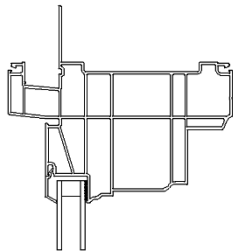
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
Dual Pane Low-E Argon (Cardinal 270)	0.25	0.27	0.51	60	Yes	-	NC	-	-
Dual Pane Low-E (Cardinal 270)	0.28	0.28	0.51	57	Yes	-	-	-	-
Dual Pane Clear	0.41	0.58	0.60	44	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.25	0.27	0.51	60	Yes	-	NC	-	-
Dual Pane Low-E Tempered (Cardinal 270)	0.28	0.28	0.51	56	Yes	-	-	-	-
Dual Pane Clear Tempered	0.41	0.58	0.60	44	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.25	0.46	0.56	61	Yes	N	-	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.25	0.46	0.56	61	Yes	N	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.20	0.25	0.47	70	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.18	0.23	0.40	75	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.21	0.25	0.47	66	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.17	0.23	0.40	72	Yes	N	NC	SC	S
Triple Pane E7 (Cardinal 270)	0.20	0.25	0.47	70	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 270)	0.21	0.25	0.47	66	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 180)	0.22	0.39	0.47	65	Yes	N	NC	-	-

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Double Hung Direct Set Window Structural Performance

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Double Hung Direct Set (Dual Pane)	60 x 60	Single	PG65	CW
Double Hung Direct Set (Dual Pane)	72 x 72	Single	PG50	LC
Double Hung Direct Set (Dual Pane)	72 x 84	Single	PG50	LC
Double Hung Direct Set (Dual Pane)	36 x 82	Single	PG75	LC
Double Hung Direct Set (Triple Pane)	60 x 60	Single	PG70	LC
Double Hung Direct Set (Triple Pane)	72 x 72	Single	PG60	LC
Double Hung Direct Set (Triple Pane)	36 x 82	Single	PG80	LC



Casement Window Thermal Performance

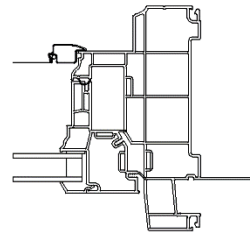
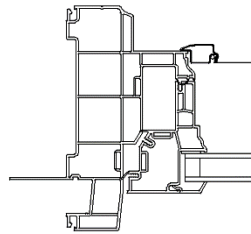
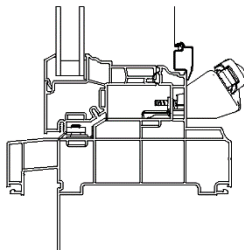
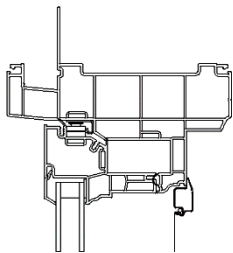
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
						-	NC	SC	S
Dual Pane Low-E Argon (Cardinal 270)	0.24	0.22	0.42	61	Yes	-	NC	SC	S
Dual Pane Low-E (Cardinal 270)	0.27	0.23	0.42	57	Yes	-	-	SC	S
Dual Pane Clear	0.37	0.47	0.49	44	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.25	0.22	0.42	60	Yes	-	NC	SC	S
Dual Pane Low-E Tempered (Cardinal 270)	0.27	0.23	0.42	56	Yes	-	-	SC	S
Dual Pane Clear Tempered	0.38	0.47	0.49	44	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.24	0.37	0.46	61	Yes	N	NC	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.25	0.37	0.45	62		N	NC	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.21	0.21	0.38	67	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.18	0.19	0.32	72	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.21	0.21	0.38	65	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.18	0.19	0.32	71	Yes	N	NC	SC	S
Triple Pane E7 (Cardinal 270)	0.21	0.21	0.38	67	Yes	N	NC	SC	S
Triple Pane E7 Tempered (Cardinal 270)	0.21	0.21	0.38	65	Yes	N	NC	SC	S
Triple Pane E7 Tempered (Cardinal 180)	0.23	0.36	0.43	62	Yes	N	NC	-	-

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Casement Window Structural Performance (Dual and Triple Pane Glazing)

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Casement - Vent	36 x 72	Single	PG65	CW



Awning Window Thermal Performance

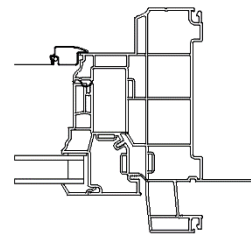
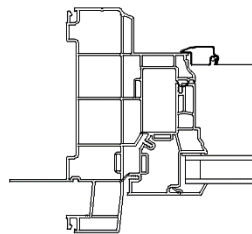
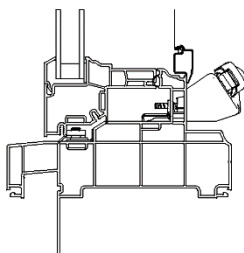
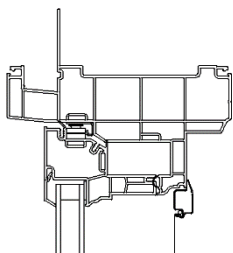
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
Dual Pane Low-E Argon (Cardinal 270)	0.24	0.22	0.42	59	Yes	-	NC	SC	S
Dual Pane Low-E (Cardinal 270)	0.27	0.23	0.42	55	Yes	-	-	SC	S
Dual Pane Clear	0.38	0.47	0.49	44	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.25	0.22	0.42	59	Yes	-	NC	SC	S
Dual Pane Low-E Tempered (Cardinal 270)	0.27	0.23	0.42	55	Yes	-	-	SC	S
Dual Pane Clear Tempered	0.38	0.47	0.49	43	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.24	0.37	0.46	60	Yes	N	NC	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.25	0.37	0.46	62	Yes	-	NC	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.21	0.21	0.38	69	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.18	0.19	0.32	73	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.22	0.21	0.38	67	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.19	0.19	0.32	72	Yes	N	NC	SC	S
Triple Pane E7 (Cardinal 270)	0.21	0.21	0.38	69	Yes	N	NC	SC	S
Triple Pane E7 Tempered (Cardinal 270)	0.22	0.21	0.38	67	Yes	N	NC	SC	S
Triple Pane E7 Tempered (Cardinal 180)	0.23	0.36	0.43	64	Yes	N	NC	-	-

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Awning Window Structural Performance (Dual and Triple Pane Glazing)

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Awning - Vent	48 x 32	Single	PG80	LC
Awning - Vent	48 x 32	Single	PG45	CW
Awning - Vent	60 x 48	Single	PG40	LC



Casement/Awning Picture Window Thermal Performance

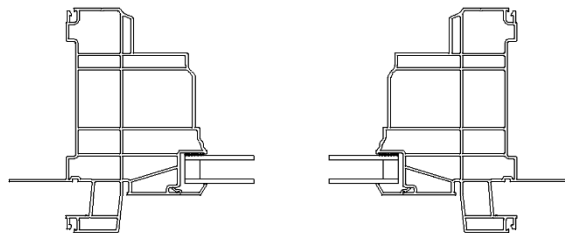
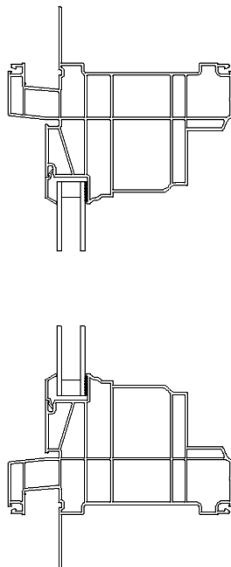
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
Dual Pane Low-E Argon (Cardinal 270)	0.25	0.27	0.51	60	Yes	-	NC	-	-
Dual Pane Low-E (Cardinal 270)	0.28	0.28	0.51	57	Yes	-	-	-	-
Dual Pane Clear	0.41	0.58	0.60	44	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.25	0.27	0.51	60	Yes	-	NC	-	-
Dual Pane Low-E Tempered (Cardinal 270)	0.28	0.28	0.51	56	Yes	-	-	-	-
Dual Pane Clear Tempered	0.41	0.58	0.60	44	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.25	0.46	0.56	61	Yes	N	-	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.25	0.46	0.56	61	Yes	N	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.20	0.25	0.47	70	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.18	0.23	0.40	75	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.21	0.25	0.47	66	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.17	0.23	0.40	72	Yes	N	NC	SC	S
Triple Pane E7 (Cardinal 270)	0.20	0.25	0.47	70	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 270)	0.21	0.25	0.47	66	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 180)	0.22	0.39	0.47	65	Yes	N	NC	-	-

¹ = Meets 2021 IECC and older in most northern zones

Thermal values are for standard glazing package offerings without grilles. Factors such as custom sizes, glass spacers, safety glass, grilles between the glass, and simulated divided lites (SDL) can affect the final values.

Casement/Awning Picture Window Structural Performance

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Casement/Awning Picture (Dual Pane)	60 x 60	Single	PG65	CW
Casement/Awning Picture (Dual Pane)	72 x 72	Single	PG50	LC
Casement/Awning Picture (Dual Pane)	72 x 84	Single	PG50	LC
Casement/Awning Picture (Dual Pane)	36 x 82	Single	PG75	LC
Casement/Awning Picture (Triple Pane)	60 x 60	Single	PG70	LC
Casement/Awning Picture (Triple Pane)	72 x 72	Single	PG60	LC
Casement/Awning Picture (Triple Pane)	36 x 82	Single	PG80	LC



Direct Glaze Polygon & Radius Windows Thermal Performance

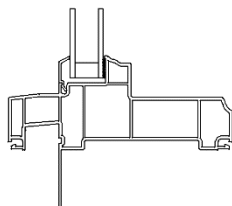
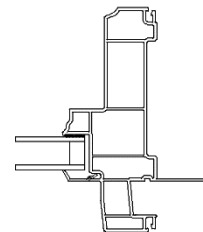
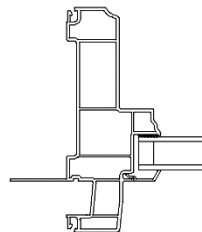
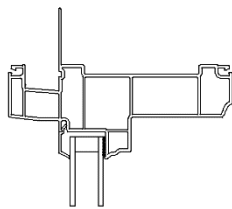
Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
Dual Pane Low-E Argon (Cardinal 270)	0.27	0.30	0.57	64	Yes	-	-	-	-
Dual Pane Low-E (Cardinal 270)	0.31	0.30	0.57	60	-	-	-	-	-
Dual Pane Clear	0.44	0.65	0.67	46	-	-	-	-	-
Dual Pane Low-E Argon Tempered (Cardinal 270)	0.27	0.30	0.57	61	Yes	-	-	-	-
Dual Pane Low-E Tempered (Cardinal 270)	0.30	0.30	0.57	57	Yes	-	-	-	-
Dual Pane Clear Tempered	0.44	0.65	0.67	45	-	-	-	-	-
Dual Pane E7 (Cardinal 180)	0.26	0.51	0.62	63	Yes	N	-	-	-
Dual Pane E7 Tempered (Cardinal 180)	0.25	0.51	0.62	63	Yes	N	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270)	0.22	0.28	0.52	68	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270)	0.19	0.26	0.45	71	Yes	N	NC	-	-
Triple Pane Low-E / Clear / Clear Tempered & Argon (Cardinal 270)	0.24	0.28	0.52	65	Yes	-	NC	-	-
Triple Pane Low-E / Clear / Low-E Tempered & Argon (Cardinal 270)	0.19	0.26	0.45	71	Yes	N	NC	-	-
Triple Pane E7 (Cardinal 270)	0.22	0.28	0.52	68	Yes	N	NC	-	-
Triple Pane E7 Tempered (Cardinal 180)	0.24	0.49	0.59	67	Yes	N	-	-	-

¹ = Meets 2021 IECC and older in most northern zones

Thermal values are for standard glazing package offerings without grilles. Factors such as custom sizes, glass spacers, safety glass, grilles between the glass, and simulated divided lites (SDL) can affect the final values.

Direct Glaze Polygon & Radius Windows Structural Performance (Dual and Triple Pane Glazing)

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Direct Glaze Polygon & Radius	60 x 60	Single	PG70	LC
Direct Glaze Polygon & Radius	72 x 72	Single	PG45	LC
Direct Glaze Polygon & Radius	72 x 84	Single	PG40	LC



Sliding Patio Door Thermal Performance

Glass Options	U-Factor	SHGC	VT	CR	IECC ¹	Energy Star 7.0			
Dual Pane Low-E Argon (Cardinal 270) - Tempered	0.26	0.23	0.43	61	Yes	N	NC	SC	S
Dual Pane Low-E (Cardinal 270) - Tempered	0.29	0.23	0.43	58	Yes	-	-	-	-
Dual Pane Clear - Tempered	0.40	0.49	0.51	45	-	-	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270) - Tempered	0.24	0.22	0.40	66	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270) - Tempered	0.21	0.20	0.34	70	Yes	N	NC	SC	S
Dual Pane Low-E Argon (270) - Tempered	0.26	0.23	0.43	57	Yes	N	NC	SC	S
Dual Pane Low-E (270) - Tempered	0.29	0.23	0.43	54	Yes	-	-	-	-
Dual Pane Clear - Tempered	0.39	0.49	0.51	44	-	-	-	-	-
Triple Pane Low-E / Clear / Clear & Argon (Cardinal 270) - Tempered	0.24	0.22	0.40	61	Yes	N	NC	SC	S
Triple Pane Low-E / Clear / Low-E & Argon (Cardinal 270) - Tempered	0.21	0.20	0.34	65	Yes	N	NC	SC	S

¹ = Meets 2021 IECC and older in most northern zones

Thermal values are for standard glazing package offerings without grilles. Factors such as custom sizes, glass spacers, safety glass, grilles between the glass, and simulated divided lites (SDL) can affect the final values.

Sliding Patio Door Structural Performance (Dual and Triple Pane Glazing)

Air, Water, and Structural Ratings	Frame Size Inches (wxh)	Configuration	Performance Grade	Performance Class
Two Panel	71.5 x 82	Single	PG50	LC
Two Panel	95.5 x 95.5	Single	PG30	LC
Three Panel	107.5 x 82	Single	PG40	LC
Four Panel	139.75 x 82	Single	PG25	LC

Product Type	Frame Size (In.)	Air Infiltration (cfm/ft ²)	Water Resistance (psf)	Uniform Load Test Pressure (psf)	Design Pressure (psf)	Performance Grade
Double Hung						
Hidden Tilt Latches	36 x 72	0.01	7.52	75.19	50.13	R PG50
Standard Tilt Latches	36 x 72	0.01	7.52	75.19	50.13	R PG50
Hidden Tilt Latches	48 x 84	0.01	7.52	75.19	50.13	LC PG50
Standard Tilt Latches	48 x 84	0.01	7.52	75.19	50.13	LC PG50
Hidden Tilt Latches	44 x 94	0.09	7.52	60.15	40.10	LC PG40
Standard Tilt Latches	44 x 94	0.12	7.52	67.67	45.11	LC PG45
Double Hung Picture	60 x 60	<0.01	12.11	90.23	60.15	CW PG60
Double Hung Picture	72 x 72	<0.01	7.52	75.19	50.13	LC PG50
Double Hung Picture	72 x 84	<0.01	7.52	52.63	35.08	LC PG35
Casement - Vent	36 x 72	<0.01	9.19	97.74	65.16	CW PG65
Awning - Vent	48 x 32	<0.01	12.11	120.30	80.20	LC PG80
Awning - Vent	48 x 32	<0.01	12.11	67.67	45.11	CW PG45
Awning - Vent	60 x 48	0.10	12.11	60.15	40.10	LC PG40
Casement Picture (Dual Pane)	60 x 60	<0.01	10.65	97.97	65.15	CW PG65
Casement Picture (Dual Pane)	72 x 72	0.10	7.52	75.19	50.13	LC PG50
Casement Picture (Dual Pane)	72 x 84	0.10	7.52	75.19	50.13	LC PG50
Casement Picture (Dual Pane)	36 x 82	<0.01	12.11	112.78	75.19	LC PG75
Casement Picture (Triple Pane)	60 x 60	<0.01	12.11	105.26	70.18	LC PG70
Casement Picture (Triple Pane)	72 x 72	<0.01	12.11	90.23	60.15	LC PG60
Casement Picture (Triple Pane)	36 x 82	<0.01	12.11	120.30	80.20	LC PG80
Direct Glaze Picture	60 x 60	<0.01	12.11	105.26	70.18	LC PG70
Direct Glaze Picture	72 x 72	<0.01	12.11	67.67	45.11	CW PG45
Direct Glaze Picture	72 x 84	<0.01	12.11	60.15	40.10	LC PG40
Sliding Patio Door						
Two Panel	71.5 x 82	0.20	7.52	75.19	50.13	LC PG50
Two Panel	95.5 x 95.5	0.06	4.60	45.11	30.08	LC PG30
Three Panel	107.5 x 82	0.17	6.06	60.15	40.10	LC PG40
Four Panel	139.75 x 82	0.10	4.59	37.59	25.06	LC PG25