

CLIMAGUARD®—RESIDENTIAL GLASS SOLUTIONS





BUILD A BETTER WINDOW WITH GUARDIAN CLIMAGUARD®.

Being recognized as a global leader in your field doesn't happen overnight. It takes consistent excellence, unparalleled reliability, and the use of cutting-edge technology to earn that distinction. With more than 85 years in business, Guardian Glass is proud to be recognized as a leader in float and fabricated glass products while servicing the architectural, residential, interiors, technical and transportation segments.

The Guardian ClimaGuard portfolio represents intelligent glass science and the skillful application of manufacturing and fabrication know-how. Our depth of expertise, service and support resources all work together to optimize window performance and meet customer's demands by providing:



ENERGY EFFICIENCY: Help control energy inside and out with a full range of ClimaGuard® Low-E products formulated for every North American region and climate.



SAFETY AND SECURITY: High-strength glass that helps protect against violent storms and break-ins.



SOUND CONTROL: Glass solutions that reduce noise from traffic, construction, neighbors and airports.



FADE AND UV PROTECTION: Products that block 99.9% of the sun's UV rays for superior fade protection.



PRIVACY: Acid-etched, patterned glass substrates and more.

CLIMAGUARD® LOW-E GLASS PRODUCTS

Heating and cooling requirements differ across the various regions of North America, due to the height and intensity of the sun and varying elevations. Guardian ClimaGuard residential low-E coated glass products are expertly formulated to meet the specific solar- and energy-control needs of differing climates — while also aligning to energy codes and guidelines — including ENERGY STAR®. No matter the intensity of the sun, there is a combination available to help achieve the right balance of capturing and reflecting solar heat.

ClimaGuard 80/71	In cold northern climates with increased heating requirements, ClimaGuard 80/71 maximizes solar heat gain and retains indoor heat.
ClimaGuard 72/57	Made for northern U.S. climates, ClimaGuard 72/57 provides selective passive solar heat gain and retains indoor heat.
ClimaGuard 70/36	For mixed climates that require improved solar control and excellent U-factor, ClimaGuard 70/36 provides balanced performance.
ClimaGuard 62/27	In all climate zones, ClimaGuard 62/27 offers the power of triple-silver to provide energy savings.
ClimaGuard 55/27	For western, southern, waterfront and homes exposed to bright sunlight, ClimaGuard 55/27 reduces both solar heat gain and glare.
ClimaGuard 53/23	Southern homes exposed to bright sunlight will remain cool thanks to the low solar heat gain of ClimaGuard 53/23 and the benefit of triple-silver.
ClimaGuard IS-20 (Interior Surface Coating)	ClimaGuard IS-20 provides an additional boost to help windows meet energy codes.

A hand is shown in the foreground, holding a transparent tablet. The tablet displays a sunset scene over a field of yellow flowers. The sun is low on the horizon, casting a warm glow. A large tree is visible on the left side of the horizon. The background behind the hand and tablet is a blurred field of yellow flowers under a clear sky.

A CLEAR CHOICE
OF BROAD SOLUTIONS

CLIMAGUARD® LOW-E PERFORMANCE DATA

Double-Glazed	Visible Light			UV Trans %	SHGC	U-Factor	
	Trans %	Reflect Out %	Reflect In %			1/2" Gap Argon	Air
ClimaGuard 80/71 (#3)	80	14	14	43	0.71	0.27	0.31
ClimaGuard 72/57 (#3)	71	12	13	31	0.58	0.25	0.30
ClimaGuard 72/57	71	13	12	31	0.47	0.25	0.30
ClimaGuard 70/36	70	11	12	30	0.39	0.25	0.29
ClimaGuard 62/27	61	11	13	9	0.26	0.24	0.29
ClimaGuard 55/27	56	17	19	22	0.28	0.25	0.29
ClimaGuard 53/23	53	12	12	14	0.23	0.24	0.29

Triple-Glazed	Visible Light			UV Trans %	SHGC	U-Factor			
	Trans %	Reflect Out %	Reflect In %			1/2" Gap Argon	Air	5/16" Gap Argon	Air
80/71 + 80/71	71	18	18	32	0.58	0.14	0.17	0.18	0.23
80/71 + 70/36	63	17	14	22	0.45	0.13	0.16	0.17	0.22
72/57 + 80/71	64	17	17	23	0.43	0.13	0.17	0.17	0.22
72/57 + 72/57	57	16	16	17	0.40	0.13	0.16	0.17	0.22
70/36 + 80/71	63	14	17	22	0.35	0.13	0.16	0.17	0.22
70/36 + 70/36	55	13	13	16	0.34	0.12	0.16	0.17	0.22

Double-Glazed w/ IS-20 (#4)	Visible Light			UV Trans %	SHGC	U-Factor		ENERGY STAR® ZONES
	Trans %	Reflect Out %	Reflect In %			1/2" Gap Argon	Air	
80/71 + IS-20	78	15	14	41	0.64	0.22	0.25	N
72/57 + IS-20	69	14	13	30	0.46	0.21	0.24	N, NC
70/36 + IS-20	68	11	13	29	0.38	0.20	0.24	NC, SC
62/27 + IS-20	59	12	14	9	0.25	0.20	0.24	All
55/27 + IS-20	54	17	19	21	0.27	0.20	0.24	SC, S
53/23 + IS-20	51	13	12	13	0.23	0.20	0.24	SC, S
Monolithic								
ClimaGuard IS-20	87	9	9	57	0.79	n/a	0.68	

A wide range of performance for a wide range of climates. Guardian ClimaGuard Low-E glass products can be matched to meet the energy and comfort requirements of a specific region or climate. Use the performance data to find the right products for your window mix.



Double-Glazed

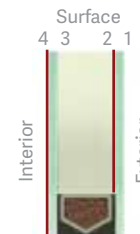
Double-glazed insulating glass units are typical for most climates.



Triple-Glazed

Triple-glazed insulating glass units provide additional insulation against the cold in northern climates.

ClimaGuard IS-20 Interior Surface Coating to boost insulating capabilities. ClimaGuard IS-20 Interior Surface Low-E glass is engineered to lower the U-factor of standard low-E windows. When applied to the #4 (inside) surface of double-glazed



or the #6 (inside) surface of triple-glazed windows, and used in conjunction with other ClimaGuard Low-E coatings, ClimaGuard IS-20 can improve energy saving. IS-20 is mechanically and chemically durable, with excellent optical properties making it ideal for exposed-surface applications, including monolithic usage in storm windows.

ClimaGuard IS-20 offers additional performance for wood windows and helps meet energy codes without using argon gas.

All configurations: 3.0mm clear glass, U-factor is measured with: argon= 90% argon/10% air fill, air=100% air fill.

Double-glazed: low-E coatings are on the #2 surface unless noted #3, IS-20 coating is on the #4 surface.

Triple-glazed: low-E coatings are on #2 and #5 surfaces. Performance data calculated using LBNL Window 7.6, IGDB v.71.

All measurements taken from center of glass values. The performance values shown are nominal and subject to variations due to manufacturing tolerances. Guardian reserves the right to change product performance characteristics without notice or obligation.



WE HELP YOU MEET ENERGY PERFORMANCE STANDARDS

ENERGY STAR® criteria, building and energy codes, and “green” incentives play increasingly large roles in the residential window business. We understand your need to stay one step ahead to maintain your long-term business success. You can trust that Guardian is on top of the latest state and local window-building codes, ENERGY STAR® programs as well as industry trends. Think of us as your residential energy efficiency expert.

Let us help you achieve compliance — When combined with an efficient window frame, Guardian Residential Glass can meet or exceed requirements for ENERGY STAR qualification throughout the U.S. and Canada, including new solar-heat gain standards in the southern states. Guardian’s Science & Technology Center and our experienced team of glass scientists keep us — and you — at the forefront of glass innovation and ahead of the curve as window efficiency standards change. Our sales and technical staff are knowledgeable partners, working to ensure that windows with Guardian Glass comply with:




- ENERGY STAR® criteria for windows, doors and skylights.
- Evolving national, state and local residential window-building codes across North America.







ENERGY STAR® CLIMATE ZONES

PRODUCTS

CANADA

	Zone 1	Triple-Glazed or High SHGC Double-Glazed
	Zone 2	Double-Glazed w/ 4th Surface Coating or High SHGC Double-Glazed
	Zone 3	Double-Glazed w/ 4th Surface Coating or High SHGC Double-Glazed

UNITED STATES

	Northern	Double-Glazed w/ 4th Surface Coating or High SHGC Double-Glazed
	North-Central	Low SHGC Double-Glazed
	South-Central	Low SHGC Double-Glazed
	Southern	Low SHGC Double-Glazed



Homeowners can save up to 12% a year in energy costs by replacing single-pane windows with ENERGY STAR® qualified windows.*

The EPA recommends high-performance windows that employ advanced technologies, like Guardian Residential Glass, that can be used to construct ENERGY STAR® qualified windows.

*EPA ENERGY STAR: www.energystar.gov/products/building_products/residential_windows_doors_and_skylights



Windows are designed to help control your environment and maintain comfort. New technologies in low-E coatings and spacers are available that help regulate the transfer of heat through window glass. U-factor and solar heat gain coefficient (SHGC) are of primary concern and windows designed with various combinations of these measurements can meet the demands of different climate characteristics and energy standards.



SUPERIOR TRIPLE-GLAZED PERFORMANCE

Triple-glazed windows can provide excellent U-factor to meet energy standards in northern North America. Homes in all climate regions can benefit from windows with a low U-factor, but homes in cold climates benefit from a low U-factor most.



HIGH SOLAR HEAT GAIN DOUBLE-GLAZED WINDOWS

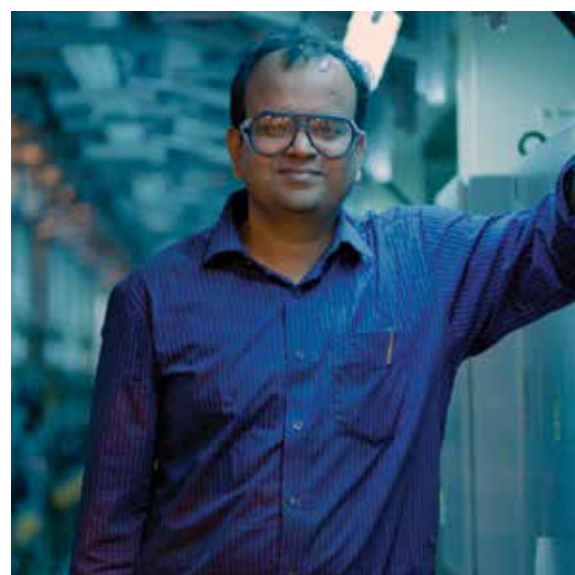
Windows with a high SHGC value will result in added natural, free heating, known as “passive solar heat gain” from the sun. Homes in cold climates and mixed climate regions can benefit from double-glazed windows with a high solar-heat gain coefficient.

DOUBLE-GLAZED 4TH SURFACE COATING

Lower the U-factor of any window by adding a 4th surface coating. See page 6 for complete performance data.

LOW SOLAR HEAT GAIN

Windows with low solar heat-gain coefficients are designed for use in warm and hot weather climates to reduce the glare and heating effects of the sun. A low SHGC combined with a low U-factor can help homeowners stay comfortable inside with less demand on their air conditioners — even as outdoor temperatures soar.





BUILD WITH US.

Selecting Guardian Glass will be one of the best business decisions you make. When you choose us, you're choosing a company with a global reach, long history of innovation and the bandwidth and product availability to meet your needs.

As one of the top glass companies in the world, we're able to offer a broad choice of glass solutions for the residential window segment. We also provide experienced, knowledgeable and hands-on service and support to window manufacturers. Our window manufacturing customers are focused on building quality windows and our fabrication partners are focused on custom glass preparation: cutting, tempering, laminating and insulating.

Guardian is known for the significant investments in the development of energy-efficient glass and technologies to meet residential segment demands. We're also constantly reinvesting in key assets and technologies to stay ahead of the curve. Our Science and Technology Center in Michigan employs glass scientists, Ph.D.s and technicians inventing new glass products, improving existing ones and transferring technologies developed for other segments (electronics, commercial, lighting and interiors) to residential windows here in North America.

We believe our understanding of the realities in window, door, and skylight manufacturing is unmatched. Our goal is to work closely with you to make sure the addition of Guardian ClimaGuard® residential glass to your production is seamless and mutually-beneficial.



CLIMAGUARD® RESIDENTIAL GLASS SOLUTIONS

Clear Glass of the highest quality and a wide range of thicknesses is available for many applications. Most commonly used is single-strength, 2.3 mm and double-strength, 3.0 mm. Thicker glass, 4.0 – 5.0 mm, can offer sound attenuation, add strength, or be used in oversized applications.

Tempered Glass resists breakage and, if broken, fractures in a way that reduces the likelihood of serious injury. Tempered glass is often referred to as “safety glass” because it can meet the Consumers Product Safety Commission (CPSC) 16 CFR 1201 Category I and Category II designations for glass that is subject to human impact.

Laminated Glass delivers strength, sound control and fade protection properties, and tends to remain in the window frame after impact to reduce the risk of injury from falling or flying glass pieces.

Patterned Glass comes in five popular textures that can add sophistication and versatility to any window or door where privacy is desired.

ClimaGuard Low-E Glass can add energy efficiency to safety & security, sound control, fade protection and privacy when coupled with tempered, laminated and/or patterned glass products.

Products	Energy Efficiency	Safety & Security	Sound Control	Fade Protection	Privacy
Clear Float Glass					
Tempered Glass		X			
Laminated Glass		X	X	X	
> 3mm Thickness			X*		
ClimaGuard Low-E	X				
Tempered ClimaGuard Low-E	X	X			
Laminated ClimaGuard Low-E	X	X	X	X	
> 3mm Thickness Low-E	X		X*		
Patterned Glass					X

* In an IG configuration with staggered glass thicknesses



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