




Vitro[®]
Architectural Glass



Together, We See Further



Together,
we can build
brighter, bolder,
more sustainable
buildings.

Building Relationships

Vitro partners with architects, building owners, contractors and glass fabricators to understand their obstacles and overcome them. Energy codes are becoming more stringent. Buildings must operate sustainably and cost-effectively. Architects must deliver high design and efficient performance, without compromises. We keep these hurdles top of mind at every stage of every project.

Building a Brighter Tomorrow

Vitro Architectural Glass (formerly PPG Glass) has been a pioneer in glass technology for over a century and remains focused on innovation. From the development of proprietary oxygen-fueled glass furnace technology, which cuts natural gas consumption by 15 percent, to continual advancements in magnetron sputtered vacuum deposition (MSVD) coatings, we've always believed that "further" never ends.

Meet Vitro

Vitro Architectural Glass, North America's largest and most trusted glass manufacturer, is responsible for many of the commercial glass industry's most commonly specified products, including high-performance *Solarban*® low-emissivity (low-e) glasses, *Starphire Ultra-Clear*® glass and a range of performance-tinted glasses.

Throughout its history, Vitro Glass has continually established and exceeded glass industry standards for solar control, color neutrality and both optical and spectral performance. In that time, Vitro has registered more than 500 patents. Today, the Vitro Glass Technology Center, located just outside Pittsburgh, employs about 200 people who remain committed to the future of glass.

As a global company focused on glass for a range of markets, Vitro is committed to innovation, sustainable manufacturing and energy-efficient end-use. By working closely with customers and partners, Vitro provides expert service and support to ensure your projects meet or exceed ever-evolving certifications and expectations.

Realizing the Power of Partnership

At Vitro, we know the source of true success lies in the strength of our partnerships. With a foundation formed on trust, teamwork and shared excitement, the possibilities for impactful innovations in glass truly are endless.

Whether you're working with one of our National Architectural Managers or any other Vitro representative, we're proud to go above and beyond, serving as a true partner to give you an edge.

Learn more at vitro.com/further

Table of Contents

Design Spotlight

Introducing *Solarban*® *Acuity*™ Series.....2

Low-E Glass4

Solarban® Solar Control Low-E Glasses.....8

Sungate® 400 Passive Low-E Glass 13

Low-Iron Glass.....14

Starphire Ultra-Clear® Glass 16

Acuity™ Low-Iron Glass..... 19

Performance-Tinted Glasses20

Blues & Greens.....22

Grays & Bronzes.....24

Reflective Glass.....26

Vistacool® Subtly Reflective

Color-Enriched Glasses.....28

Solarcool® Reflective Glasses.....29

Monolithic Glass Comparisons.....30

One-Inch Insulating

Glass Unit Comparisons 31

Vitro Certified™ Network.....34

Sustainability & LEED® 35

Glass & Energy Management.....36

Glass Design Resources..... 37



Comcast Center Atrium
Product
Solarban® 60 Starphire® Glass
Location
Philadelphia, Pennsylvania – USA
Architect
Robert A.M. Stern Architects
Vitro Certified™ Fabricator
J.E. Berkowitz, LP
Glazing Contractor
Enclos

Like Solarban® Starphire® glass, Solarban® Acuity™ glass delivers a distinctive low-iron aesthetic with high transparency and visible light transmittance (VLT).

DESIGN SPOTLIGHT

Introducing Solarban® Acuity™ Glass

Upgrade from coated clear glass – for just a fraction of the total installed façade cost.

The right glass can be the centerpiece of your design concept. That's why we've engineered the Solarban® Acuity™ low-e low-iron glass system. Combining the color fidelity of new, affordable Acuity™ low-iron glass with the performance you expect from the Solarban® family of glasses, you can design an ambitious façade – and actually realize it, on budget and on time.

Cost Considerations

Fabricated glass costs are an important consideration in the façade design process.

Vitro market research indicates the installed cost of a standard glass and metal curtainwall averages \$90 per square foot nationally. Upgrading a low-e coated clear insulating glass unit (IGU) to a Solarban® Acuity™ glass unit will typically increase the total installed curtainwall cost by only **\$1 to \$2 per square foot**.

This optimization of cost, clarity and performance allows you to make Solarban® Acuity™ glass an integral centerpiece of your façade design.

National Averages for Total Installed Curtainwall Costs



HCA Office

Product
Solarban® R100 Clear Glass

Page 9

Location
Nashville, Tennessee — USA

Architect
Gresham Smith

Vitro Certified™ Fabricator
Cristacurva

Glazing Contractor
McInerney & Associates, Inc.

Photography: Tom Kessler





OVO Athletic Centre

Products
Solarban® R100 Optiblue® Glass
AviProtek® bird-friendly glass
by Walker Glass

Pages 9 & 11

Location
Toronto, Ontario — Canada

Architect
Guernsey

Vitro Certified™ Fabricator
Trulite Glass and
Aluminum Solutions

**Acid-Etched Pattern
Manufacturer**
Walker Glass

Photography: Philip Castleton



**University of Nebraska
School of Nursing - Lincoln**

Product
Solarban® 90 Clear Glass
Page 9

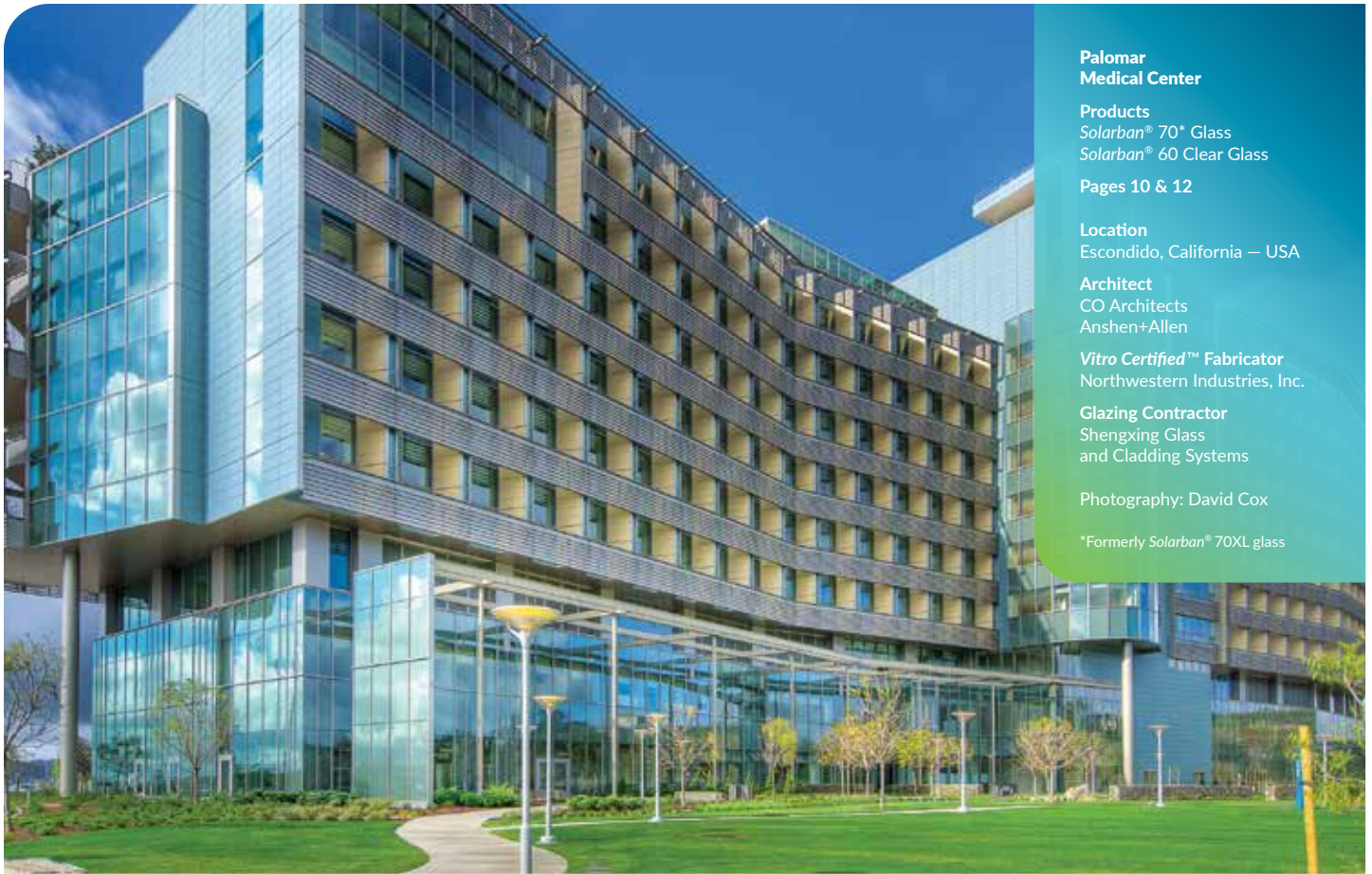
Location
Lincoln, Nebraska — USA

Architect
Alley Poyner Macchietto
Architecture

Vitro Certified™ Fabricator
ITI Glass

Glazing Contractor
Glass Edge

Photography: Tom Kessler



**Palomar
Medical Center**

Products
Solarban® 70* Glass
Solarban® 60 Clear Glass
Pages 10 & 12

Location
Escondido, California — USA

Architect
CO Architects
Anshen+Allen

Vitro Certified™ Fabricator
Northwestern Industries, Inc.

Glazing Contractor
Shengxing Glass
and Cladding Systems

Photography: David Cox

*Formerly Solarban® 70XL glass

**Omni Nashville
Convention Center Hotel**

Products
Solarban® R100 Clear Glass
Page 9

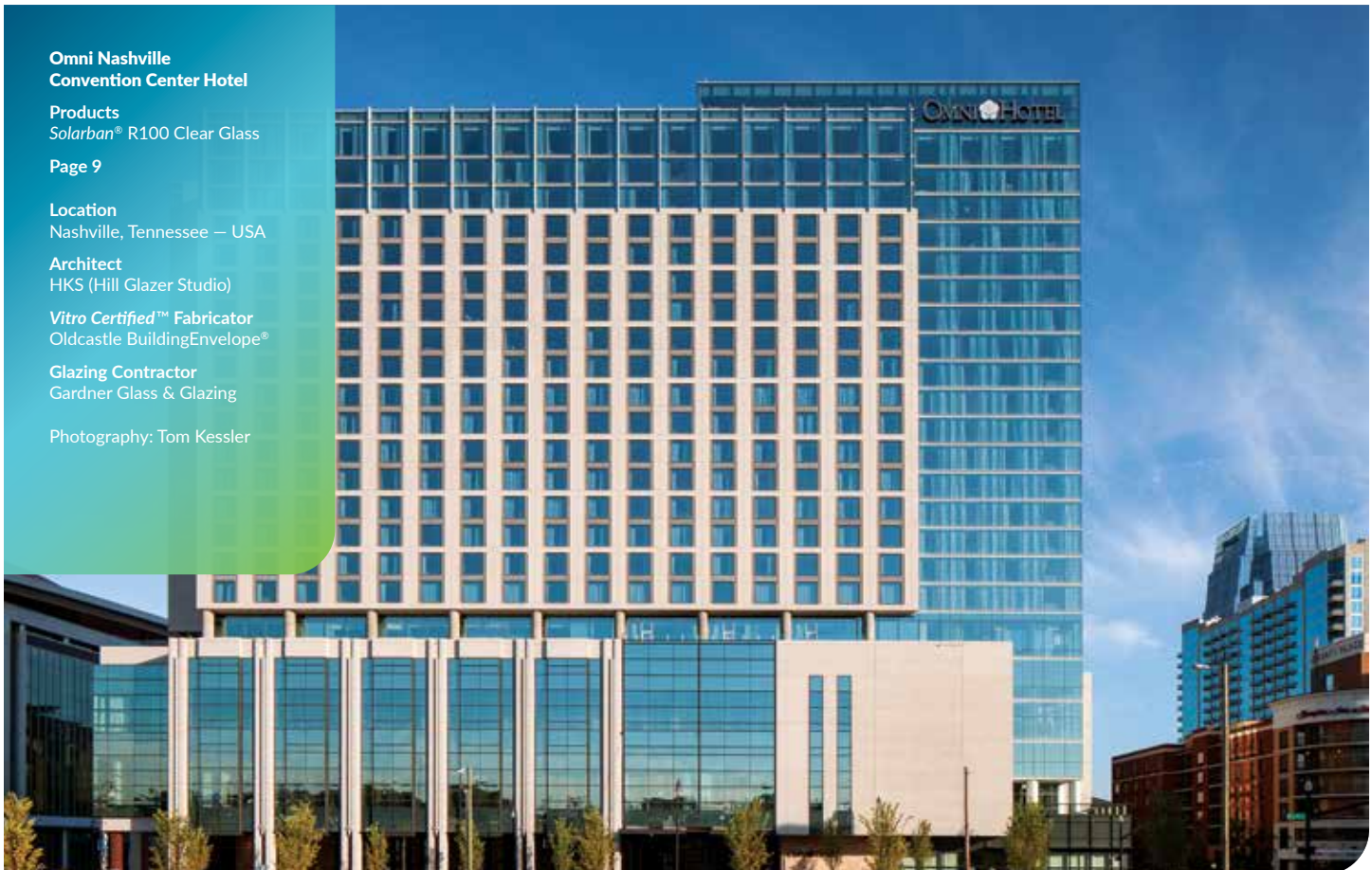
Location
Nashville, Tennessee — USA

Architect
HKS (Hill Glazer Studio)

Vitro Certified™ Fabricator
Oldcastle BuildingEnvelope®

Glazing Contractor
Gardner Glass & Glazing

Photography: Tom Kessler



VIA 57 West**Product**
Solarban® 70* Glass

Page 10

Location
New York, New York — USA**Architect**
Bjarke Ingels Group**Glass Fabricator**
Tecnoglass, S.A.**Glazing Contractor**
Enclos**Curtain Wall Designer
& Fabricator:**
Enclos

Photography: Tom Kessler

*Formerly Solarban® 70XL glass

Preserving Views. Conserving Energy.

At VIA 57 West — an audacious, shape-shifting structure on the bank of New York City's Hudson River — 5,000 floor-to-ceiling windows in an array of shapes and sizes incorporate Solarban® 70* glass, contributing to an integrated energy management program that incorporates a highly efficient mechanical system, occupancy sensors for lighting and a hybrid water source heat pump system. World-renowned firm Bjarke Ingels Group (BIG) was intent on specifying a product with a high-performing solar heat gain coefficient (SHGC) while preserving quality views.

*Formerly Solarban® 70XL glass

Solarban® Solar Control Low-E Glass

When your project requires elevated levels of occupant comfort and distinguished aesthetics, the *Solarban®* brand of solar control low-emissivity (low-e) glasses by Vitro Architectural Glass offers unparalleled choices to help you achieve your design objectives.

Trusted by architects for half a century, you can rely on *Solarban®* glass to keep occupants comfortable and to realize your boldest visions. *Solarban®* glass products feature some of the highest light-to-solar gain (LSG) ratios in the industry and can be combined with a wide array of low-iron or tinted glass options by Vitro for customized performance and aesthetic effects.



Possibilities, Expanded

North America's largest jumbo glass coater is now in operation at our Wichita Falls, Texas, plant. That means Solarban® low-e glasses now are available in jumbo sizes up to 130 inches by 204 inches.

255 King St./Stadium Tower

Products
Solarban® 67 Clear Glass
Mucky Water Spandrel
Coatings by ICD

Location
Seattle, Washington — USA

Architect
Freiheit & Ho

Vitro Certified™ Fabricator
Hartung Glass Industries

Glazing Contractor
High Rise
Glazing Specialist, LLC

Spandrel Coatings Manufacturer
ICD High Performance
Coatings

Photography: Tom Kessler



**The Ent Center
for the Arts at UCCS**

Product
Solarban® 90 Clear Glass

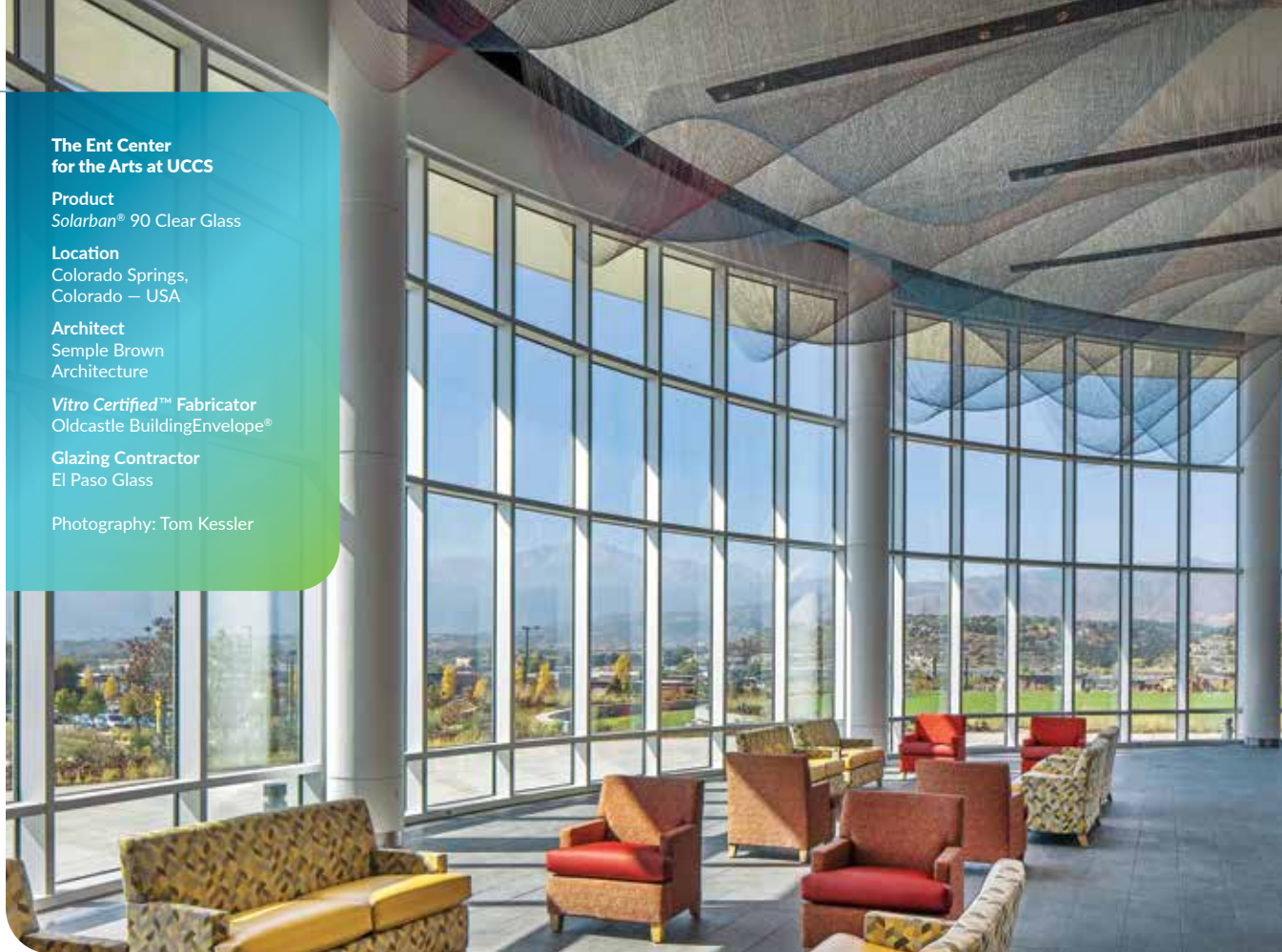
Location
Colorado Springs,
Colorado – USA

Architect
Semple Brown
Architecture

Vitro Certified™ Fabricator
Oldcastle BuildingEnvelope®

Glazing Contractor
El Paso Glass

Photography: Tom Kessler



A NEW MEASURE OF PERFORMANCE

Solarban® 90 Glass

Aesthetic: Neutral, similar to clear glass

Reflectivity: Low

The latest evolution in solar control low-e glass, *Solarban® 90* glass conveys a neutral appearance similar to that of clear glass in both color and reflectance.

1-Inch IGU on Clear (2)		Substrate Options		
SHGC	VLT	Clear	Low-Iron	Tinted
0.23	51%	✓	✓	✓

NEUTRAL-REFLECTIVE

Solarban® R100 Glass

Aesthetic: Cool blue-gray

Reflectivity: High

Solarban® R100 glass is a neutral-reflective low-e glass with an excellent solar heat gain coefficient (SHGC) of 0.23 and visible light transmittance (VLT) of 42 percent.

1-Inch IGU on Clear (2)		Substrate Options		
SHGC	VLT	Clear	Low-Iron	Tinted
0.23	42%	✓	✓	✓

Data is based on center-of-glass performance, in a one-inch insulating glass unit (IGU) with clear glass, of representative factory production samples. Actual values may vary due to the production process and manufacturing tolerances. All tabulated data is based on NFRC methodology using the LBNL Window 7.3 software.



NASA Goddard Space Flight Center
Product
Solarban® 70 Glass*
Location
 Greenbelt, Maryland – USA
Architect
 AECOM
Vitro Certified™ Fabricator
 Trulite Glass and Aluminum Solutions
Glazing Contractor
 Aluvisa
 Photography: Ron Solomon
 *Formerly *Solarban® 70XL* glass

EXCEPTIONALLY TRANSPARENT

Solarban® 72 Glass

Aesthetic: Exceptionally transparent

Reflectivity: Low

Solarban® 72 glass builds on the advances of *Solarban® 70** glass to provide even greater levels of transparency and color neutrality with minimal sacrifice of solar control performance. Available on *Starphire Ultra-Clear®* glass or *Acuity™* low-iron glass.

1-Inch IGU on <i>Starphire®</i> (2)		Substrate Options			
SHGC	VLT	Clear	Low-Iron	Tinted	
0.28	68%		✓		
1-Inch IGU on <i>Acuity™</i> (2)		Substrate Options			
SHGC	VLT	Clear	Low-Iron	Tinted	
0.28	67%		✓		

HIGH-PERFORMANCE & NEUTRAL

Solarban® 70 Glass*

(formerly *Solarban® 70XL* glass)

Aesthetic: Neutral

Reflectivity: Low

Backed by a coating that architects have trusted for more than a decade, *Solarban® 70** glass, a technological breakthrough in solar control low-e glass, offers a balanced combination of visible light transmittance (VLT), solar control and clarity.

1-Inch IGU		Substrate Options			
SHGC	VLT	Clear	Low-Iron	Tinted	
0.27	64%	✓		✓	

* Vitro has changed the name of *Solarban® 70XL* glass to *Solarban® 70* glass, formally dropping the "XL."

Designing Large IGUs?

Learn about key considerations pertaining to large insulating glass units. Visit the Vitro Glass Education Center to watch our video, "Specifying Large Insulating Glass Units."

glassed.vitroglazings.com

OPTIMIZED FOR OPTIBLUE® GLASS

Solarban® z50 Glass

(Solarban® 60 Optiblue® Glass)

Aesthetic: Neutral, cool blue-gray

Reflectivity: Low

With its soothing, neutral, steel blue-gray appearance, Solarban® z50 glass brings a distinctly different aesthetic to the Solarban® 60 glass family, along with minimal exterior reflectance, superb solar control and high levels of visible light transmittance (VLT).

1-Inch IGU with Clear		Substrate Options			
SHGC	VLT	Clear	Low-Iron	Tinted	
0.32	51%				✓

Solarban® z75

(Solarban® 70* Optiblue® Glass)

Aesthetic: Cool blue-gray

Reflectivity: Low

With its cool blue-gray appearance and ample VLT, Solarban® z75 glass excels at controlling glare while offering superior solar control.

1-Inch IGU with Clear		Substrate Options			
SHGC	VLT	Clear	Low-Iron	Tinted	
0.23	46%				✓



Thermo Fisher Scientific Global Headquarters

Products
Solarban® z50 Glass

Location
Waltham, Massachusetts — USA

Architect
GLSD

Vitro Certified™ Fabricator
SIGCO

Glazing Contractor
Middlesex Glass

Photography: Tom Kessler

CRISP & NEUTRAL

Solarban® 67 Glass

Aesthetic: Crisp, neutral

Reflectivity: Moderate

Solarban® 67 glass combines excellent solar performance with a soft, neutral coating that endows commercial buildings with a crisp, clean and soft reflective exterior appearance.

1-Inch IGU on Clear (2)		Substrate Options			
SHGC	VLT	Clear	Low-Iron	Tinted	
0.29	54%	✓	✓	✓	

VERSATILE NEUTRALITY

Solarban® 60 Glass

Aesthetic: Clear, color-neutral

Reflectivity: Low

Solarban® 60 glass features a clear, color-neutral appearance that is available on clear glass, low-iron glass or any Vitro tinted glass for a wide array of aesthetic choices.

1-Inch IGU on Clear (2)		Substrate Options			
SHGC	VLT	Clear	Low-Iron	Tinted	
0.39	70%	✓	✓	✓	



FAST Transit Center
Products
Solarban® 67 Clear Glass
Location
 Fayetteville, North Carolina — USA
Architect
 Gantt Huberman Architects
Vitro Certified™ Fabricator
 United Plate Glass
Glazing Contractor
 A1 Glass and Aluminum
 Photography: Tom Kessler

Sungate® 400 Passive Low-E Glass

Sungate® 400 glass is a highly transparent, passive low-e glass designed specifically for use in heating-dominated climates. Manufactured with a magnetron sputtered vacuum deposition (MSVD) “soft coat,” Sungate® 400 glass helps buildings harvest energy from the sun and retain solar and furnace heat to reduce winter heating costs. Sungate® 400 glass delivers a winter U-value that is 9 percent lower than passive low-e glasses manufactured with a “hard” pyrolytic coating.

1-Inch IGU on Clear (3)		Substrate Options		
SHGC	VLT	Clear	Low-Iron	Tinted
0.60	76%	✓	✓	

SUNGATE® 400
Low-E Glass

The Tower at PNC Plaza

Products

Sungate® 400 Starphire® Glass

Location

Pittsburgh, Pennsylvania – USA

Architect

Gensler

Vitro Certified™ Fabricator

J.E. Berkowitz, LP

Glazing Contractor

Permasteelisa Group

Photography: Tom Cwenar





The Boulevard Club

Products
Solarban® 60 Starphire® Glass
AviProtek® bird-friendly glass
by Walker Glass
Pages 12 & 16

Location
Toronto, Ontario — Canada

Architect
Teepie Architects

Vitro Certified™ Fabricator
Trulite Glass and
Aluminum Solutions

**Acid-Etched
Pattern Manufacturer**
Walker Glass

Photography: Philip Castleton

**Oklahoma University
College of Medicine**

Products
Solarban® R100 Solargray® Glass
Solarban® 72 Starphire® Glass
Pages 9, 10, 16 & 26

Location
Oklahoma City, Oklahoma — USA

Architects
Bockus Payne

Vitro Certified™ Fabricator
TriStar Glass

Glazing Contractor
Oak Cliff Glass & Mirror

Photography: Randy Alvarado



**University of Kansas
Medical Center Health
Education Building**

Product
Solarban® 70* Glass
Solarban® 72 Starphire® Glass

Pages 10 & 16

Location
Kansas City, Kansas — USA

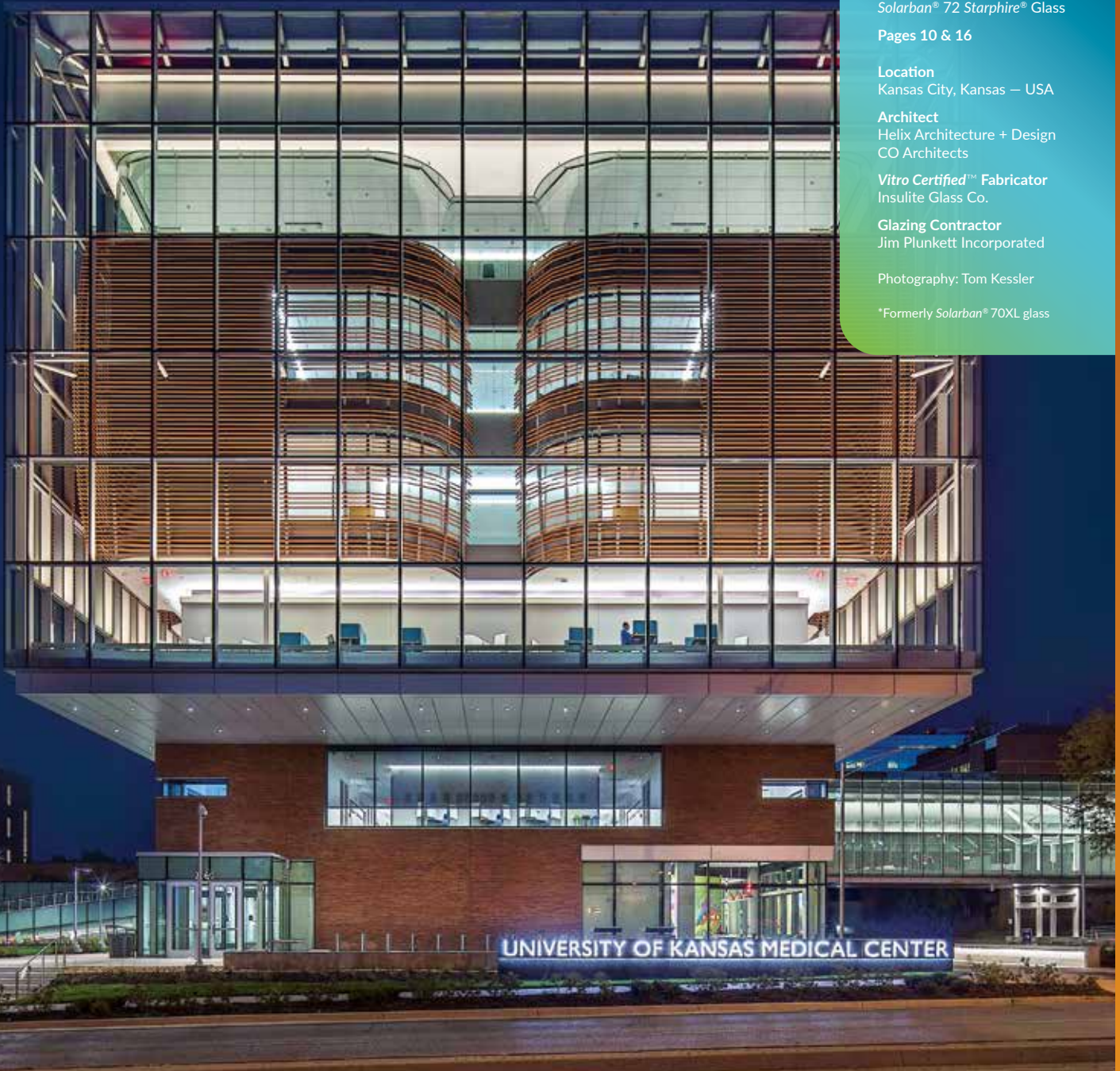
Architect
Helix Architecture + Design
CO Architects

Vitro Certified™ Fabricator
Insulite Glass Co.

Glazing Contractor
Jim Plunkett Incorporated

Photography: Tom Kessler

*Formerly Solarban® 70XL glass



Anatomy of a Lantern

Balancing the use of glass, metal and brick to create an iconic presence on campus, the University of Kansas Medical Center Health Education Building features a four-story glass "lantern" box design glazed with Solarban® 70* glass. Flexible learning studios and state-of-the-art labs float within the box to showcase the building's curriculum to the public. A glass-enclosed bridge featuring Solarban® 72 Starphire® glass passes through the center of the structure and connects it to adjacent buildings.

The exceptional clarity of the glass met Helix Architecture + Design's and CO Architects' requirements for transparency, connectivity and identity. A three-story skylight system that allows ventilation between floors is supplemented by an energy-efficient glass configuration featuring Solarban® 70* glass, which limits heat gain while enhancing occupant comfort. A large cantilevered glass "cube" highlights the medical simulation and clinical skills floors as the "heart" of the building.

*Formerly Solarban® 70XL glass

Starphire Ultra-Clear® Glass

Brilliance and clarity that conventional clear glass can't match

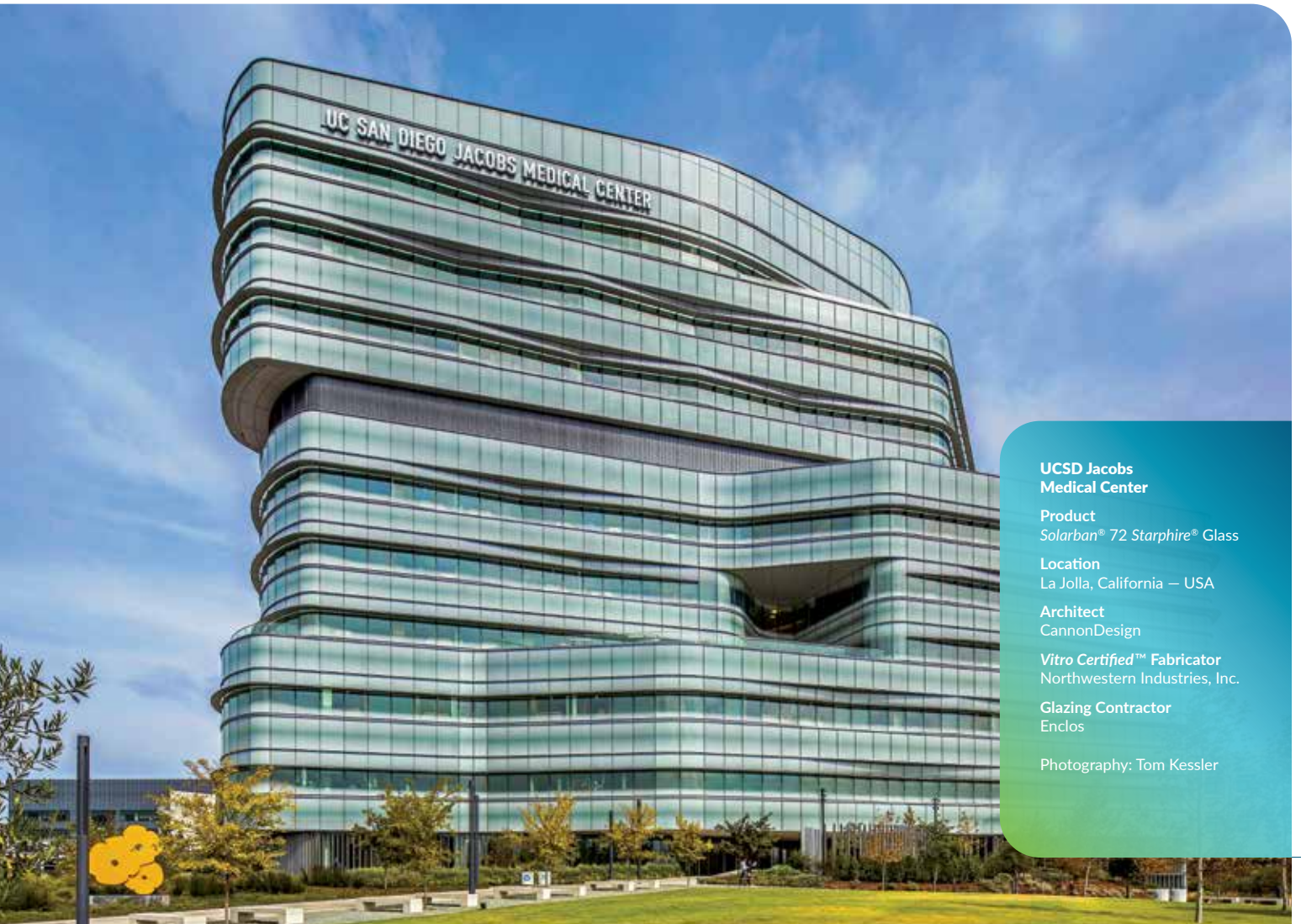
THE CLEAREST. THE ORIGINAL.

Offering pure, undistorted transmitted color, without the green hue inherent in conventional clear glass, *Starphire Ultra-Clear®* glass represents the ultimate achievement in highly transparent low-iron glass technology. As the benchmark in the industry, Vitro Glass produces *Starphire®* glass in a variety of thicknesses for vision glass, safety glass and security glass, point-fixed glazing and other specialty and decorative applications.



Clearly Historic

Since its introduction nearly 30 years ago, Starphire® glass has remained the most transparent commercial float glass available.



UCSD Jacobs Medical Center

Product
Solarban® 72 Starphire® Glass

Location
La Jolla, California — USA

Architect
CannonDesign

Vitro Certified™ Fabricator
Northwestern Industries, Inc.

Glazing Contractor
Enclos

Photography: Tom Kessler

Amazon Spheres**Products**

Solarban® 60 Starphire® Glass

Location

Seattle, Washington – USA

Architect

NBBJ

Vitro Certified™ Fabricator

Northwestern Industries, Inc.

Glazing Contractor

Enclos

Photography: Bruce Damonte

APPLICATIONS**Exteriors**

Starphire Ultra-Clear® glass provides an unprecedented option for curtainwall glass applications, such as vision glazings and spandrel glass, offering brilliant clarity, true-to-life views of the outdoors and true-to-life colors that conventional coated, insulated or laminated glass simply can't match.

Extra Heavy Glass

When conventional clear glass is laminated into multiple layers, or specified in increasing thicknesses, its appearance becomes progressively greener. *Starphire®* glass, with its signature azure blue edge, maintains its clarity and true color transmittance at all thicknesses. Architects can take advantage of this unique attribute by specifying *Starphire®* extra-heavy glass in thicknesses of up to 3/4-inch or 19 millimeters for heavy glass applications, such as entrances, storefronts and security glazing.

Interiors

The unique *Starphire®* glass edge brings more light into interior spaces while offering unmatched levels of brightness, clarity and visual excitement. When used for shelves, shower enclosures, showcases, tabletops, back splashes, doors, side lites, decorative panels, clerestories and partitions, *Starphire®* glass provides the ultimate color fidelity while remaining crystal clear as thickness increases.

APPEARANCE

87% ↓

Less Green than
Clear Glass

PERFORMANCE

7% ↑

Higher VLT
than Clear Glass in
1/2-Inch Thickness

PERFORMANCE

16% ↑

Higher VLT
than Clear Glass in
1-3/8-Inch Laminate

STUNNINGLY CLEAR AT ANY THICKNESS

Monolithic Data

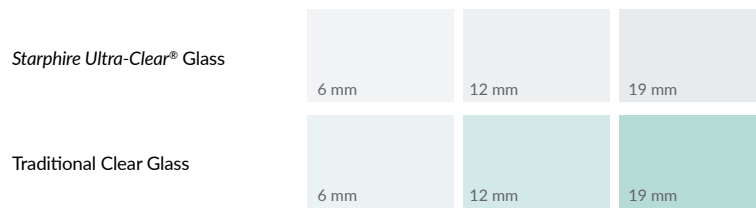
At any thickness, *Starphire Ultra-Clear*® glass transmits ample visible light to deliver visual excitement and create a sense of connectivity between spaces.

Inches	Millimeters	VLT
1/8 to 3/8	3.2 to 10	91
1/2 to 3/4	12 to 19	90

SURFACE COMPARISON

The surface clarity of *Starphire*® glass actually becomes more apparent as the glass gets thicker, maintaining its signature clear aesthetic.

The chart below demonstrates how the thickness of the glass can affect the greenish hue of traditional clear float glass in comparison to *Starphire*® glass.



The Starphire® Edge

For interior applications where the glass edge is exposed – such as partitions, entrances, handrails and balustrades – *Starphire*® glass maintains its signature azure blue edge, even at lengths of 130 inches and thicknesses of 19 millimeters. Review the *Starphire*® Edge Color Guide at vitroglazings.com.



Jewel Changi Airport

Products

Solarban® 70* Glass
Solarban® 72 *Starphire*® Glass

Location

Singapore

Architect

Moshe Safdie Architects

Vitro Certified™

Global Fabricators
 GnT Glass Company, Ltd.
 Wujiang Golden Glass
 Technologies

*Formerly *Solarban*® 70XL glass

Acuity™ Low-Iron Glass

Elevate aesthetics for just a modest investment, without sacrificing performance.

Where conventional clear glass was once a given – such as spandrel and vision glass applications – pure clarity is now within reach. Acuity™ glass by Vitro Architectural Glass provides an affordable low-iron solution and joins Starphire® glass in the Vitro family of low-iron options. Available with all Solarban® solar control low-e coatings, Acuity™ glass offers vivid views with minimal green cast.

When used with low-e coatings, Acuity™ low-iron glass delivers a natural aesthetic, improves visible light transmittance (VLT) by 1 to 4 percent and gives you the solar heat gain coefficients (SHGCs) you expect from Vitro high-performance glasses – all without compromising stringent project budgets.

Acuity™ glass is available in 6, 8 and 10 millimeter thicknesses.

APPEARANCE

60% ↓

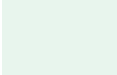
Less Green than Conventional Clear Glass



Solarban® Acuity™ glass is stocked at all Vitro facilities for immediate shipment with the same lead time as all Solarban® glass products. All configurations include uncoated Acuity™ glass as the interior lite:


VERSATILE NEUTRALITY

Solarban® 60 Acuity™ Glass

Solarban® 60 (2) Acuity™ + Acuity™		
	SHGC	VLT
	0.41	73%


EXCEPTIONALLY TRANSPARENT

Solarban® 72 Acuity™ Glass

Solarban® 72 (2) Acuity™ + Acuity™		
	SHGC	VLT
	0.28	67%


SOFT & NEUTRAL

Solarban® 67 Acuity™ Glass

Solarban® 67 (2) Acuity™ + Acuity™		
	SHGC	VLT
	0.30	56%


A NEW MEASURE OF PERFORMANCE

Solarban® 90 Acuity™ Glass

Solarban® 90 (2) Acuity™ + Acuity™		
	SHGC	VLT
	0.23	53%

NEUTRAL-REFLECTIVE

Solarban® R100 Acuity™ Glass

Solarban® R100 (2) Acuity™ + Acuity™		
	SHGC	VLT
	0.23	43%

**Berkshire Hathaway
HomeServices Real Estate
Corporate Office**

Products
Solarban® R100 Pacifica® Glass
Solarban® R100 Clear Glass

Pages 9 & 23

Location
Omaha, Nebraska – USA

Architects
Purdy & Slack Architects

Vitro Certified™ Fabricator
Insulite Glass Co.

Glazing Contractor
City Glass Company



Burns & McDonnell

Products
*Solarban® z75 Glass**
Page 11

Location
Kansas City, Missouri – USA

Architect
Burns & McDonnell

Vitro Certified™ Fabricator
Insulite Glass Co.

Glazing Contractor
AAA Glass Co.

*See p. 11 for product details.

**Daimler Trucks
North America Headquarters**

Products
Solarban® R100 Solarblue® Glass
Tropical Vacation and Basic Blue
Spandrel Coatings by ICD

Pages 9 & 23

Location
Portland, Oregon – USA

Architect
Ankrom Moisan Architects

Vitro Certified™ Fabricator
Hartung Glass Industries

Glazing Contractor
Benson Industries

**Spandrel Coatings
Manufacturer**
ICD High Performance Coatings

Photography: Tom Kessler

A Pickup in Energy Efficiency

Daimler Trucks North America Corporate Headquarters, featuring *Solarban® R100* glass on performance-tinted *Solarblue®* glass, is a testament to energy efficiency. In fact, so much so that the U.S. Green Building Council (USGBC) awarded the building LEED® Platinum certification—the agency's highest rating—and ENERGY STAR® scored the building at 99 out of 100 possible points, an achievement that only 1 percent of office buildings nationwide can assert. *Solarban® R100* on *Solarblue®* glass was integral to the design strategy executed by Ankrom Moisan Architects, who used the demands of the building's interior workplaces to guide its overall structure. Combined in a standard one-inch insulating glass unit (IGU), the glasses deliver visible light transmittance (VLT) of 26 percent and a solar heat gain coefficient (SHGC) of 0.19. Spandrels are finished in two glass coatings from ICD High Performance Coatings, a Vitro Glass partner: 6-2998 Basic Blue, an ICD Custom Color, and 6-2387 Tropical Vacation, an ICD/Vitro Harmonizing Color.

Blue & Green Performance-Tinted Glasses

A SEA OF NAUTICALLY INSPIRED TINTS

Vitro Architectural Glass offers a broad portfolio of blue and green performance tints that imbue buildings with exceptionally natural, environment-blending colors. While most of these glasses are spectrally selective in a one-inch insulating glass unit (IGU) with clear glass, they can dramatically lower solar heat loads with *Solarban*® low-e glass coatings and provide unique solutions. For information on spectrally selective glazing, see page 36.

AQUA-BLUE HARMONY

Azuria® Glass

Aesthetic: Aqua-blue hue

Reflectivity: Low

Azuria® glass offers a stunning aqua-blue hue with visible light transmittance (VLT) of 50 percent and a low solar heat gain coefficient (SHGC) of 0.24 when coated with *Solarban*® 70 glass in a one-inch IGU.

1-Inch IGU with <i>Solarban</i> ® 70 (2)		
	SHGC	VLT
	0.24	50%
Coating Options		
Low-E	Reflective	
<i>Solarban</i> ®	<i>Vistacool</i> ® <i>Solarcool</i> ®	



167 West Erie

Products
Solarban® 60 *Solarblue*® Glass

Location
Chicago, Illinois — USA

Architect
bKL Architecture

Glass Fabricator
Kawneer

Glazing Contractor
Reflection Window + Wall

Photography: Tom Kessler

Mission College
Products

Solarban® 60 Solarblue® Glass

Location

Santa Clara, California – USA

Glass Fabricator

Glassfab Tempering Services

Glazing Contractor

Walters & Wolf


A PLEASANT GREEN
Atlantica® Glass

Aesthetic: Emerald-green

Reflectivity: Low

Atlantica® glass is an emerald-green glass that delivers an SHGC of 0.23, while maintaining 49 percent VLT when coated with *Solarban*® 70 glass in a one-inch IGU.

1-Inch IGU with <i>Solarban</i> ® 70 (2)		Coating Options		
SHGC	VLT	Low-E	Reflective	
0.23	49%	<i>Solarban</i> ®	NA	

SOOTHING LIGHT-GREEN
Solexia® Glass

Aesthetic: Light-green

Reflectivity: Low

Solexia® glass is a light-green tinted glass that has provided high light transmittance and aesthetic solutions to architects and building owners worldwide for decades.

1-Inch IGU with <i>Solarban</i> ® 70 (2)		Coating Options		
SHGC	VLT	Low-E	Reflective	
0.26	56%	<i>Solarban</i> ®	NA	

SPARKLING LIGHT-BLUE
Solarblue® Glass

Aesthetic: Light sky-blue

Reflectivity: Low

Solarblue® glass features a sparkling, light sky-blue tint that balances high VLT of 41 percent with an SHGC of 0.22 when coated with *Solarban*® 70 glass in a one-inch IGU.

1-Inch IGU with <i>Solarban</i> ® 70 (2)		Coating Options		
SHGC	VLT	Low-E	Reflective	
0.22	41%	<i>Solarban</i> ®	<i>Vistacool</i> ® <i>Solarcool</i> ®	

DEEP BLUE
Pacifica® Glass

Aesthetic: Deeply saturated true-blue

Reflectivity: Low

Pacifica® glass is a deeply saturated true-blue tint with an SHGC of 0.19 and VLT of 31 percent when coated with *Solarban*® 70 glass in a one-inch IGU.

1-Inch IGU with <i>Solarban</i> ® 70 (2)		Coating Options		
SHGC	VLT	Low-E	Reflective	
0.19	31%	<i>Solarban</i> ®	<i>Vistacool</i> ® <i>Solarcool</i> ®	

For information on *Optiblue*® glass, see *Solarban*® z50 and *Solarban*® z75 glasses on page 11.

Gray & Bronze Performance-Tinted Glasses

FROM WARM NEUTRALS TO PRIVACY GLASS

Vitro Architectural Glass offers an expansive series of bronze and gray performance-tinted glasses ranging from very neutral, light-transmitting aesthetics to rich, dark glasses that limit transmittance. All can create distinctive looks that blend well with a variety of architectural elements and can be paired with *Solarban*® or *Sungate*® low-e glass coatings for optimum performance.



3 Eleven

Products

Solarban® 60 *Optigray*® Glass
Solarban® 60 Clear Glass

Location

Chicago, Illinois – USA

Architect

FitzGerald

Vitro Certified™ Fabricator

Oldcastle BuildingEnvelope®

Glazing Contractor

CK2 Contracting, Inc.

Photography: Tom Kessler

Mundelein High School, Science Expansion

Product

Solarban® 60 Clear Glass
Solarban® 70* Glass
Solarban® 60 Solargray® Glass

Location

Mundelein, Illinois – USA

Architect

Legat Architects

Vitro Certified™ Fabricator

Oldcastle BuildingEnvelope®

Glazing Contractor

McHenry County Glass & Mirror

Photography: Tom Kessler

*Formerly Solarban® 70XL glass



ULTRA-NEUTRAL GRAY

Optigray® Glass

Aesthetic: Warm light-gray

Reflectivity: Low

Optigray® glass features an ultra-neutral, warm light-gray color designed to complement Solarban® solar control low-e glasses and maximize light transmittance and clarity.

1-Inch IGU with Solarban® 70 (2)		Coating Options		
	SHGC	VLT	Low-E	Reflective
	0.23	46%	Solarban®	NA

A RICH CONTRAST

Graylite® II Glass

Aesthetic: Dark-gray

Reflectivity: Low

Graylite® II glass delivers a rich dark-gray aesthetic that limits light transmittance and heat load while providing glare control and privacy, all with a distinctive color contrast.

1-Inch IGU with Solarban® 70 (3)		Coating Options		
	SHGC	VLT	Low-E	Reflective
	0.11	6%	Solarban®	NA

A CLASSIC NEUTRAL

Solargray® Glass

Aesthetic: Cool medium-gray

Reflectivity: Low

Solargray® glass has a cool medium-gray appearance with a classic, neutral aesthetic favored by many designers and maintains visible light transmittance (VLT) of 32 percent in a one-inch insulating glass unit (IGU) with Solarban® 70 Glass.

1-Inch IGU with Solarban® 70 (2)		Coating Options		
	SHGC	VLT	Low-E	Reflective
	0.19	32%	Solarban®	Vistacool® Solarcool®

WARM, HARMONIZING BRONZE

Solarbronze® Glass

Aesthetic: Warm bronze

Reflectivity: Low

Solarbronze® glass offers a warm bronze appearance that complements a range of hues from adjacent building materials and still offers VLT of 39 percent in a one-inch IGU with Solarban® 70 glass.

1-Inch IGU with Solarban® 70 (2)		Coating Options		
	SHGC	VLT	Low-E	Reflective
	0.20	39%	Solarban®	Vistacool®, Solarcool®

Data is based on center-of-glass performance, in a one-inch insulating glass unit with clear glass, of representative factory production samples. Actual values may vary due to the production process and manufacturing tolerances. All tabulated data is based on NFRC methodology using the LBNL Window 7.3 software.



Gateway Corporate Center

Product
Vistacool® Azuria® Glass

Page 28

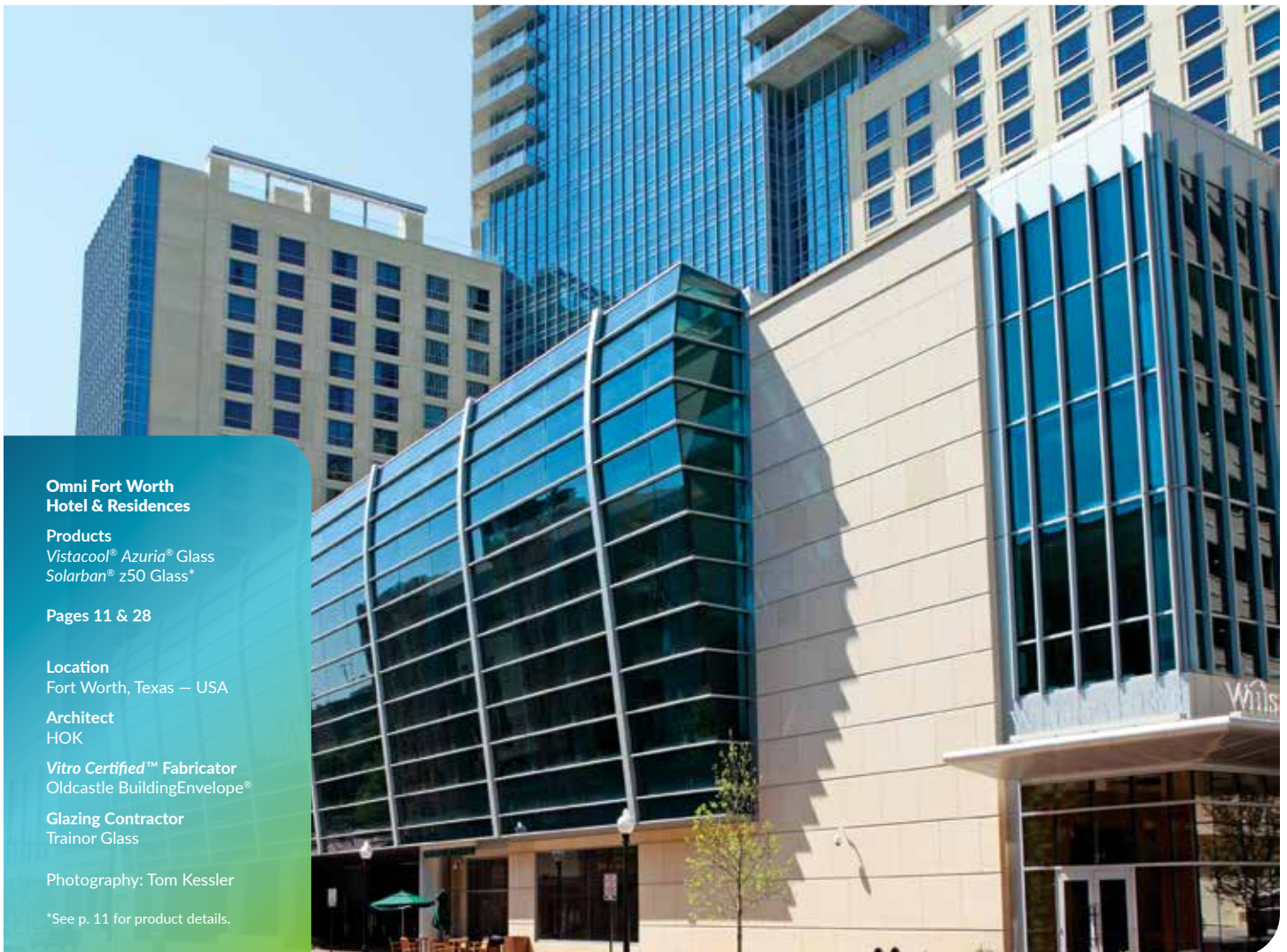
Location
Dallas, Texas — USA

Architect
O'Brien + Associates

Vitro Certified™ Fabricator
Trulite Glass
and Aluminum Solutions

Glazing Contractor
B+B Glass

Photography: Wes Thompson



**Omni Fort Worth
Hotel & Residences**

Products
Vistacool® Azuria® Glass
Solarban® z50 Glass*

Pages 11 & 28

Location
Fort Worth, Texas — USA

Architect
HOK

Vitro Certified™ Fabricator
Oldcastle BuildingEnvelope®

Glazing Contractor
Trainer Glass

Photography: Tom Kessler

*See p. 11 for product details.

Sky Las Vegas**Product**

Vistacool[®] *Azuria*[®] Glass
Solarban[®] 60 Clear Glass

Pages 12 & 28

Location

Las Vegas, Nevada — USA

Architect

Klai Juba Architects

***Vitro Certified*[™] Fabricator**

Oldcastle BuildingEnvelope[®]

Glazing Contractor

Heinaman Contract Glazing

Photography: Tom Kessler

Striking Jackpot

As one of the first luxury high-rises on Las Vegas Boulevard, Sky Las Vegas is distinguished by its striking blue glass exterior. Central to this aesthetic is 92,000 square-feet of *Vistacool*[®] *Azuria*[®] glass, featuring a proprietary *Vistacool*[®] color-enriched coating that subtly reflects *Azuria*[®] glass' stunning aqua-blue tint. Despite the color-richness, the configuration delivers visible light transmittance (VLT) of 42 percent with an exceptional solar heat gain coefficient (SHGC) of 0.26 in a one-inch insulating glass unit (IGU). By blocking more than 70 percent of the sun's heat energy, *Vistacool*[®] *Azuria*[®] glass with *Solarban*[®] 60 glass not only enhances the comfort of residents but also lowers their air-conditioning and lighting costs.

Vistacool® Subtly Reflective Color-Enriched Glasses

The Vistacool® family of subtly reflective, color-enriched glasses is engineered to deliver high levels of visible light transmittance (VLT) with a softly reflective appearance that is more understated than the mirror-like aesthetic of traditional reflective glass. Designed as a durable second-surface-only coating, Vistacool® glasses are available in two distinct tints – Azuria® glass for an aqua-blue appearance or Pacifica® glass for a true-blue appearance – that may be combined with Solarban® or Sungate® low-e glass coatings to achieve light-to-solar gain (LSG) ratios as high as 1.62.

RICH, AQUA-BLUE

Vistacool® Azuria® Glass

Vistacool® (2) Azuria® + Solarban® 60 (3)			
	SHGC	EXTERIOR REFLECTANCE	VLT
	0.26	20%	42%

DEEP, TRUE-BLUE

Vistacool® Pacifica® Glass

Vistacool® (2) Pacifica® + Solarban® 60 (3)			
	SHGC	EXTERIOR REFLECTANCE	VLT
	0.22	11%	26%



Baker Hughes

Products

Vistacool® Pacifica® Glass
Solarban® 60 Clear Glass
Solarban® 70* Glass

Location

Houston, Texas – USA

Architect

Energy Architecture

Vitro Certified™ Fabricator

Northwestern Industries, Inc.

Glazing Contractor

Duke Glass, Inc.

*Formerly Solarban® 70XL glass


Solarcool[®] Reflective Glasses

For more than 45 years, Vitro's proven and highly durable Solarcool[®] reflective coated glasses have enhanced the appearance of thousands of buildings and the comfort of occupants. When applied to the first (#1) surface of an insulating glass unit (IGU), Solarcool[®] glass produces a reflective, metallic sheen. On the second (#2) surface, Solarcool[®] coatings add reflectivity and enrich the color of five Vitro tinted glasses.

When combined in a one-inch IGU with Solarban[®] 60 glass, Solarcool[®] reflective glasses offer an expansive palette of appearance and performance options with solar heat gain coefficients (SHGCs) ranging from 0.15 to 0.18 and exterior reflectance of up to 19 percent.


AQUA-BLUE

Solarcool[®] Azuria[®] Glass

Solarcool [®] (2) Azuria [®] + Solarban [®] 60 (3)			
	SHGC	EXTERIOR REFLECTANCE	VLT
	0.17	19%	21%


WARM BRONZE

Solarcool[®] Solarbronze[®] Glass

Solarcool [®] (2) Solarbronze [®] + Solarban [®] 60 (3)			
	SHGC	EXTERIOR REFLECTANCE	VLT
	0.18	14%	17%


RICH BLUE

Solarcool[®] Pacifica[®] Glass

Solarcool [®] (2) Pacifica [®] + Solarban [®] 60 (3)			
	SHGC	EXTERIOR REFLECTANCE	VLT
	0.15	10%	13%


MEDIUM-GRAY

Solarcool[®] Solargray[®] Glass

Solarcool [®] (2) Solargray [®] + Solarban [®] 60 (3)			
	SHGC	EXTERIOR REFLECTANCE	VLT
	0.17	11%	14%

LIGHT SKY-BLUE

Solarcool[®] Solarblue[®] Glass

Solarcool [®] (2) Solarblue [®] + Solarban [®] 60 (3)			
	SHGC	EXTERIOR REFLECTANCE	VLT
	0.18	14%	17%

Data is based on center-of-glass performance, in a one-inch insulating glass unit with clear glass, of representative factory production samples. Actual values may vary due to the production process and manufacturing tolerances. All tabulated data is based on NFRC methodology using the LBNL Window 7.3 software.

Monolithic Glass Comparison¹

Glass Thickness		Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr·ft ² ·°F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light-to-Solar Gain (LSG) ⁵	
Inches	mm		Exterior %	Interior %	Winter Nighttime	Winter Argon			
Uncoated									
CLEAR Glass									
	1/8	3	90	9	9	1.04	NA	0.86	1.05
	5/32	4	90	9	9	1.04	NA	0.85	1.06
	3/16	5	89	9	9	1.03	NA	0.83	1.07
	1/4	6	89	8	9	1.02	NA	0.82	1.09
	5/16	8	87	8	8	1.01	NA	0.79	1.10
	3/8	10	87	8	8	1.00	NA	0.77	1.13
	1/2	12	85	8	8	0.98	NA	0.73	1.16
	5/8	16	82	8	8	0.97	NA	0.69	1.19
	3/4	19	81	8	8	0.95	NA	0.68	1.19
ACUITY™ Glass									
	1/4	6	90	8	8	1.02	NA	0.87	1.03
	5/16	8	90	8	8	1.01	NA	0.86	1.05
	3/8	10	90	8	8	1.00	NA	0.85	1.06
STARPHIRE® Glass									
	1/8	3	91	8	8	1.04	NA	0.91	1.00
	5/32	4	91	8	8	1.04	NA	0.91	1.00
	3/16	5	91	8	8	1.03	NA	0.90	1.01
	1/4	6	91	8	8	1.02	NA	0.90	1.01
	5/16	8	91	8	8	1.01	NA	0.89	1.02
	3/8	10	91	8	8	1.00	NA	0.89	1.02
	1/2	12	90	8	8	0.98	NA	0.88	1.02
	5/8	16	90	8	8	0.97	NA	0.87	1.03
	3/4	19	90	8	8	0.95	NA	0.86	1.05
SOLEXIA® Glass									
	1/8	3	83	8	8	1.04	NA	0.71	1.17
	5/32	4	81	8	8	1.04	NA	0.68	1.19
	3/16	5	79	8	8	1.03	NA	0.65	1.22
	1/4	6	77	8	8	1.02	NA	0.62	1.24
ATLANTICA® Glass									
	1/4	6	67	7	7	1.02	NA	0.53	1.26
AZURIA® Glass									
	5/32	4	75	7	7	1.04	NA	0.57	1.32
	3/16	5	72	7	7	1.03	NA	0.54	1.33
	1/4	6	68	7	7	1.02	NA	0.52	1.31
SOLARBLUE® Glass									
	1/4	6	56	6	6	1.02	NA	0.61	0.92
PACIFICA® Glass									
	1/4	6	42	5	5	1.02	NA	0.49	0.86
SOLARBRONZE® Glass									
	1/8	3	67	7	7	1.04	NA	0.73	0.92
	5/32	4	63	7	7	1.04	NA	0.70	0.90
	3/16	5	58	6	6	1.03	NA	0.67	0.87
	1/4	6	53	6	6	1.02	NA	0.63	0.84
	3/8	10	37	5	6	1.00	NA	0.53	0.70
	1/2	12	27	5	5	0.98	NA	0.47	0.57
OPTIGRAY® Glass									
	1/4	6	63	6	6	1.02	NA	0.65	0.97
SOLARGRAY® Glass									
	1/8	3	60	6	7	1.04	NA	0.69	0.87
	5/32	4	56	6	7	1.04	NA	0.66	0.85
	3/16	5	50	6	6	1.03	NA	0.62	0.81
	1/4	6	44	6	6	1.02	NA	0.58	0.76
	3/8	10	28	5	5	1.00	NA	0.48	0.58
	1/2	12	18	5	5	0.98	NA	0.42	0.43
GRAYLITE® II Glass									
	1/8	3	24	5	5	1.04	NA	0.45	0.53
	5/32	4	18	4	5	1.04	NA	0.42	0.43
	3/16	5	13	4	5	1.03	NA	0.39	0.33
	1/4	6	9	4	5	1.02	NA	0.36	0.25

Insulating Glass Unit Performance Comparisons 1-inch (25 mm) units with 1/2-inch (13 mm) airspace and two 1/4-inch (6 mm) lites

Outdoor Lite: Coating if Any (Surface) Glass	Glass Type +	Indoor Lite: Coating if Any (Surface) Glass	Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr·ft ² ·°F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light-to-Solar Gain (LSG) ⁵
				Exterior %	Interior %	Winter Nighttime	Winter Argon		
Uncoated									
	CLEAR Glass + Clear		79	15	15	0.47	0.45	0.70	1.13
	ACUITY™ + ACUITY™		82	15	15	0.47	0.45	0.78	1.05
	STARPHIRE® + STARPHIRE®		84	15	15	0.47	0.45	0.82	1.02
	SOLEXIA® + Clear		69	13	15	0.47	0.45	0.50	1.38
	ATLANTICA® + Clear		60	10	14	0.47	0.45	0.40	1.50
	AZURIA® + Clear		61	11	14	0.47	0.45	0.39	1.56
	SOLARBLUE® + Clear		50	9	13	0.47	0.45	0.49	1.02
	PACIFICA® + Clear		38	7	13	0.47	0.45	0.36	1.06
	SOLARBRONZE® + Clear		47	8	13	0.47	0.45	0.51	0.92
	OPTIGRAY® + Clear		56	10	13	0.47	0.45	0.52	1.08
	SOLARGRAY® + Clear		40	7	13	0.47	0.45	0.46	0.87
	GRAYLITE®II + Clear		8	4	12	0.47	0.45	0.22	0.36
Coated									

SUNGATE® 400 Passive Low-E Glass

	SUNGATE 400 (2) Clear + Clear		76	14	14	0.32	0.28	0.60	1.27
	SUNGATE 400 (2) STARPHIRE + STARPHIRE		80	14	14	0.32	0.28	0.68	1.18
	CLEAR + SUNGATE 400 (3) Clear		76	14	14	0.32	0.28	0.63	1.21
	SOLEXIA + SUNGATE 400 (3) Clear		66	11	13	0.32	0.28	0.44	1.50
	ATLANTICA + SUNGATE 400 (3) Clear		58	9	12	0.32	0.28	0.35	1.66
	AZURIA + SUNGATE 400 (3) Clear		59	10	12	0.32	0.28	0.34	1.74
	SOLARBLUE + SUNGATE 400 (3) Clear		48	8	12	0.32	0.28	0.42	1.14
	PACIFICA + SUNGATE 400 (3) Clear		37	7	11	0.32	0.28	0.30	1.23
	SOLARBRONZE + SUNGATE 400 (3) Clear		46	8	12	0.32	0.28	0.44	1.05
	OPTIGRAY + SUNGATE 400 (3) Clear		54	9	12	0.32	0.28	0.46	1.17
	SOLARGRAY + SUNGATE 400 (3) Clear		38	7	12	0.32	0.28	0.39	0.97
	GRAYLITE II + SUNGATE 400 (3) Clear		8	4	11	0.32	0.28	0.15	0.53

SOLARBAN® 60 Solar Control Low-E Glass

	SOLARBAN 60 (2) Clear + Clear		70	11	12	0.29	0.24	0.39	1.79
	SOLARBAN 60 (2) ACUITY + ACUITY		73	11	12	0.29	0.24	0.41	1.78
	SOLARBAN 60 (2) STARPHIRE + STARPHIRE		74	11	12	0.29	0.24	0.41	1.80
	SOLARBAN 60 (2) SOLEXIA + Clear		61	9	12	0.29	0.24	0.32	1.91
	SOLARBAN 60 (2) ATLANTICA + Clear		53	8	11	0.29	0.24	0.27	1.96
	SOLARBAN 60 (2) AZURIA + Clear		54	8	11	0.29	0.24	0.28	1.93
	SOLARBAN 60 (2) SOLARBLUE + Clear		45	7	11	0.29	0.24	0.29	1.55
	SOLARBAN 60 (2) PACIFICA + Clear		34	6	10	0.29	0.24	0.23	1.48
	SOLARBAN 60 (2) SOLARBRONZE + Clear		42	7	11	0.29	0.24	0.28	1.50
	SOLARBAN 60 (2) OPTIGRAY + Clear		50	8	11	0.29	0.24	0.30	1.67
	SOLARBAN 60 (2) SOLARGRAY + Clear		35	6	10	0.29	0.24	0.25	1.40
	SOLEXIA + SOLARBAN 60 (3) Clear		61	10	10	0.29	0.24	0.37	1.65
	ATLANTICA + SOLARBAN 60 (3) Clear		53	8	10	0.29	0.24	0.31	1.71
	AZURIA + SOLARBAN 60 (3) Clear		54	9	10	0.29	0.24	0.31	1.74
	SOLARBLUE + SOLARBAN 60 (3) Clear		45	7	9	0.29	0.24	0.33	1.36
	PACIFICA + SOLARBAN 60 (3) Clear		34	6	9	0.29	0.24	0.25	1.36
	SOLARBRONZE + SOLARBAN 60 (3) Clear		42	7	9	0.29	0.24	0.32	1.31
	OPTIGRAY + SOLARBAN 60 (3) Clear		50	8	9	0.29	0.24	0.35	1.43
	SOLARGRAY + SOLARBAN 60 (3) Clear		35	7	9	0.29	0.24	0.29	1.21
	GRAYLITE II + SOLARBAN 60 (3) Clear		7	4	8	0.29	0.24	0.13	0.54

SOLARBAN® 67 Solar Control Low-E Glass

	SOLARBAN 67 (2) Clear + Clear		54	19	16	0.29	0.24	0.29	1.86
	SOLARBAN 67 (2) ACUITY + ACUITY		56	19	16	0.29	0.24	0.30	1.87
	SOLARBAN 67 (2) STARPHIRE + STARPHIRE		57	20	16	0.29	0.24	0.30	1.90
	SOLARBAN 67 (2) SOLEXIA + Clear		47	16	16	0.29	0.24	0.25	1.88
	SOLARBAN 67 (2) ATLANTICA + Clear		41	13	16	0.29	0.24	0.22	1.86
	SOLARBAN 67 (2) AZURIA + Clear		42	13	16	0.29	0.24	0.23	1.83

Insulating Glass Unit Performance Comparisons 1-inch (25 mm) units with 1/2-inch (13 mm) airspace and two 1/4-inch (6 mm) lites

Outdoor Lite: Coating if Any (Surface) Glass	Glass Type + Indoor Lite: Coating if Any (Surface) Glass	Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr·ft ² ·°F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light-to-Solar Gain (LSG) ⁵
			Exterior %	Interior %	Winter Nighttime	Winter Argon		

Coated

SOLARBAN® 67 Solar Control Low-E Glass (Continued)

SOLARBAN 67 (2) OPTIBLUE + Clear	39	12	15	0.29	0.24	0.25	1.56
SOLARBAN 67 (2) SOLARBLUE + Clear	34	10	15	0.29	0.24	0.23	1.48
SOLARBAN 67 (2) PACIFICA + Clear	26	8	15	0.29	0.24	0.19	1.37
SOLARBAN 67 (2) SOLARBRONZE + Clear	32	10	15	0.29	0.24	0.22	1.45
SOLARBAN 67 (2) OPTIGRAY + Clear	38	12	15	0.29	0.24	0.24	1.58
SOLARBAN 67 (2) SOLARGRAY + Clear	27	8	15	0.29	0.24	0.20	1.35
ATLANTICA + SOLARBAN 67 (3) Clear	41	11	18	0.29	0.24	0.29	1.41
AZURIA + SOLARBAN 67 (3) Clear	42	11	18	0.29	0.24	0.29	1.45
SOLARBLUE + SOLARBAN 67 (3) Clear	34	9	18	0.29	0.24	0.30	1.13
PACIFICA + SOLARBAN 67 (3) Clear	26	7	18	0.29	0.24	0.23	1.13
SOLARBRONZE + SOLARBAN 67 (3) Clear	32	9	18	0.29	0.24	0.29	1.10
OPTIGRAY + SOLARBAN 67 (3) Clear	38	10	18	0.29	0.24	0.32	1.19
SOLARGRAY + SOLARBAN 67 (3) Clear	27	8	18	0.29	0.24	0.26	1.04
GRAYLITE II + SOLARBAN 67 (3) Clear	5	4	18	0.29	0.24	0.12	0.42

SOLARBAN® 70 Solar Control Low-E Glass[†] (formerly Solarban® 70XL glass)

SOLARBAN 70 (2) [†] + Clear	64	13	14	0.28	0.24	0.27	2.37
SOLARBAN 70 (2) SOLEXIA + Clear	56	11	14	0.28	0.24	0.26	2.15
SOLARBAN 70 (2) ATLANTICA + Clear	49	10	13	0.28	0.24	0.23	2.13
SOLARBAN 70 (2) AZURIA + Clear	50	10	13	0.28	0.24	0.24	2.08
SOLARBAN 70 (2) SOLARBLUE + Clear	41	8	13	0.28	0.24	0.22	1.86
SOLARBAN 70 (2) PACIFICA + Clear	31	7	13	0.28	0.24	0.19	1.63
SOLARBAN 70 (2) SOLARBRONZE + Clear	39	8	13	0.28	0.24	0.20	1.95
SOLARBAN 70 (2) OPTIGRAY + Clear	46	9	13	0.28	0.24	0.23	2.00
SOLARBAN 70 (2) SOLARGRAY + Clear	32	7	13	0.28	0.24	0.19	1.68
SOLEXIA + SOLARBAN 70 (3) [†]	56	11	12	0.28	0.24	0.32	1.75
ATLANTICA + SOLARBAN 70 (3) [†]	48	9	11	0.28	0.24	0.28	1.71
AZURIA + SOLARBAN 70 (3) [†]	49	9	11	0.28	0.24	0.29	1.69
SOLARBLUE + SOLARBAN 70 (3) [†]	41	8	12	0.28	0.24	0.27	1.52
PACIFICA + SOLARBAN 70 (3) [†]	31	6	10	0.28	0.24	0.22	1.41
SOLARBRONZE + SOLARBAN 70 (3) [†]	38	8	11	0.28	0.24	0.26	1.46
OPTIGRAY + SOLARBAN 70 (3) [†]	46	9	12	0.28	0.24	0.28	1.64
SOLARGRAY + SOLARBAN 70 (3) [†]	32	7	11	0.28	0.24	0.24	1.33
GRAYLITE II + SOLARBAN 70 (3) [†]	6	4	10	0.28	0.24	0.11	0.55

SOLARBAN® 72 Solar Control Low-E Glass

SOLARBAN 72 (2) ACUITY + ACUITY	67	13	14	0.28	0.24	0.28	2.39
SOLARBAN 72 (2) STARPHIRE + STARPHIRE	68	13	14	0.28	0.24	0.28	2.43

SOLARBAN® 90 Solar Control Low-E Glass

SOLARBAN 90 (2) Clear + Clear	51	12	19	0.29	0.24	0.23	2.22
SOLARBAN 90 (2) ACUITY + ACUITY	53	12	19	0.29	0.24	0.23	2.30
SOLARBAN 90 (2) STARPHIRE + STARPHIRE	54	13	20	0.29	0.24	0.23	2.35
SOLARBAN 90 (2) SOLEXIA + Clear	44	10	19	0.29	0.24	0.22	2.00
SOLARBAN 90 (2) ATLANTICA + Clear	39	9	19	0.29	0.24	0.20	1.95
SOLARBAN 90 (2) AZURIA + Clear	39	9	19	0.29	0.24	0.21	1.86
SOLARBAN 90 (2) OPTIBLUE + Clear	37	8	19	0.29	0.24	0.20	1.85
SOLARBAN 90 (2) SOLARBLUE + Clear	32	8	18	0.29	0.24	0.19	1.68
SOLARBAN 90 (2) PACIFICA + Clear	24	6	18	0.29	0.24	0.17	1.41
SOLARBAN 90 (2) SOLARBRONZE + Clear	31	7	18	0.29	0.24	0.18	1.72
SOLARBAN 90 (2) OPTIGRAY + Clear	36	8	19	0.29	0.24	0.20	1.80
SOLARBAN 90 (2) SOLARGRAY + Clear	26	6	18	0.29	0.24	0.17	1.53
SOLEXIA + SOLARBAN 90 (3) Clear	44	16	12	0.29	0.24	0.30	1.47
ATLANTICA + SOLARBAN 90 (3) Clear	39	13	12	0.29	0.24	0.26	1.50
AZURIA + SOLARBAN 90 (3) Clear	39	13	12	0.29	0.24	0.27	1.44
SOLARBLUE + SOLARBAN 90 (3) Clear	32	10	11	0.29	0.24	0.25	1.28
PACIFICA + SOLARBAN 90 (3) Clear	24	8	11	0.29	0.24	0.21	1.14
SOLARBRONZE + SOLARBAN 90 (3) Clear	30	10	11	0.29	0.24	0.24	1.25

Insulating Glass Unit Performance Comparisons 1-inch (25 mm) units with 1/2-inch (13 mm) airspace and two 1/4-inch (6 mm) lites

Outdoor Lite: Coating if Any (Surface) Glass	Glass Type +	Indoor Lite: Coating if Any (Surface) Glass	Visible Light Transmittance (VLT) ² %	Visible Light Reflectance ²		(Btu/hr·ft ² ·°F) NFRC U-Value ³		Solar Heat Gain Coefficient (SHGC) ⁴	Light-to-Solar Gain (LSG) ⁵
				Exterior %	Interior %	Winter Nighttime	Winter Argon		

Coated

SOLARBAN® 90 Solar Control Low-E Glass (Continued)

	OPTIGRAY + SOLARBAN 90 (3) Clear		36	12	11	0.29	0.24	0.27	1.33
	SOLARGRAY + SOLARBAN 90 (3) Clear		25	8	11	0.29	0.24	0.22	1.14
	GRAYLITE II + SOLARBAN 90 (3) Clear		5	4	11	0.29	0.24	0.11	0.45

SOLARBAN® z50 Solar Control Low-E Glass††

	SOLARBAN 60 (2) OPTIBLUE + Clear		51	8	11	0.29	0.24	0.32	1.59
--	----------------------------------	--	----	---	----	------	------	------	------

SOLARBAN® z75 Solar Control Low-E Glass††

	SOLARBAN 70 (2) OPTIBLUE + Clear		46	9	13	0.28	0.24	0.23	2.00
--	----------------------------------	--	----	---	----	------	------	------	------

SOLARBAN® R100 Solar Control Low-E Glass

	SOLARBAN R100 (2) Clear + Clear		42	32	14	0.29	0.25	0.23	1.83
	SOLARBAN R100 (2) ACUITY + ACUITY		43	33	13	0.29	0.25	0.23	1.87
	SOLARBAN R100 (2) STARPHIRE + STARPHIRE		44	33	14	0.29	0.25	0.23	1.91
	SOLARBAN R100 (2) SOLEXIA + Clear		36	25	13	0.29	0.25	0.21	1.71
	SOLARBAN R100 (2) ATLANTICA + Clear		31	20	13	0.29	0.25	0.19	1.63
	SOLARBAN R100 (2) AZURIA + Clear		32	21	13	0.29	0.25	0.19	1.68
	SOLARBAN R100 (2) OPTIBLUE + Clear		30	19	13	0.29	0.25	0.20	1.50
	SOLARBAN R100 (2) SOLARBLUE + Clear		26	15	13	0.29	0.25	0.19	1.37
	SOLARBAN R100 (2) PACIFICA + Clear		20	11	13	0.29	0.25	0.16	1.25
	SOLARBAN R100 (2) SOLARBRONZE + Clear		25	15	13	0.29	0.25	0.18	1.39
	SOLARBAN R100 (2) OPTIGRAY + Clear		29	18	13	0.29	0.25	0.20	1.45
	SOLARBAN R100 (2) SOLARGRAY + Clear		21	12	13	0.29	0.25	0.17	1.24

VISTACOOl® Subtly Reflective Glass

	VISTACOOl (2) AZURIA + Clear		47	21	32	0.47	0.45	0.34	1.38
	VISTACOOl (2) PACIFICA + Clear		29	11	31	0.47	0.45	0.32	0.91

SOLARCOOL® Reflective Glass

	SOLARCOOL (2) AZURIA + Clear		24	20	38	0.47	0.45	0.25	0.96
	SOLARCOOL (2) PACIFICA + Clear		15	10	38	0.47	0.45	0.25	0.60
	SOLARCOOL (2) SOLARBLUE + Clear		20	15	38	0.47	0.45	0.32	0.63
	SOLARCOOL (2) SOLARBRONZE + Clear		19	14	38	0.47	0.45	0.34	0.56
	SOLARCOOL (2) SOLARGRAY + Clear		16	11	38	0.47	0.45	0.32	0.50

VISTACOOl® and SOLARCOOL® with SOLARBAN® 60 Solar Control Low-E Glass (3)

	VISTACOOl (2) AZURIA + SOLARBAN 60 (3) Clear		42	20	24	0.29	0.24	0.26	1.62
	VISTACOOl (2) PACIFICA + SOLARBAN 60 (3) Clear		26	11	23	0.29	0.24	0.22	1.18
	SOLARCOOL (2) AZURIA + SOLARBAN 60 (3) Clear		21	19	29	0.29	0.24	0.17	1.24
	SOLARCOOL (2) SOLARBLUE + SOLARBAN 60 (3) Clear		17	14	29	0.29	0.24	0.18	0.94
	SOLARCOOL (2) PACIFICA + SOLARBAN 60 (3) Clear		13	10	29	0.29	0.24	0.15	0.87
	SOLARCOOL (2) SOLARBRONZE + SOLARBAN 60 (3) Clear		17	14	29	0.29	0.24	0.18	0.94
	SOLARCOOL (2) SOLARGRAY + SOLARBAN 60 (3) Clear		14	11	29	0.29	0.24	0.17	0.82

VISTACOOl® and SOLARCOOL® with SOLARBAN® 70 Solar Control Low-E Glass (3)† (formerly Solarban® 70XL glass)

	VISTACOOl (2) AZURIA + SOLARBAN 70 (3)†		38	21	23	0.28	0.24	0.24	1.58
	VISTACOOl (2) PACIFICA + SOLARBAN 70 (3)†		24	11	22	0.28	0.24	0.19	1.26
	SOLARCOOL (2) AZURIA + SOLARBAN 70 (3)†		19	19	27	0.28	0.24	0.16	1.19
	SOLARCOOL (2) SOLARBLUE + SOLARBAN 70 (3)†		16	14	27	0.28	0.24	0.15	1.07
	SOLARCOOL (2) PACIFICA + SOLARBAN 70 (3)†		12	10	27	0.28	0.24	0.13	0.92
	SOLARCOOL (2) SOLARBRONZE + SOLARBAN 70 (3)†		15	14	27	0.28	0.24	0.15	1.00
	SOLARCOOL (2) SOLARGRAY + SOLARBAN 70 (3)†		13	11	27	0.28	0.24	0.14	0.93

† Solarban® 70 (formerly Solarban® 70XL) for annealed applications is applied to low-iron glass; heat-treated applications will require either clear or low-iron glass depending on manufacturing process.

†† Optiblu® is a unique substrate by Vitro Glass designed for use with several Solarban® glass coatings.

1. Data is based on center-of-glass performance of representative factory production samples. Actual values may vary due to the production process and manufacturing tolerances. All tabulated data is based on NFRC methodology using the LBNL Window 7.3 software.

2. Transmittance and Reflectance values based on spectrophotometric measurements and energy distribution of solar radiation.

3. U-Value – A measure of the insulating characteristics of the glass or how much heat gain or loss occurs through the glass due to the difference between indoor and outdoor temperatures and is measured Btu/hr·ft²·°F. The lower the number, the better the insulating performance. This number is the reciprocal of the R-value. Winter argon represents the winter nighttime U-value performance when the cavity is filled with a 90% argon/10% air/gas mixture.

4. Solar Heat Gain Coefficient (SHGC) – Measures how well a window blocks (or shades) the heat from sunlight. SHGC is the fraction of solar radiation transmitted through a window or skylight, as well as the amount that is absorbed by the glass and reradiated to the interior. SHGC is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits and the greater the shading ability. The SHGC is similar to the Shading Coefficient (SC), but also accounts for absorbed, converted and inwardly radiated solar energy.

5. Light-to-solar gain (LSG) ratio is the ratio of visible light transmittance to solar heat gain coefficient.

Vitro Certified™ Network

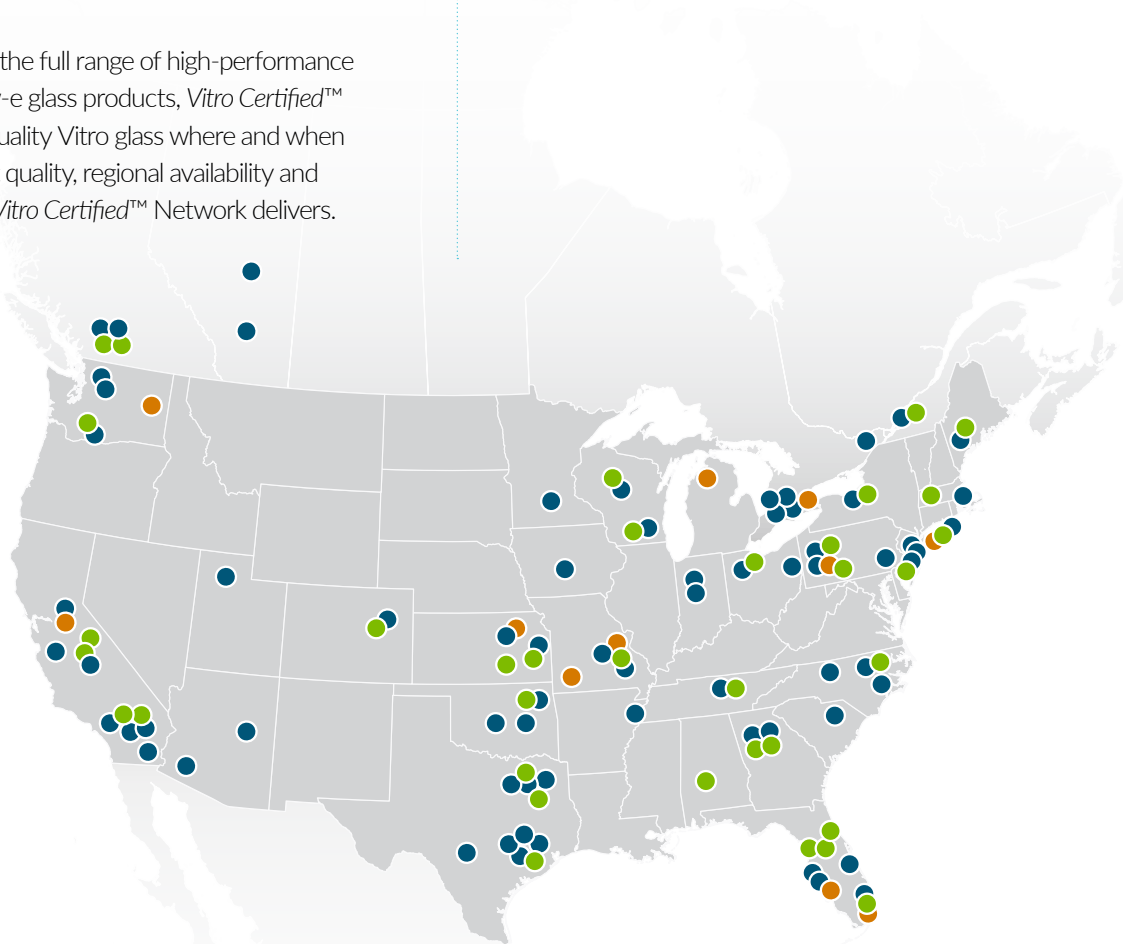
**Regional sourcing. Superior products.
Unmatched service.**

Your projects require glass fabricators that understand the nuances of commercial magnetron sputtered vacuum deposition (MSVD) glass fabrication – and the expectations of glaziers and building owners. That’s why every member of the *Vitro Certified™* Network must pass a demanding annual vetting process, which provides you with a selection of only the most experienced, knowledgeable fabricators throughout North America and beyond.

Vitro Certified™ Network members are audited annually and evaluated across more than 100 criteria, from storage and handling to recordkeeping and product support. That means every member has the tools necessary to ensure a quality product, delivered on-time and on-budget.

As the exclusive source of the full range of high-performance *Solarban®* solar control low-e glass products, *Vitro Certified™* Fabricators provide high-quality Vitro glass where and when you need it. For consistent quality, regional availability and enhanced lead times, the *Vitro Certified™* Network delivers.

- *Vitro Certified™* Fabricators
- *Vitro Certified™* Laminators
- *Vitro Certified™* Architectural Window Manufacturers



Vitro Certified™ Fabricators

Vitro Certified™ Laminators

Vitro Certified™ Architectural Window Manufacturers

Vitro Certified™ International Fabricators

Vitro Certified™ International Laminators

All members of the *Vitro Certified™* Network can enroll unique or high-profile projects in the *Vitro Concierge Program™*, a priority glass scheduling and delivery program.

A Culture of Sustainability

A Pioneer in Sustainability Certifications

Vitro Architectural Glass has raised the bar by becoming the first glass manufacturer in the worldwide and North American markets to provide critical sustainability documentation – such as Environmental Product Declarations and *Cradle to Cradle™* (C2C) certification – for its entire collection of architectural glasses.

To earn C2C certification, Vitro Glass products are evaluated independently to measure their total life-cycle impact on human health and the environment.

LEED® Support

As the oldest and largest glass manufacturer in North America, Vitro Architectural Glass has a long history of helping architects incorporate many of the principles now codified in the LEED rating system.

Vitro Glass products can help you earn credits across at least six LEED categories. Get guidance on earning LEED credits through your glass selections with the Vitro Glass Guide to LEED at vitroglazings.com/leed.

The Vitro Sustainability Model

Across the company and its business units, Vitro takes active steps to protect the environment. In addition to providing energy-efficient architectural glass products, we support several initiatives that promote protection of the environment and reduction of energy consumption in the glass manufacturing process. In 2017, Vitro recycled nearly 97,000 tons of glass through its glass recycling program and consumed over 76,000 gigajoules of electrical energy from renewable sources.

For more information, visit vitro.com.

Bullitt Center

Products

Solarban® 60 Clear Glass
Starphire Ultra-Clear® Glass

Location

Seattle, Washington – USA

Architect

The Miller Hull Partnership LLP

Vitro Certified™ Fabricator

Northwestern Industries, Inc.

Glazing Contractor

Goldfinch Brothers

Photography: Tom Kessler



Sustainability Support

Download EPDs, Get LEED Support & More
vitroglazings.com/sustainability
archservices@vitro.com
1.855.887.6457 / 1.855.VTRO.GLS



Glass & Energy Management

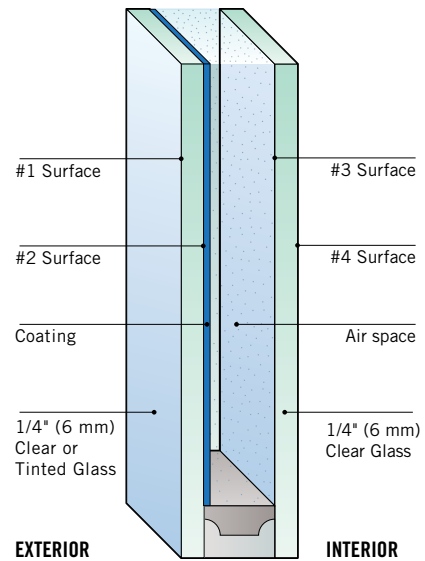
Over the past half-century, glass has become critical to green building design. Glass not only is forged from basic ingredients, such as silica sand, soda-ash and limestone, which are plentiful and relatively inexpensive, but it also transmits light while mitigating the effects of solar heat gain. Few building materials balance these competing functions so deftly. Thanks to ongoing technological advances by Vitro, there is tangible promise for even more eco-effective glasses in the future.

Setting the Standard for Performance

Solarban[®] solar control low-e glasses reduce solar heat gain, which is quantified by solar heat gain coefficient (SHGC). *Sungate*[®] passive low-e coatings transmit solar heat energy into buildings, generating higher SHGCs. Both types of low-e coatings also improve U-values.

Understanding Glass Surface Designations

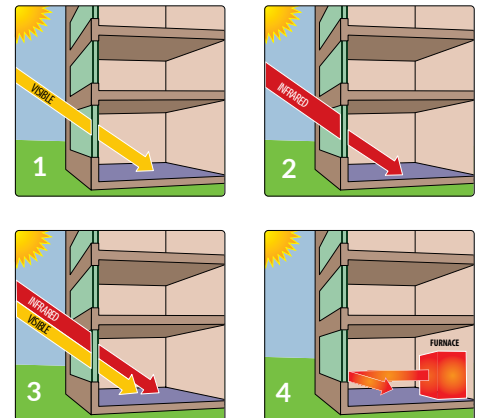
In a standard dual-pane insulating glass unit (IGU), the first (#1) surface faces outdoors; the fourth (#4) faces indoors. The two surfaces inside the IGU are the second (#2) and third (#3) surfaces, which face each other and are separated by an airspace and an insulating spacer. Magnatron sputtered vacuum deposition (MSVD) coatings, or “soft” coats, such as *Solarban*[®] coatings, must be glazed on the inner surfaces.



Insulating Glass Unit

Four Factors of Energy Performance

1. Visible light transmittance (VLT) measures the amount of natural light transmitted into a building.
2. SHGC quantifies the amount of solar energy that passes directly into a building.
3. Light-to-solar gain (LSG) ratio is the ratio of VLT to SHGC. Glazings with LSG ratios of 1.25 or greater are defined as spectrally selective by the U.S. Department of Energy’s Federal Energy Management Program (FEMP).
4. U-value quantifies a glass’s insulating ability. Glasses with lower U-values are better at retaining interior heat than glasses with higher U-values.



Glass Design Resources

Vitro Architectural Glass offers the industry's most comprehensive portals for glass research, product selection and specification.

Online Tools

Explore our suite of specification and product selection tools that can lead to extraordinary projects.

Search

search.vitroglazings.com

Use Search to explore Vitro's extensive selection of products.

Project Gallery

projects.vitroglazings.com

Browse our Project Gallery to view completed projects that highlight innovative and creative applications of Vitro glass products.

Construct

construct.vitroglazings.com

With Construct, you can simplify the process of specifying Vitro glass and even competitive glass products – now featuring password-free access to International Glazing Database (IGDB) data.

Sample Order & Literature Fulfillment Center

samples.vitroglazings.com

Order a sample to see the amazing aesthetics for yourself.

Vitro Glass Education Center

glassed.vitroglazings.com

Designed to deliver technical information in an accessible, engaging format, the Vitro Glass Education Center features short videos, illustrations and articles that address the key challenges facing architects, specifiers and other building professionals today.

Amazon Spheres

Products
Solarban® 60 Starphire® Glass

Location
Seattle, Washington — USA

Architect
NBBJ

Vitro Certified™ Fabricator
Northwestern Industries, Inc.

Glazing Contractor
Enclos

Photography: Tom Kessler



vitroglazings.com

1-855-VTRO-GLS (887-6457)

