

A photograph of a modern architectural glass building with a curved facade and a green-to-blue gradient overlay across the middle. A white speech bubble contains the text 'Together, We See Further'.

Together, We See Further



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

Building a Brighter Tomorrow

Vitro has been influencing skylines around the world for more than a century with signature architectural glass products that define today's most iconic buildings. The strength of our partnerships with architects, building owners, contractors and glass fabricators drives our desire to innovate and create solutions for today's challenges that deliver high design, energy efficiency and cost effectiveness. We employ thousands of dedicated team members who are defining the future of glass thanks to countless advancements in glass technology and production.

Focused on Sustainability

At Vitro, we're committed to remaining a pioneer in glass technology, especially when it comes to delivering products that meet and exceed today's standards for sustainability. From the development of proprietary oxygen-fueled glass furnace technology, which cuts natural gas consumption by 15%, to continual advancements in magnetron sputtered vacuum deposition (MSVD) coatings, Vitro glass products offer opportunities to lower not just operational carbon but embodied carbon, as well.

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, Pennsylvania, 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

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DESIGN SPOTLIGHT

Introducing VacuMax™ Vacuum Insulating Glass (VIG)

Add Extraordinary Insulation to Any Configuration.

Thanks to its innovative insulating technology, VacuMax™ VIG provides thermal insulation performance that is two to four times better than conventional insulating glass units and up to 14 times better than monolithic glass. With its extraordinary R-values, VacuMax™ VIG delivers energy savings and reduced carbon emissions due to decreased HVAC use and subsequent Btu usage, and the unit's slim construction and light weight allows it to be incorporated into virtually any traditional glazing system, window frame or curtainwall application.

Performance Benefits

Tempered VacuMax™ VIG units are made up of two lites of 4mm (0.16") glass. Surface #2 on the interior lite includes a double-silver, low-e coating similar to Solarban® 60 solar control, low-e glass, and the lites are separated by a non-leaded proprietary metal seal and a vacuum space.

VacuMax™ VIG units are available in sizes from 0.30m x 0.30m (12" x 12") to 1.47m x 2.44m (58" x 96"). The entire VIG unit has a total thickness of 8.3mm (0.33"), only slightly thicker than a standard 6mm (0.24") glass lite.

For added versatility, tempered VacuMax™ VIG units can be used as a substitute for the interior lite in any double- or triple-glazed insulating glass unit (IGU), where it forms an insulating gas space in addition to a vacuum insulating cavity and creates a hybrid IGU that delivers an R-value of R16+.

With wall-like center of glass R-values of 14+, VacuMax™ VIG delivers the ultimate in thermal insulation performance.

VacuMax™
Vacuum Insulating Glass

Learn more at VacuMaxVIG.com

Built for the Long Term

With its proprietary metal alloy edge seal system, VacuMax™ VIG has exceptionally long life compared to other VIG products and delivers superior resistance against thermal expansion or contraction caused by extreme indoor/outdoor temperature differences.

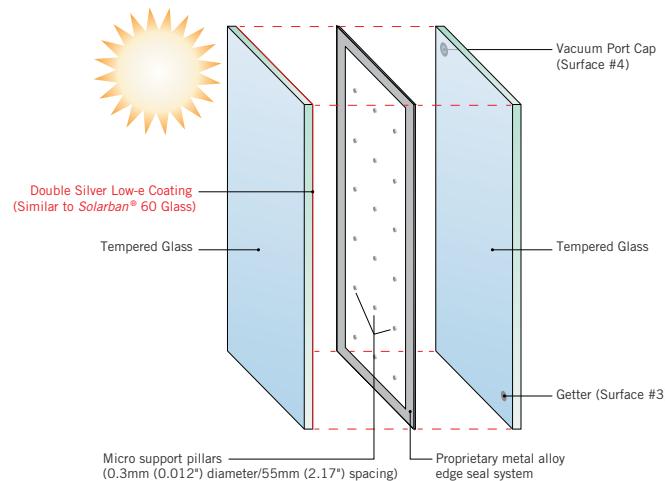
Improved Acoustics & Condensation Performance

VacuMax™ VIG also delivers increased acoustic performance for dramatic noise dampening plus reduced center of glass condensation at temperatures as low as -58 °F.

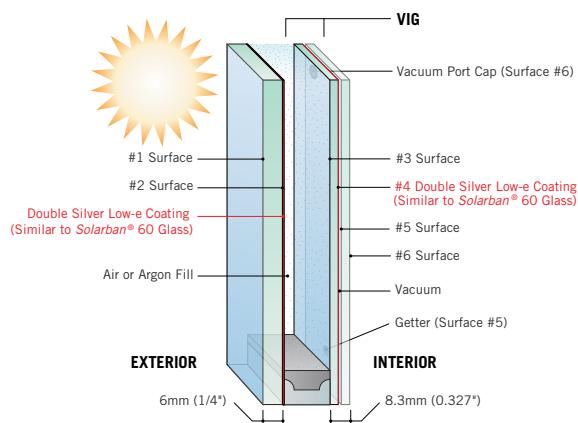
Perfect for a Range of Applications

VacuMax™ VIG is an ideal solution for any commercial or residential renovation or new construction project requiring extraordinary insulating performance, including office buildings, educational institutions, hospitality and healthcare.

R14+ VIG



R16+ Nominal 1" Hybrid IGU



Solarvolt™ Building Integrated Photovoltaic (BIPV) Glass System

Vitro's legacy of sustainability continues with the Solarvolt™ BIPV glass system. Seamlessly integrated into the building structure, Solarvolt™ BIPV glass unveils new possibilities for renewable power generation and design. Solarvolt™ BIPV glass combines aesthetics, CO₂-free power generation and protection from the elements for commercial buildings.



An Integrated Building Envelope Solution

Solarvolt™ BIPV glass systems replace traditional façade cladding materials, such as stone or ceramic materials, and enhance just about any part of commercial building exteriors, including balustrades and balconies, skylights, spandrel glass, roof elements, canopies and more. Upon request, Solarvolt™ BIPV glass can become components of many traditional façade solutions.

Vitro manufactures customizable lites, including popular glass-glass composite solar panels with solar cells arranged between two glass lites, as well as glass substrate lites in sizes 2,500mm x 3,700mm (98.4" x 145.6") and in thicknesses up to two 10mm (0.39") lites.



Learn more at VitroSolarvolt.com

HCA Office

Product

Solarban® R100 Glass

Page 10

Location

Nashville, Tennessee — USA

Architect

Gresham Smith

Vitro Certified™ Fabricator
Cristacurva

Glazing Contractor
McInerney & Associates, Inc.

Photography: Tom Kessler



**University of Texas at Austin
The Moody Center**

Products

Solarban® 70* Glass

Solarban® 70 Solargray® Glass

Pages 9 & 25

Location

Austin, Texas — USA

Architect

Gensler

Vitro Certified™ Fabricator
Tristar Glass, Inc.

Glazing Contractor
Dynamic Glass

Photography: Tom Kessler

*Formerly Solarban® 70XL glass



**Gonzaga University
Health Sciences and
Innovation Building**

Products

Solarban® 90 Acuity™ Glass

Pages 9 & 25

Location

Spokane, Washington — USA

Architect

CollinsWoerman

Vitro Certified™ Fabricator
Hartung Glass Industries

Glazing Contractor
AllStar Glass

Photography:
Benjamin Benschneider



VIA 57 West

Product
*Solarban® 70** Glass

Page 9

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.

Solarban® Solar Control Low-e Glass

When you want to maximize energy efficiency and lower operational carbon to meet today's sustainability standards without sacrificing aesthetics, the *Solarban®* brand of solar control low-e glasses by Vitro Architectural Glass offers unparalleled choices to help you achieve both your energy performance and 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. Best of all, *Solarban®* glass products 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 oversized glass coater is located at our Wichita Falls, Texas, plant. That means *Solarban®* low-e glasses are available in oversized standard sizes of 3.30m x 5.18m (130" x 204"), as well as our Titan glass products that allow for sizes up to 3.30m x 6.10m (130" x 240").



510 Vermont

Products

Solarban® 70* Glass

Page 9

Location

Los Angeles, California – USA

Architect

Gensler

Vitro Certified™ Fabricator
Glassfab Tempering Services

Glazing Contractor
Walters & Wolf

Photography: Tom Kessler

*Formerly *Solarban®* 70XL glass

EPIC 1**Product***Solarban® 90 Starphire® Glass***Location**

Dallas, Texas – USA

Architect

Perkins + Will

Vitro Certified™ Fabricator

Oldcastle BuildingEnvelope®

Glazing Contractor

Harmon

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%	✓	✓	✓

**Biblioteca TEC
Campus Monterrey****Product***Solarban® 90 Glass***Location**Monterrey,
Nuevo León – Mexico**Architect**Sasaki Associates
RDLP Arquitectos
GLR Arquitectos**Vitro Certified™ Fabricator**

Vidrios El Castillo

Glazing Contractor

VICRION

Data is based on center-of-glass performance, in a one-inch 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.



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."

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 Starphire® (2)		Substrate Options		
SHGC	VLT	Clear	Low-Iron	Tinted
0.28	68%		✓	

1-Inch IGU on Acuity™ (2)		Substrate Options		
SHGC	VLT	Clear	Low-Iron	Tinted
0.28	66%		✓	





Four Constitution Square

Product

Solarban® 60 Optiblue®* Glass
Solarban® R100 Glass
Solarban® 60 Starphire® Glass

Location

Washington,
District of Columbia – USA

Architect

HOK

Vitro Certified™ Fabricator
Olcastle BuildingEnvelope®

Glazing Contractor
Physical Security LLC

Photography: Tom Kessler

*Formerly Solarban® z50 glass

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%	✓	✓	✓

NEUTRAL-REFLECTIVE

Solarban® R77 Glass

Aesthetic: Crisp, neutral

Reflectivity: Moderate

Solarban® R77 glass offers reflectivity that is higher than Solarban® R67 glass but lower than Solarban® R100 glass. With its balanced, reflective quality, it is ideal for façade and curtainwall designs intended to capture the visual character of the sky and ambient environment.

1-Inch IGU on Clear (2)		Substrate Options		
SHGC	VLT	Clear	Low-Iron	Tinted
0.25	47%	✓	✓	✓

NEUTRAL-REFLECTIVE

Solarban® R67 Glass

(Formerly Solarban® 67 Glass)

Aesthetic: Crisp, neutral

Reflectivity: Moderate

Solarban® R67 glass combines excellent solar control performance with a 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%	✓	✓	✓

NEUTRAL-REFLECTIVE

Solarban® R100 Glass

Aesthetic: Cool blue-gray

Reflectivity: High

Solarban® R100 glass is a neutral-reflective low-e glass with excellent solar performance and light transmittance.

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

OPTIMIZED FOR OPTIBLUE® GLASS**Solarban® 60 Optiblue® Glass**
(Formerly Solarban® z50 Glass)**Aesthetic:** Neutral, cool blue-gray**Reflectivity:** Low

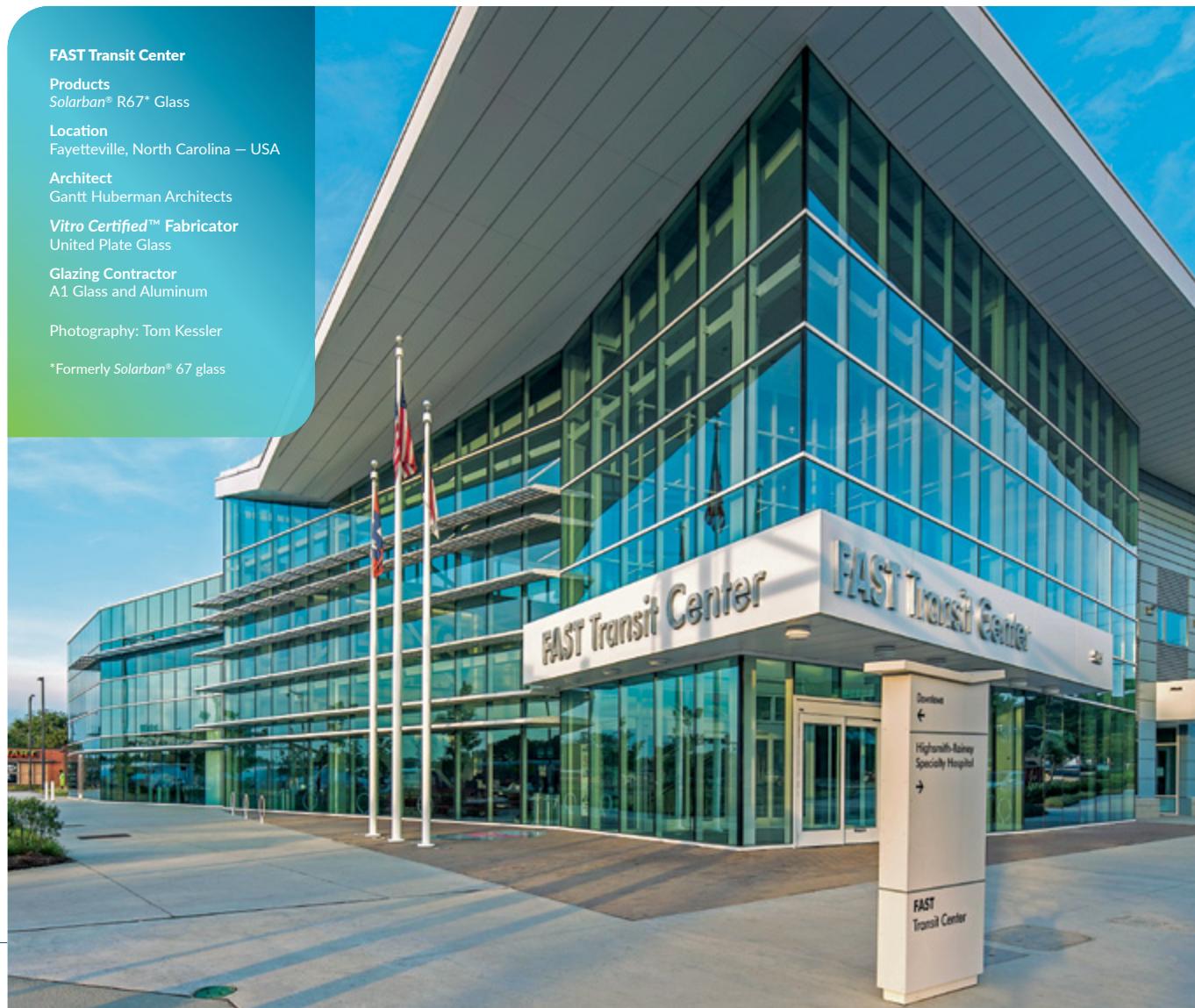
With its soothing, neutral, steel blue-gray appearance, Solarban® 60 Optiblue® glass brings a distinctly different aesthetic to the Solarban® 60 glass family, along with minimal exterior reflectance, superb solar control and high levels of VLT.

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

OPTIMIZED FOR OPTIBLUE® GLASS**Solarban® 70 Optiblue® Glass**
(Formerly Solarban® z75 Glass)**Aesthetic:** Soft silver-blue**Reflectivity:** Low

With its cool blue-gray appearance and ample VLT, Solarban® 70 Optiblue® 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%			✓

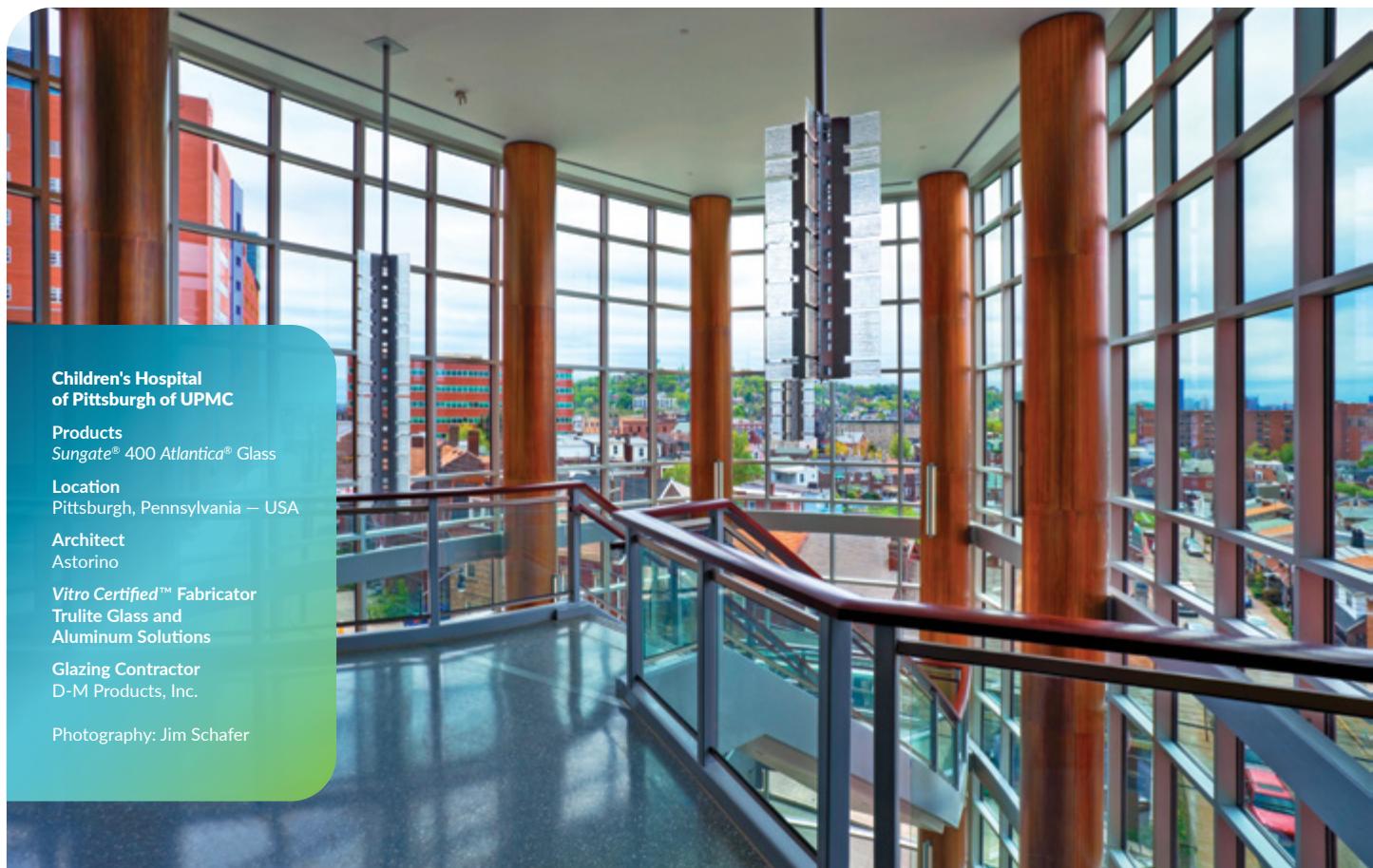


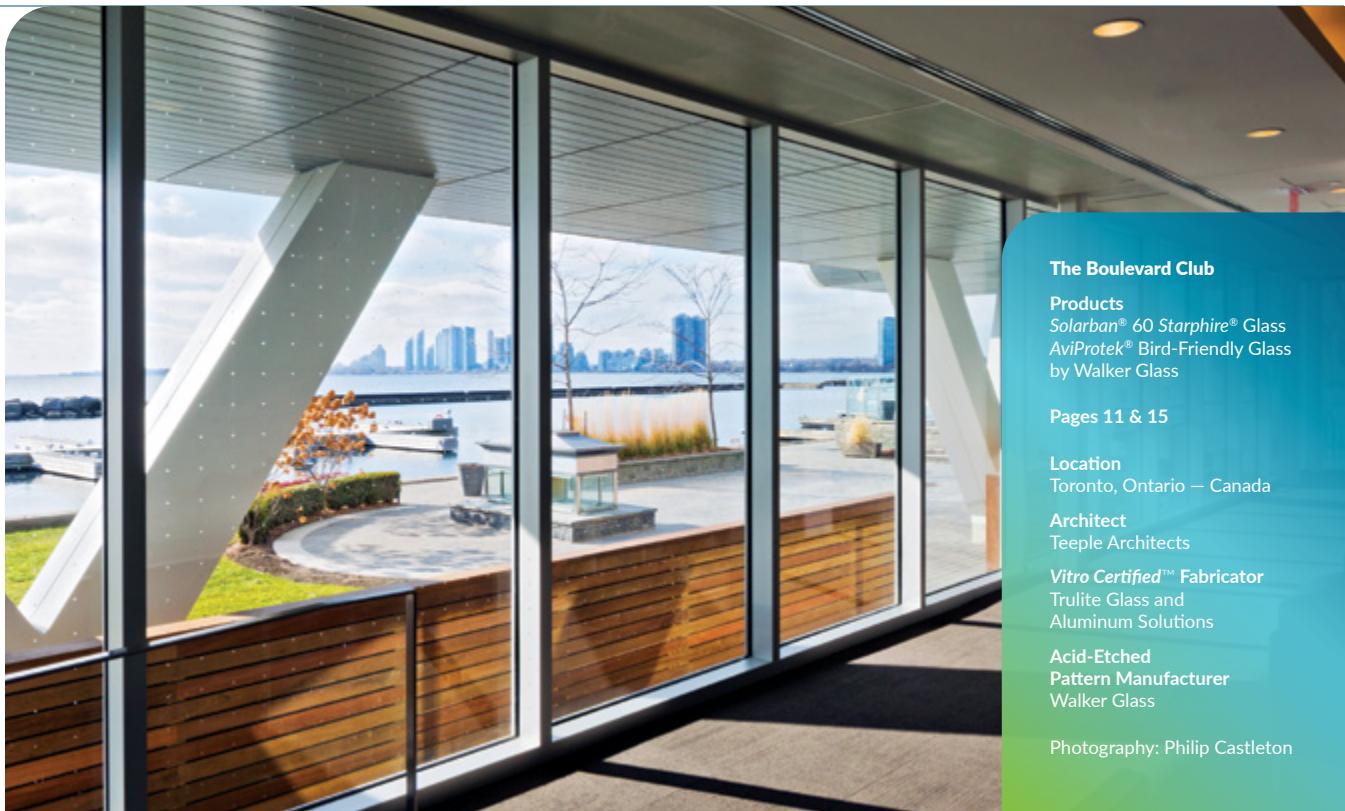
Sungate® 400 Passive Low-E Glass

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% lower than passive low-e glasses manufactured with a “hard” pyrolytic coating. Sungate® 400 glass also has been engineered to work with Solarban® 70 (formerly Solarban® 70XL glass) and Solarban® 60 glasses to optimize performance in triple-pane IGUs.

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

SUNGATE® 400
Low-E Glass





The Boulevard Club

Products

Solarban® 60 Starphire® Glass
AviProtek® Bird-Friendly Glass
by Walker Glass

Pages 11 & 15

Location

Toronto, Ontario – Canada

Architect

Teeple Architects

Vitro Certified™ Fabricator
Trulite Glass and
Aluminum Solutions

Acid-Etched
Pattern Manufacturer
Walker Glas

Photography: Philip Castleton



Oklahoma University College of Medicine

Products

Solarban® R100 Solargray® Glass
Solarban® 72 Starphire® Glass

Pages 9, 10, 15 & 25

Location

Oklahoma City, Oklahoma – USA

Architects

Bockus Payne Associates
Architecture

Vitro Certified™ Fabricator
Tristar Glass Inc.

Glazing Contractor
Oak Cliff Mirror &
Glass Company Inc.

Photography: Randy Alvarado



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

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

Pages 9 & 15

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 at the "heart" of the building.

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, Starphire® glass is produced in a variety of thicknesses for vision glass, safety glass and security glass, point-fixed glazing and other specialty and decorative applications. Starphire® glass provides an unprecedented option for curtainwall glass applications, offering brilliant clarity, true-to-life views of the outdoors and vibrant colors that conventional coated, insulated or laminated glass simply can't match.

EXTRA-HEAVY GLASS

Starphire® glass maintains its signature azure blue edge, clarity and true color transmittance even in increasing thicknesses or when laminated into multiple layers. Architects can specify 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 with unique designs for added visual interest.

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



Amazon Spheres

Products

Solarban® 60 Starphire® Glass

Page 10

Location

Seattle, Washington – USA

Architect

NBBJ

Vitro Certified™ Fabricator

Glazing Contractor

Enclos

Photography: Tom Kessler



Apache Corporation

Products
Starphire® Glass

Location
Calgary, Alberta – Canada

Architect
utile

Vitro Authorized™
Starphire® Glass Partner
Goldray Glass

Photography: Bruce Damonte

UCSF Medical Center

Products
*Solarban® 70** Glass
Starphire® Glass

Location
San Francisco, California – USA

Architect
Stantec Architecture
Taylor Design

Vitro Certified™ Fabricator
Glassfab Tempering Services Inc.

Vitro Authorized™
Starphire® Glass Partner
Skyline Design

Glazing Contractor
Enclos

Photography:
Michael McLane Photography

*Formerly *Solarban® 70XL* glass



INTERIOR APPLICATIONS

Decorative Applications

For sparkling clarity and visual excitement, *Starphire®* glass has no equal. The design possibilities are boundless with decorative *Starphire®* glass, which renders colors and patterns in their truest forms. Use *Starphire®* glass with a variety of techniques such as digital printing, dichroic lamination, acid etching and more – even on laminated or heavy glass – to create brilliant visuals.

The *Starphire®* Glass 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 3.30m (130") and thicknesses of 19mm (0.75"). Review the *Starphire®* Edge Color Guide at vitroglassings.com for more information.

Functional Beauty

Starphire® glass provides a unique combination of performance and visual impact ideal for functional pieces such as doors, partitions, stairs and handrails. For security applications, *Starphire®* glass can be tempered or laminated for safety and extra strength – while still delivering unparalleled color transmission.

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.

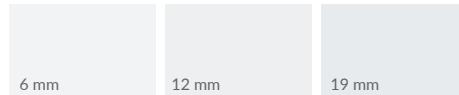
Inches	Millimeters	VLT
1/8 to 3/8	3.2 to 10	91%
1/2 to 3/4	12 to 19	90%

SURFACE COMPARISON

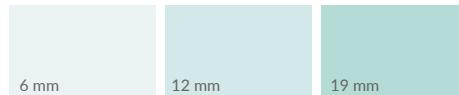
The surface clarity of Starphire® glass actually becomes more apparent as the glass gets thicker, maintaining its signature clear aesthetic.

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

Starphire Ultra-Clear® Glass

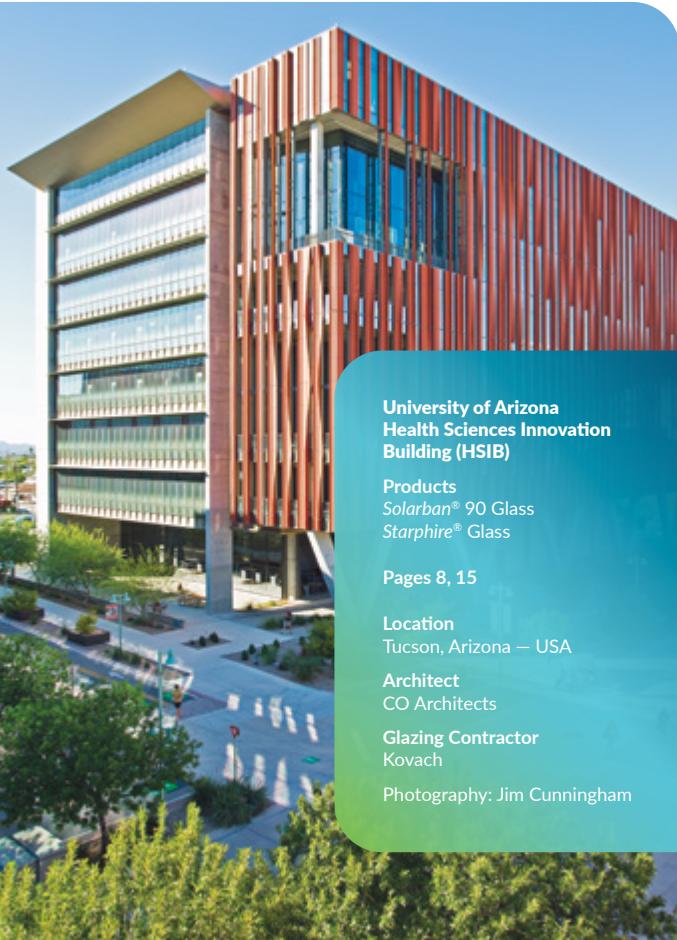


Traditional Clear Glass



No glazing product comes close to the clarity offered by Starphire Ultra-Clear® glass.

To optimize transparent façades, curtainwalls, and commercial windows, specify Starphire® glass for a 2-4% improvement in VLT compared to coated conventional clear glass.



University of Arizona Health Sciences Innovation Building (HSIB)

Products

Solarban® 90 Glass
Starphire® Glass

Pages 8, 15

Location

Tucson, Arizona – USA

Architect

CO Architects

Glazing Contractor

Kovach

Photography: Jim Cunningham



Jewel Changi Airport

Products

Solarban® 70* Glass
Solarban® 72 Starphire® Glass

Pages 9, 11

Location

Singapore – Malaysia

Architect

Moshe Safdie Architects
XRSP Architects, Planners
and Engineers

Vitro Certified™

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

Glazing Contractor

Mero Asia Pacific

Photography:
thirtysixshots photography

*Formerly Solarban® 70XL glass

**SAFE Credit Union
Performing Arts Center**

Products

Solarban® 90 Acuity™ Glass

Pages 8, 19

Location

Sacramento, California – USA

Architect

DLR Group

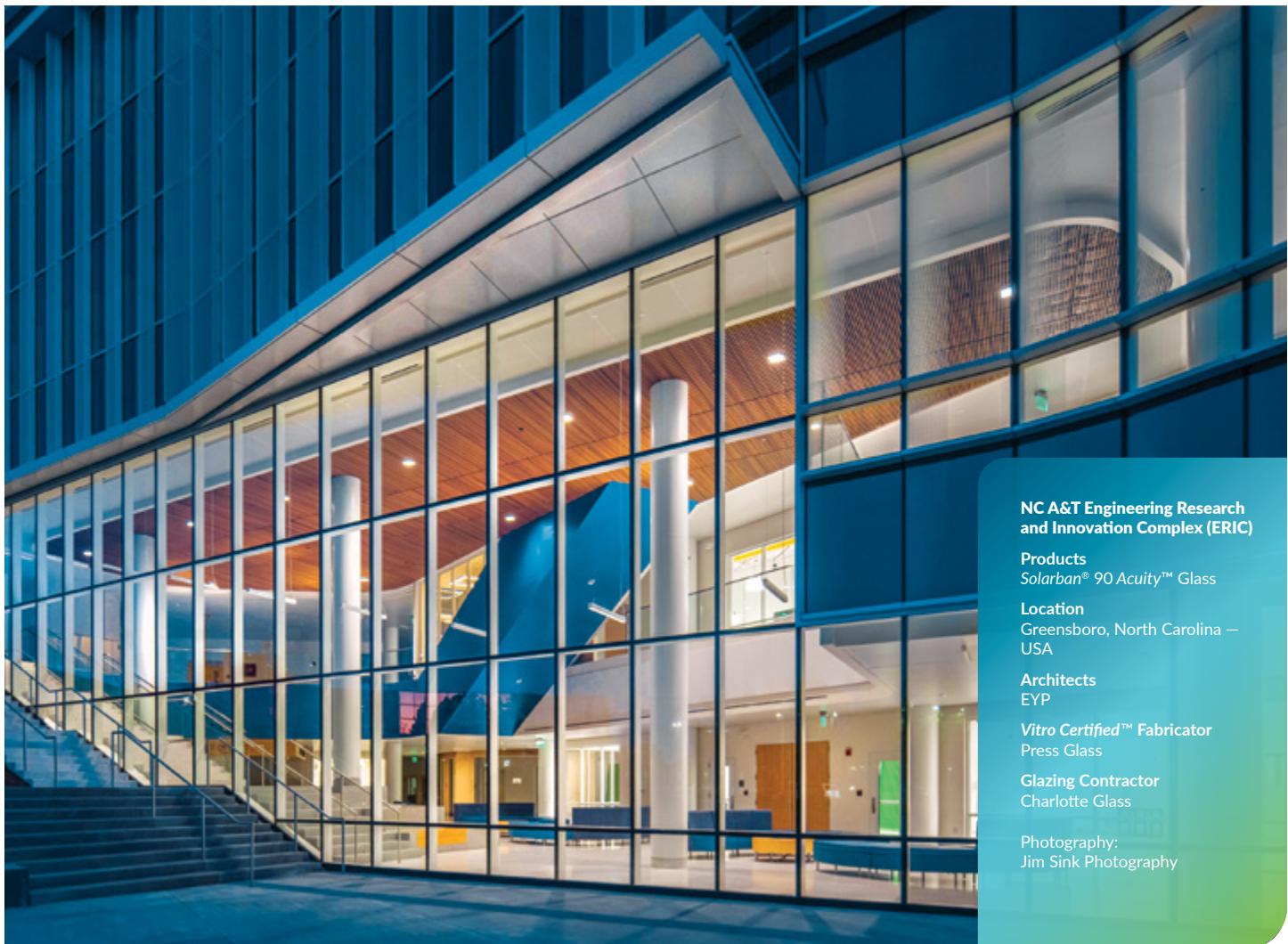
Vitro Certified™ Fabricator

Glassfab Tempering Services Inc.

Glazing Contractor

Bagatelos

Photography: Tom Kessler



**NC A&T Engineering Research
and Innovation Complex (ERIC)**

Products

Solarban® 90 Acuity™ Glass

Location

Greensboro, North Carolina –
USA

Architects

EYP

Vitro Certified™ Fabricator

Press Glass

Glazing Contractor

Charlotte Glass

Photography:

Jim Sink Photography

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 provides an affordable low-iron solution and joins Starphire® glass in the Vitro family of low-iron glass 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 VLT by 1-4% and gives you the 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%

SOFT & NEUTRAL

Solarban® R67* Acuity™ Glass

Solarban® R67 (2) Acuity™ + Acuity™		
	SHGC	VLT
	0.30	56%

*Formerly Solarban® 67 glass

EXCEPTIONALLY TRANSPARENT

Solarban® 72 Acuity™ Glass

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

NEUTRAL-REFLECTIVE

Solarban® R77 Acuity™ Glass

Solarban® R77 (2) Acuity™ + Acuity™		
	SHGC	VLT
	0.25	49%

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%



4545 Roosevelt

Product

Solarban® 60 Glass
Solarban® 70 Glass
*Solarban® R67** Glass
Solarblue® Glass

Location

Seattle, Washington – USA

Pages 9, 10, 11 & 23

Architect

NBBJ

Vitro Certified™ Fabricator
Hartung Glass Industries

Glazing Contractor
Washington Glass & Glazing

Photography: Tom Kessler

*Formerly *Solarban® 67* glass



**UCI Middle Earth
Housing Expansion**

Products

*Solarban® R67** *Solexia® Glass*

Location

Irvine, California – USA

Pages 10 & 23

Architect

Mithun

Vitro Certified™ Fabricator
Northwestern Industries, Inc.

Glazing Contractor
Kovach Building Enclosures

Photography: Tom Kessler

*Formerly *Solarban® 67* glass



**Daimler Trucks
North America Headquarters**

Products
Solarban® R100 Solarblue® Glass

Pages 10 & 23

Location
Portland, Oregon – USA

Architect
Ankrom Moisan Architects

Vitro Certified™ Fabricator
Hartung Glass Industries

Glazing Contractor
Benson Industries

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% 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 IGU, the glasses deliver VLT of 26% and a SHGC of 0.19.

Blue & Green Performance-Tinted Glasses

A SEA OF NAUTICALLY INSPIRED TINTS

Vitro 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 IGU with clear glass, they can dramatically lower solar heat loads with *Solarban*[®] low-e glass coatings and provide unique solutions.

LIGHT-BODIED BLUE

Designed to complement *Solarban*[®] glasses, *Optiblue*[®] glass is a light-bodied, neutral color tint that optimizes the performance and aesthetics of *Solarban*[®] glass coatings as substrates. *Optiblue*[®] glass provides *Solarban*[®] 60 with *Optiblue*[®] (formerly *Solarban*[®] z50) and *Solarban*[®] 70 with *Optiblue*[®] (formerly *Solarban*[®] z75) glasses with their cool-neutral appearance. Combining *Optiblue*[®] glass with *Solarban*[®] 90 glass in a standard one-inch IGU results in a 0.20 SHGC and a VLT of 37%.

AQUA-BLUE HARMONY

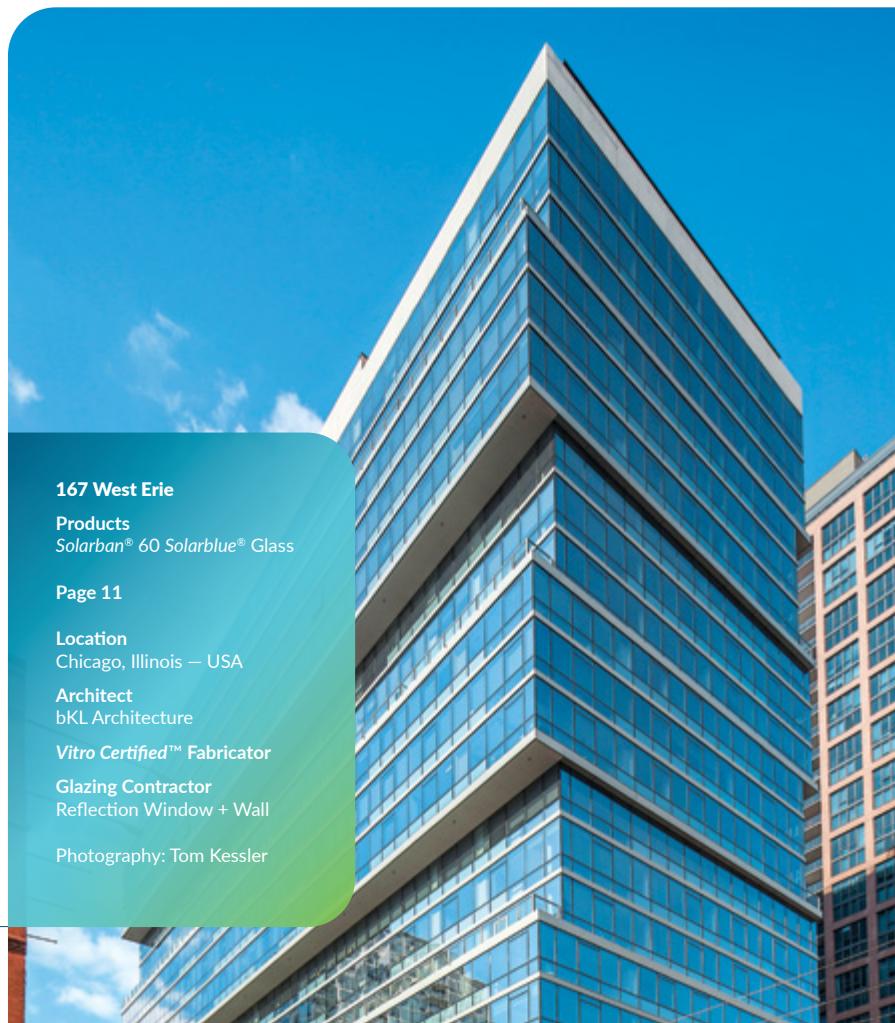
Auria[®] Glass

Aesthetic: Aqua-blue

Reflectivity: Low

Aqua-blue *Auria*[®] glass offers an exterior reflectance similar to clear glass with VLT of 50% and a low 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>Solarcool</i> [®]	



Mission College**Products**

Solarban® 60 Solarblue® Glass

Page 11**Location**

Santa Clara, California – USA

Vitro Certified™ Fabricator

Glassfab Tempering Services Inc.

Glazing Contractor

Walters & Wolf

**A PLEASANT GREEN****Atlantica® Glass****Aesthetic:** Emerald-green**Reflectivity:** Low

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

1-Inch IGU with Solarban® 70 (2)		Coating Options		
	SHGC	VLT	Low-e	Reflective
	0.23	49%	Solarban®	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% with a SHGC of 0.22 when coated with Solarban® 70 glass in a one-inch IGU.

1-Inch IGU with Solarban® 70 (2)		Coating Options		
	SHGC	VLT	Low-e	Reflective
	0.22	41%	Solarban®	Solarcool®

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 Solarban® 70 (2)		Coating Options		
	SHGC	VLT	Low-e	Reflective
	0.26	56%	Solarban®	NA

DEEP BLUE**Pacifica® Glass****Aesthetic:** Deeply saturated true-blue**Reflectivity:** Low

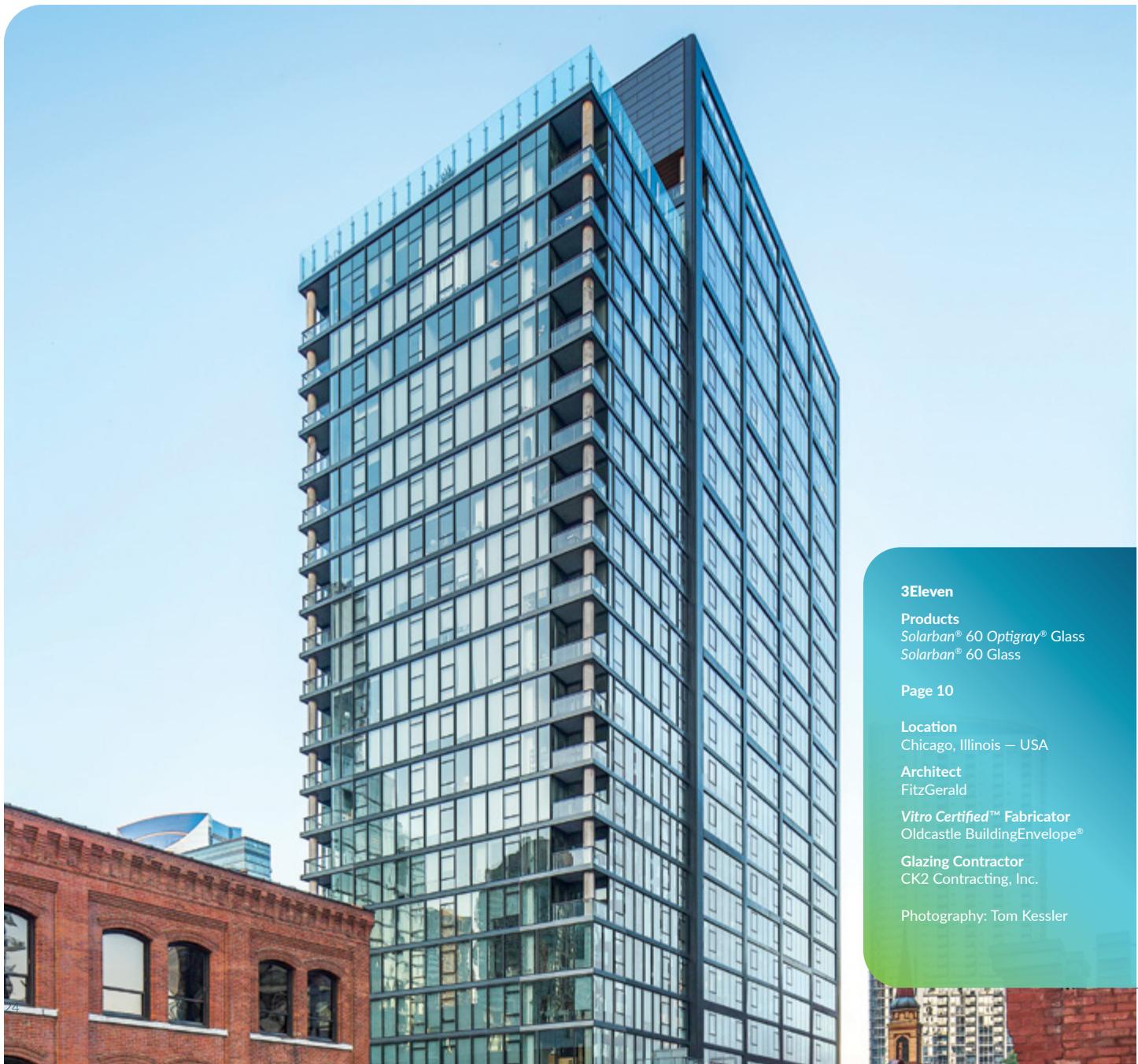
Pacifica® glass is a deeply saturated true-blue tint with a SHGC of 0.19 and VLT of 31% when coated with Solarban® 70 glass in a one-inch IGU.

1-Inch IGU with Solarban® 70 (2)		Coating Options		
	SHGC	VLT	Low-e	Reflective
	0.19	31%	Solarban®	Solarcool®

Gray & Bronze Performance-Tinted Glasses

FROM WARM NEUTRALS TO PRIVACY GLASS

Vitro 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.



3Eleven

Products

Solarban® 60 Optigray® Glass
Solarban® 60 Glass

Page 10

Location

Chicago, Illinois — USA

Architect

FitzGerald

Vitro Certified™ Fabricator
Oldcastle BuildingEnvelope®

Glazing Contractor
CK2 Contracting, Inc.

Photography: Tom Kessler

**Rolex****Products**

Solarban® R67 Optigray® Glass

Page 10**Location**

Dallas, Texas — USA

ArchitectKengo Kuma and Associates
HDF Architects**Vitro Certified™ Fabricator**
Tristar Glass, Inc.

Photography: Tom Kessler

*Formerly Solarban® 67 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 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 VLT of 32% in a one-inch IGU with Solarban® 70 glass.

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

A RICH CONTRAST**Graylite® II Glass****Aesthetic:** Dark gray**Reflectivity:** Low

Graylite® II glass delivers a rich dark-gray aesthetic, glare control and distinctive color contrast when paired with a Vitro low-e glass in a one-inch IGU.

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

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% 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®	Solarcool®

Data is based on center-of-glass performance, in a one-inch 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.



Gateway Corporate Center

Product

Vistacool® Azuria® Glass

Page 28

Location

Dallas, Texas — USA

Architect

O'Brien + Associates

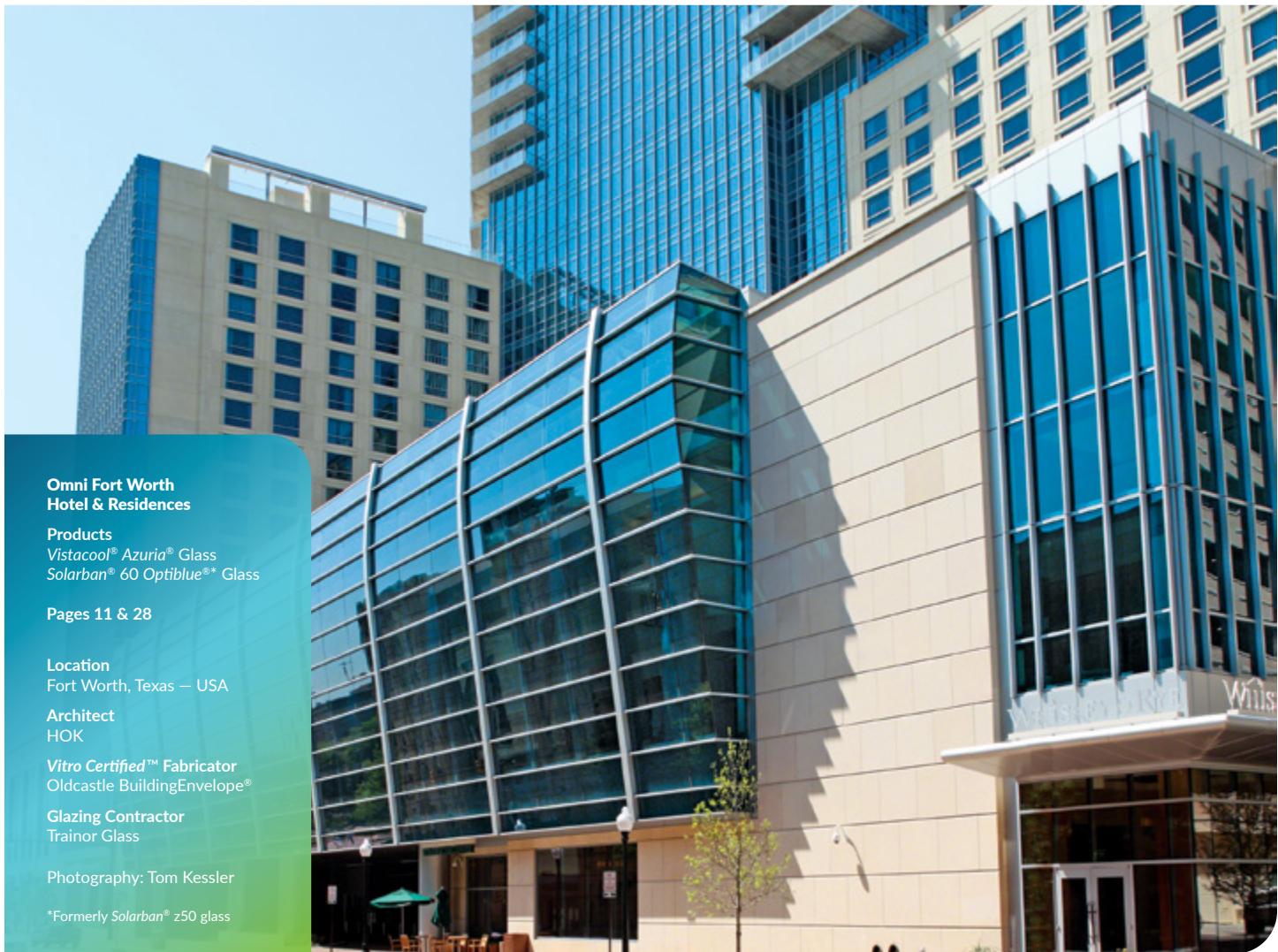
Vitro Certified™ Fabricator

Trulite Glass and Aluminum Solutions

Glazing Contractor

B+B Glass

Photography: Wes Thompson



**Omni Fort Worth
Hotel & Residences**

Products

Vistacool® Azuria® Glass

Solarban® 60 Optiblue®* Glass

Pages 11 & 28

Location

Fort Worth, Texas — USA

Architect

HOK

Vitro Certified™ Fabricator

Oldcastle BuildingEnvelope®

Glazing Contractor

Trainor Glass

Photography: Tom Kessler

*Formerly Solarban® z50 glass



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 VLT of 42% with an exceptional SHGC of 0.26 in a one-inch IGU. By blocking more than 70% 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.

Sky Las Vegas

Product

Vistacool® Azuria® Glass
Solarban® 60 Clear Glass

Pages 11 & 28

Location

Las Vegas, Nevada – USA

Architect

Klai Juba Architects

Vitro Certified™ Fabricator
Oldcastle BuildingEnvelope®

Glazing Contractor
Heinaman Contract Glazing

Photography: Tom Kessler

Vistacool® Subtly Reflective Color-Enriched Glasses

The Vistacool® family of subtly reflective, color-enriched glasses is engineered to deliver high levels of 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.

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%



Solarcool® Reflective Glasses

For more than 50 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 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 SHGCs ranging from 0.15 to 0.18 and exterior reflectance of up to 19%.

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 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.

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 for 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	Color Rendering Index (CRI) ⁵
				Exterior %	Interior %	Winter Nighttime	Winter Argon		
Uncoated									
CLEAR Glass + Clear			79	15	15	0.47	0.45	0.70	95
ACUITY™ + ACUITY™			82	15	15	0.47	0.45	0.78	98
STARPHIRE® + STARPHIRE®			84	15	15	0.47	0.45	0.82	99
SOLEXIA® + Clear			69	13	15	0.47	0.45	0.50	86
ATLANTICA® + Clear			60	10	14	0.47	0.45	0.40	84
AZURIA® + Clear			61	11	14	0.47	0.45	0.39	77
SOLARBLUE® + Clear			50	9	13	0.47	0.45	0.49	84
PACIFICA® + Clear			38	7	13	0.47	0.45	0.36	72
SOLARBRONZE® + Clear			47	8	13	0.47	0.45	0.51	95
OPTIGRAY® + Clear			56	10	13	0.47	0.45	0.52	94
SOLARGRAY® + Clear			40	7	13	0.47	0.45	0.46	93
GRAYLITE® II + Clear			8	4	12	0.47	0.45	0.22	85
Coated									

SOLARBAN® 60 Solar Control Low-e Glass

SOLARBAN 60 (2) Clear + Clear	70	11	12	0.29	0.24	0.39	95
SOLARBAN 60 (2) ACUITY + ACUITY	73	11	12	0.29	0.24	0.41	97
SOLARBAN 60 (2) STARPHIRE + STARPHIRE	74	11	12	0.29	0.24	0.41	98
SOLARBAN 60 (2) SOLEXIA + Clear	61	9	12	0.29	0.24	0.32	90
SOLARBAN 60 (2) ATLANTICA + Clear	53	8	11	0.29	0.24	0.27	86
SOLARBAN 60 (2) AZURIA + Clear	54	8	11	0.29	0.24	0.28	78
SOLARBAN 60 (2) SOLARBLUE + Clear	45	7	11	0.29	0.24	0.29	94
SOLARBAN 60 (2) PACIFICA + Clear	34	6	10	0.29	0.24	0.23	86
SOLARBAN 60 (2) SOLARBRONZE + Clear	42	7	11	0.29	0.24	0.28	95
SOLARBAN 60 (2) OPTIGRAY + Clear	50	8	11	0.29	0.24	0.30	94
SOLARBAN 60 (2) SOLARGRAY + Clear	35	6	10	0.29	0.24	0.25	95
SOLEXIA + SOLARBAN 60 (3) Clear	61	10	10	0.29	0.24	0.37	88
ATLANTICA + SOLARBAN 60 (3) Clear	53	8	10	0.29	0.24	0.31	84
AZURIA + SOLARBAN 60 (3) Clear	54	9	10	0.29	0.24	0.31	77
SOLARBLUE + SOLARBAN 60 (3) Clear	45	7	9	0.29	0.24	0.33	84
PACIFICA + SOLARBAN 60 (3) Clear	34	6	9	0.29	0.24	0.25	72
SOLARBRONZE + SOLARBAN 60 (3) Clear	42	7	9	0.29	0.24	0.32	95
OPTIGRAY + SOLARBAN 60 (3) Clear	50	8	9	0.29	0.24	0.35	93
SOLARGRAY + SOLARBAN 60 (3) Clear	35	7	9	0.29	0.24	0.29	93
GRAYLITE II + SOLARBAN 60 (3) Clear	7	4	8	0.29	0.24	0.13	84

SOLARBAN® 60 Solar Control Low-e Glass on OPTIBLUE®†† (formerly SOLARBAN® z50 Glass)

SOLARBAN 60 (2) OPTIBLUE + Clear	51	8	11	0.29	0.24	0.32	91
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SOLARBAN® 70 Solar Control Low-e Glass[†] (formerly SOLARBAN® 70XL Glass)

SOLARBAN 70 (2)† + Clear	64	13	14	0.28	0.24	0.27	91
SOLARBAN 70 (2) SOLEXIA + Clear	56	11	14	0.28	0.24	0.26	85
SOLARBAN 70 (2) ATLANTICA + Clear	49	10	13	0.28	0.24	0.23	81
SOLARBAN 70 (2) AZURIA + Clear	50	10	13	0.28	0.24	0.24	69
SOLARBAN 70 (2) SOLARBLUE + Clear	41	8	13	0.28	0.24	0.22	81
SOLARBAN 70 (2) PACIFICA + Clear	31	7	13	0.28	0.24	0.19	69
SOLARBAN 70 (2) SOLARBRONZE + Clear	39	8	13	0.28	0.24	0.20	93
SOLARBAN 70 (2) OPTIGRAY + Clear	46	9	13	0.28	0.24	0.23	89
SOLARBAN 70 (2) SOLARGRAY + Clear	32	7	13	0.28	0.24	0.19	89
SOLEXIA + SOLARBAN 70 (3)†	56	11	12	0.28	0.24	0.32	85
ATLANTICA + SOLARBAN 70 (3)†	48	9	11	0.28	0.24	0.28	81
AZURIA + SOLARBAN 70 (3)†	49	9	11	0.28	0.24	0.29	75
SOLARBLUE + SOLARBAN 70 (3)†	41	8	12	0.28	0.24	0.27	81
PACIFICA + SOLARBAN 70 (3)†	31	6	10	0.28	0.24	0.22	69
SOLARBRONZE + SOLARBAN 70 (3)†	38	8	11	0.28	0.24	0.26	93
OPTIGRAY + SOLARBAN 70 (3)†	46	9	12	0.28	0.24	0.28	90
SOLARGRAY + SOLARBAN 70 (3)†	32	7	11	0.28	0.24	0.24	89
GRAYLITE II + SOLARBAN 70 (3)†	6	4	10	0.28	0.24	0.11	81

SOLARBAN® 70 Solar Control Low-e Glass on OPTIBLUE®†† (formerly SOLARBAN® z75 Glass)

SOLARBAN 70 (2) OPTIBLUE + Clear	46	9	13	0.28	0.24	0.23	87
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Insulating Glass Unit Performance for 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	Color Rendering Index (CRI) ⁵
				Exterior %	Interior %	Winter Nighttime	Winter Argon		

SOLARBAN® 72 Solar Control Low-e Glass

	SOLARBAN 72 (2) ACUITY + ACUITY	67	13	14	0.28	0.24	0.28	94
	SOLARBAN 72 (2) STARPHIRE + STARPHIRE	68	13	14	0.28	0.24	0.28	95

SOLARBAN® 90 Solar Control Low-e Glass

	SOLARBAN 90 (2) Clear + Clear	51	12	19	0.29	0.24	0.23	92
	SOLARBAN 90 (2) ACUITY + ACUITY	53	12	19	0.29	0.24	0.23	94
	SOLARBAN 90 (2) STARPHIRE + STARPHIRE	54	13	20	0.29	0.24	0.23	95
	SOLARBAN 90 (2) SOLEXIA + Clear	44	10	19	0.29	0.24	0.22	86
	SOLARBAN 90 (2) ATLANTICA + Clear	39	9	19	0.29	0.24	0.20	82
	SOLARBAN 90 (2) AZURIA + Clear	39	9	19	0.29	0.24	0.21	75
	SOLARBAN 90 (2) OPTIBLUE + Clear	37	8	19	0.29	0.24	0.20	88
	SOLARBAN 90 (2) SOLARBLUE + Clear	32	8	18	0.29	0.24	0.19	81
	SOLARBAN 90 (2) PACIFICA + Clear	24	6	18	0.29	0.24	0.17	69
	SOLARBAN 90 (2) SOLARBRONZE + Clear	31	7	18	0.29	0.24	0.18	94
	SOLARBAN 90 (2) OPTIGRAY + Clear	36	8	19	0.29	0.24	0.20	90
	SOLARBAN 90 (2) SOLARGRAY + Clear	26	6	18	0.29	0.24	0.17	90
	SOLEXIA + SOLARBAN 90 (3) Clear	44	16	12	0.29	0.24	0.30	86
	ATLANTICA + SOLARBAN 90 (3) Clear	39	13	12	0.29	0.24	0.26	82
	AZURIA + SOLARBAN 90 (3) Clear	39	13	12	0.29	0.24	0.27	75
	SOLARBLUE + SOLARBAN 90 (3) Clear	32	10	11	0.29	0.24	0.25	81
	PACIFICA + SOLARBAN 90 (3) Clear	24	8	11	0.29	0.24	0.21	69
	SOLARBRONZE + SOLARBAN 90 (3) Clear	30	10	11	0.29	0.24	0.24	94
	OPTIGRAY + SOLARBAN 90 (3) Clear	36	12	11	0.29	0.24	0.27	90
	SOLARGRAY + SOLARBAN 90 (3) Clear	25	8	11	0.29	0.24	0.22	90
	GRAYLITE II + SOLARBAN 90 (3) Clear	5	4	11	0.29	0.24	0.11	82

SOLARBAN® R100 Neutral-Reflective Low-e Glass

	SOLARBAN R100 (2) Clear + Clear	42	32	14	0.29	0.25	0.23	93
	SOLARBAN R100 (2) ACUITY + ACUITY	43	33	13	0.29	0.25	0.23	92
	SOLARBAN R100 (2) STARPHIRE + STARPHIRE	44	33	14	0.29	0.25	0.23	93
	SOLARBAN R100 (2) SOLEXIA + Clear	36	25	13	0.29	0.25	0.21	83
	SOLARBAN R100 (2) ATLANTICA + Clear	31	20	13	0.29	0.25	0.19	80
	SOLARBAN R100 (2) AZURIA + Clear	32	21	13	0.29	0.25	0.19	72
	SOLARBAN R100 (2) OPTIBLUE + Clear	30	19	13	0.29	0.25	0.20	86
	SOLARBAN R100 (2) SOLARBLUE + Clear	26	15	13	0.29	0.25	0.19	79
	SOLARBAN R100 (2) PACIFICA + Clear	20	11	13	0.29	0.25	0.16	66
	SOLARBAN R100 (2) SOLARBRONZE + Clear	25	15	13	0.29	0.25	0.18	95
	SOLARBAN R100 (2) OPTIGRAY + Clear	29	18	13	0.29	0.25	0.20	89
	SOLARBAN R100 (2) SOLARGRAY + Clear	21	12	13	0.29	0.25	0.17	89

SOLARBAN® R77 Neutral-Reflective Low-e Glass

	SOLARBAN R77 (2) Clear + Clear	47	25	16	0.29	0.24	0.25	94
	SOLARBAN R77 (2) ACUITY + ACUITY	49	26	16	0.29	0.24	0.25	95
	SOLARBAN R77 (2) STARPHIRE + STARPHIRE	50	26	16	0.29	0.24	0.25	98
	SOLARBAN R77 (2) SOLEXIA + Clear	41	20	16	0.29	0.24	0.23	87
	SOLARBAN R77 (2) ATLANTICA + Clear	35	16	16	0.29	0.24	0.20	83
	SOLARBAN R77 (2) AZURIA + Clear	36	17	16	0.29	0.24	0.21	76
	SOLARBAN R77 (2) OPTIBLUE + Clear	34	15	16	0.29	0.24	0.21	90
	SOLARBAN R77 (2) SOLARBLUE + Clear	30	13	16	0.29	0.24	0.20	83
	SOLARBAN R77 (2) PACIFICA + Clear	23	9	15	0.29	0.24	0.17	70
	SOLARBAN R77 (2) SOLARBRONZE + Clear	28	12	16	0.29	0.24	0.19	96
	SOLARBAN R77 (2) OPTIGRAY + Clear	33	15	16	0.29	0.24	0.21	93
	SOLARBAN R77 (2) SOLARGRAY + Clear	23	10	15	0.29	0.24	0.18	93

SOLARBAN® R67 Neutral-Reflective Low-e Glass (formerly SOLARBAN® 67 Glass)

	SOLARBAN R67 (2) Clear + Clear	54	19	16	0.29	0.24	0.29	92
	SOLARBAN R67 (2) ACUITY + ACUITY	56	19	16	0.29	0.24	0.30	94
	SOLARBAN R67 (2) STARPHIRE + STARPHIRE	57	20	16	0.29	0.24	0.30	95
	SOLARBAN R67 (2) SOLEXIA + Clear	47	16	16	0.29	0.24	0.25	85
	SOLARBAN R67 (2) ATLANTICA + Clear	41	13	16	0.29	0.24	0.22	82
	SOLARBAN R67 (2) AZURIA + Clear	42	13	16	0.29	0.24	0.23	74

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

Glass Type Outdoor Lite: Coating if Any (Surface) Glass	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	Color Rendering Index (CRI) ⁵
			Exterior %	Interior %	Winter Nighttime	Winter Argon		

SOLARBAN® R67 Neutral-Reflective Low-e Glass (formerly SOLARBAN® 67 Glass) (Continued)

SOLARBAN R67 (2) OPTIBLUE + Clear	39	12	15	0.29	0.24	0.25	88
SOLARBAN R67 (2) SOLARBLUE + Clear	34	10	15	0.29	0.24	0.23	81
SOLARBAN R67 (2) PACIFICA + Clear	26	8	15	0.29	0.24	0.19	68
SOLARBAN R67 (2) SOLARBRONZE + Clear	32	10	15	0.29	0.24	0.22	95
SOLARBAN R67 (2) OPTIGRAY + Clear	38	12	15	0.29	0.24	0.24	90
SOLARBAN R67 (2) SOLARGRAY + Clear	27	8	15	0.29	0.24	0.20	90

SUNGATE® 400 Low-E Glass

SUNGATE 400 (2) Clear + Clear	76	14	14	0.32	0.28	0.60	96
SUNGATE 400 (2) STARPHIRE + STARPHIRE	80	14	14	0.32	0.28	0.68	100
CLEAR + SUNGATE 400 (3) Clear	76	14	14	0.32	0.28	0.63	96
SOLEXIA + SUNGATE 400 (3) Clear	66	11	13	0.32	0.28	0.44	89
ATLANTICA + SUNGATE 400 (3) Clear	58	9	12	0.32	0.28	0.35	85
AZURIA + SUNGATE 400 (3) Clear	59	10	12	0.32	0.28	0.34	78
SOLARBLUE + SUNGATE 400 (3) Clear	48	8	12	0.32	0.28	0.42	85
PACIFICA + SUNGATE 400 (3) Clear	37	7	11	0.32	0.28	0.30	72
SOLARBRONZE + SUNGATE 400 (3) Clear	46	8	12	0.32	0.28	0.44	95
OPTIGRAY + SUNGATE 400 (3) Clear	54	9	12	0.32	0.28	0.46	94
SOLARGRAY + SUNGATE 400 (3) Clear	38	7	12	0.32	0.28	0.39	94
GRAYLITE II + SUNGATE 400 (3) Clear	8	4	11	0.32	0.28	0.15	86

VISTACOOL® Subtly Reflective Glass

VISTACOOL (2) AZURIA + Clear	47	21	32	0.47	0.45	0.34	76
VISTACOOL (2) PACIFICA + Clear	29	11	31	0.47	0.45	0.32	73

SOLARCOOL® Reflective Glass

SOLARCOOL (2) AZURIA + Clear	24	20	38	0.47	0.45	0.25	85
SOLARCOOL (2) PACIFICA + Clear	15	10	38	0.47	0.45	0.25	81
SOLARCOOL (2) SOLARBLUE + Clear	20	15	38	0.47	0.45	0.32	95
SOLARCOOL (2) SOLARBRONZE + Clear	19	14	38	0.47	0.45	0.34	85
SOLARCOOL (2) SOLARGRAY + Clear	16	11	38	0.47	0.45	0.32	92

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	78
VISTACOOL (2) PACIFICA + SOLARBAN 60 (3) Clear	26	11	23	0.29	0.24	0.22	73
SOLARCOOL (2) AZURIA + SOLARBAN 60 (3) Clear	21	19	29	0.29	0.24	0.17	85
SOLARCOOL (2) SOLARBLUE + SOLARBAN 60 (3) Clear	17	14	29	0.29	0.24	0.18	92
SOLARCOOL (2) PACIFICA + SOLARBAN 60 (3) Clear	13	10	29	0.29	0.24	0.15	80
SOLARCOOL (2) SOLARBRONZE + SOLARBAN 60 (3) Clear	17	14	29	0.29	0.24	0.18	85
SOLARCOOL (2) SOLARGRAY + SOLARBAN 60 (3) Clear	14	11	29	0.29	0.24	0.17	91

VISTACOOL® and SOLARCOOL® with SOLARBAN® 70 Solar Control Low-e Glass (3)^t (formerly Solarban® 70XL Glass)

VISTACOOL (2) AZURIA + SOLARBAN 70 ^t	38	21	23	0.28	0.24	0.24	76
VISTACOOL (2) PACIFICA + SOLARBAN 70 ^t	24	11	22	0.28	0.24	0.19	71
SOLARCOOL (2) AZURIA + SOLARBAN 70 ^t	19	19	27	0.28	0.24	0.16	82
SOLARCOOL (2) SOLARBLUE + SOLARBAN 70 ^t	16	14	27	0.28	0.24	0.15	89
SOLARCOOL (2) PACIFICA + SOLARBAN 70 ^t	12	10	27	0.28	0.24	0.13	77
SOLARCOOL (2) SOLARBRONZE + SOLARBAN 70 ^t	15	14	27	0.28	0.24	0.15	88
SOLARCOOL (2) SOLARGRAY + SOLARBAN 70 ^t	13	11	27	0.28	0.24	0.14	91

^t 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.

^{††} Optiblue® is a unique substrate by Vitro Glass designed for use with several Solarban® 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. Color Rendering Index (CRI) is a measurement from 0 to 100 of how accurately a color is reproduced under certain lighting conditions, relative to natural light. A value of 100 would indicate an unobstructed view. For glass, the color rendering index is calculated using the LBNL Optics 6 software following EN410 methodology, which is defined as the "change in color of an object as a result of the light being transmitted by the glass."

A Culture of Sustainability

Innovating for the Environment

At Vitro Architectural Glass, it is our mission to continually raise the industry standard for sustainability. Vitro has raised the bar by becoming the first U.S. glass manufacturer to have its entire collection of architectural glass products recognized by the *Cradle to Cradle Certified™* Products Program and is the first North American manufacturer to publish third-party verified Environmental Product Declarations (EPDs) for flat glass and processed glass products. Vitro also partners with Walker Glass to offer AviProtek® E glass, which unites bird-safe, acid-etched visual patterns with Solarban® low-e coatings to reduce bird collisions with glass and improve energy performance.

Reducing Carbon in the Built Environment

As architects and glaziers work to design and construct building projects in a more sustainable manner, the consideration of embodied carbon has become a bigger factor in understanding the overall impact of a project's carbon footprint. Designers are working to balance the reduction of emissions from a building's operations, known as operational carbon, with emissions caused by the manufacturing and installation of construction materials, known as embodied carbon.

According to the U.S. Department of Energy, low-e coatings reduce the energy lost through typical windows by 35%, resulting in about 1.5 quads in U.S. annual energy savings and significantly lower a building's operational carbon generated by HVAC. Solarban® solar control low-e glasses reduce solar heat gain, which is quantified by 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.

The Tower at PNC Plaza

Products

Sungate® 400 Starphire® Glass

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Location

Pittsburgh, Pennsylvania – USA

Architect

Gensler

Vitro Certified™ Fabricator

Glazing Contractor

Permasteelisa Group

Photography: Tom Cwenar



Sustainability Support

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archresource@vitro.com

1.855.887.6457 / 1.855.VTRO.GLS



Additionally, new glass technologies like VacuMax™ VIG units, which feature an unparalleled ability to improve a building's insulation factor, further reduce operational carbon by ensuring less energy is lost through a façade's glazing.

Embodied Carbon and Glass

Perhaps the most comprehensive metric to consider as it relates to embodied carbon in glass is Global Warming Potential (GWP). Most of the embodied carbon in glass originates with the energy-intensive process of heating the melting furnace to 3,000 degrees Fahrenheit to convert a blend of silica, soda ash, dolomite, metal compounds and recycled cullet glass to flat glass.

To help reduce embodied carbon and overall energy consumption in glass production, Vitro (as its legacy company PPG Glass) pioneered the use of oxy-fuel technology, which can reduce energy consumption by as much as 20% and cut greenhouse gas emissions in half. Vitro uses oxy-fuel technology at three U.S. plants and licenses this technology to other glass manufacturers around the world.

Information about the additional steps Vitro is taking to support a more sustainable built environment can be found at vitroglazings.com/sustainability.

LEED Support

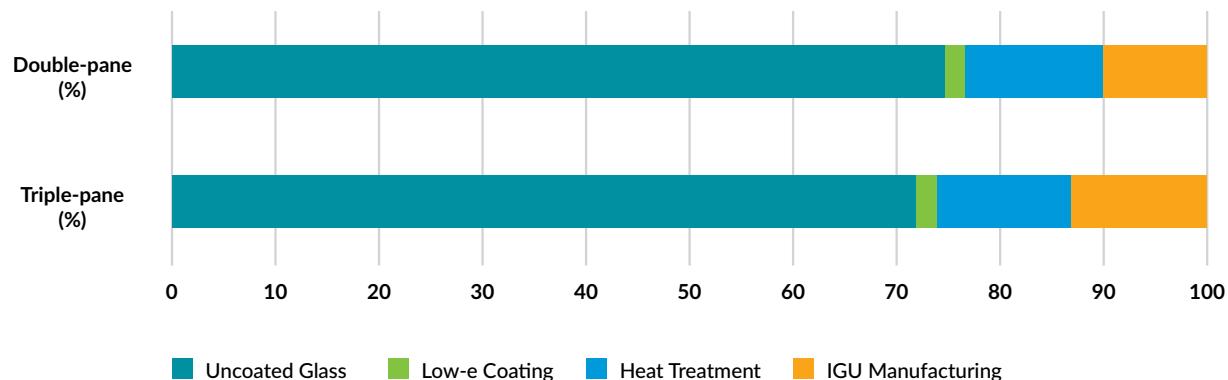
Vitro Architectural Glass has a long history of helping architects incorporate many of the principles now codified in the LEED rating system, which designates multiple options for building projects to earn points in nine credit categories. Vitro products have the potential to help building projects earn LEED points in at least seven of those categories. Get guidance on earning LEED credits through your glass selections at vitroglazings.com/leed.

The Vitro Sustainability Model

Vitro understands the importance of preserving the environment. Supported by our Safety, Healthy Environment and Energy Policy, Vitro designs and implements programs and projects that support sustainable development such as glass recycling, implementing an energy-efficient Energy Management System and powering select plants with renewable energy.

Vitro also operates under a Code of Ethics and Conduct that defines its commitments to preserving human rights, managing commercial relations, respecting and promoting neighboring communities, caring for and protecting the environment, and maintaining harmonious relationships with governments and the authorities.

Global Warming Potential (GWP) of Processed Glass



Of the embodied carbon in an IGU, approximately 75% comes from manufacturing the flat glass lites. Of the remaining, 13% comes from heat strengthening or tempering the glass, 10% comes from the IGU fabrication process itself, and just 2% comes from the process of adding low-e coatings.

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

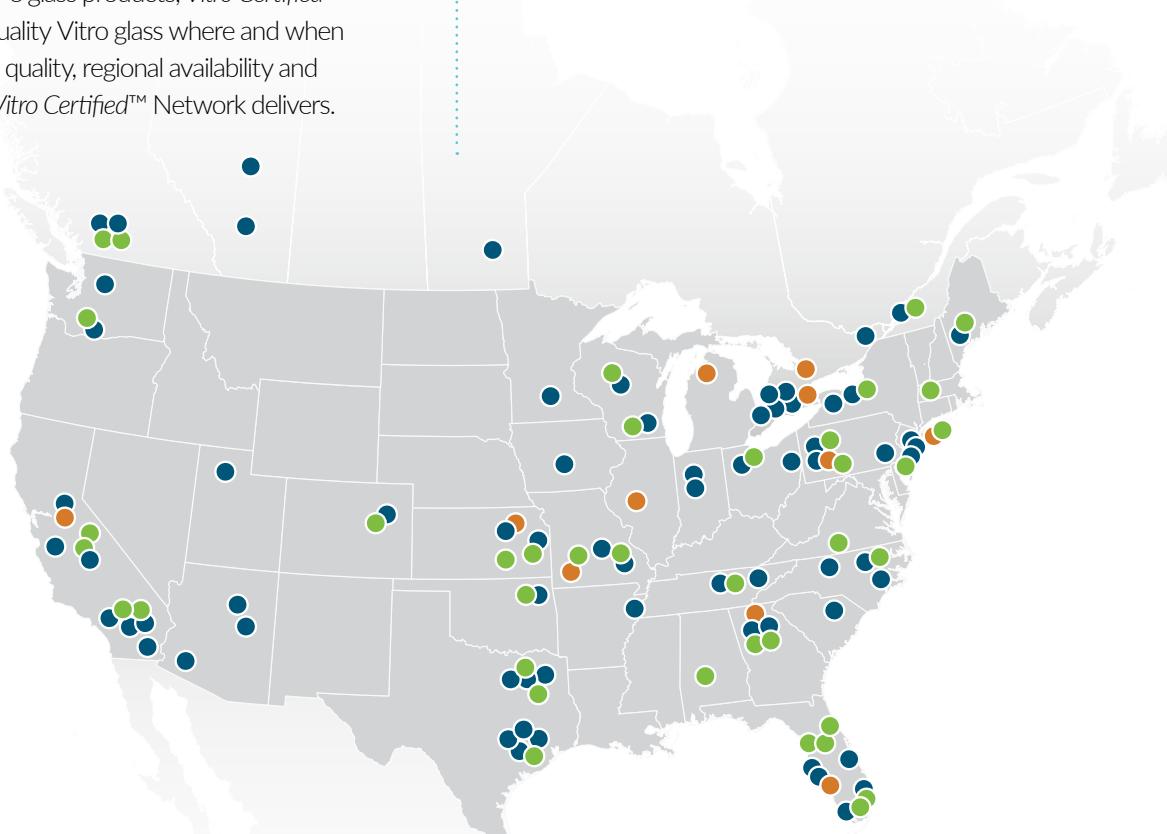
Vitro Certified™ Laminators

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.



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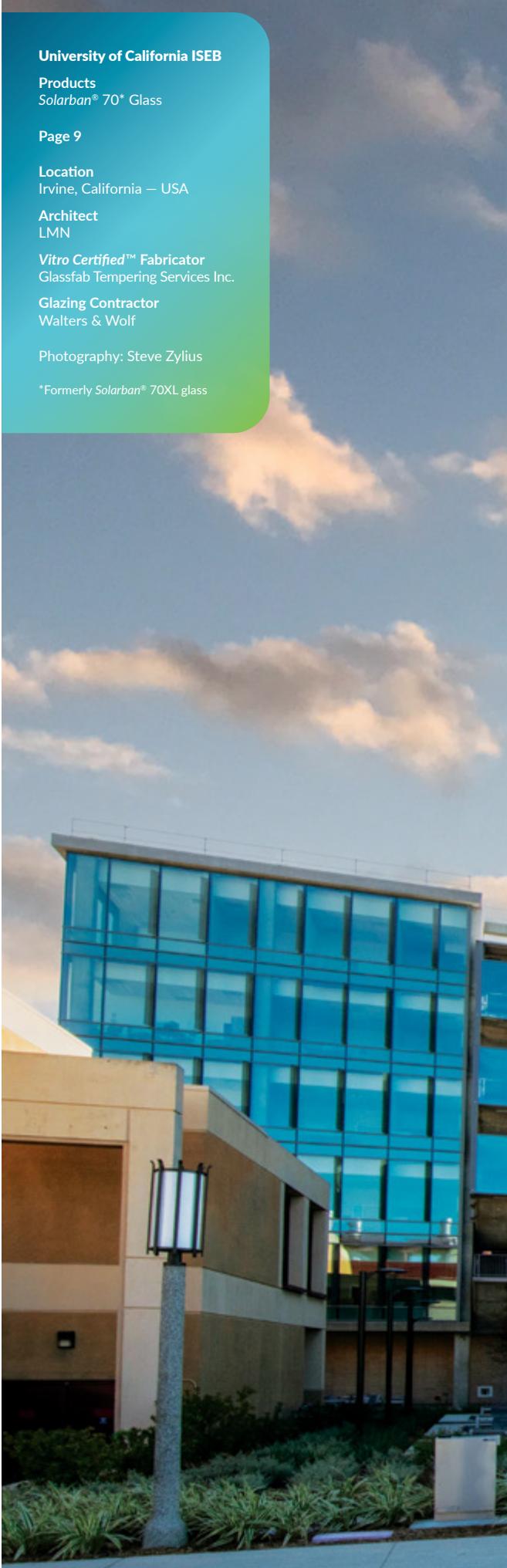
Our newest glass selection and design tool enables you to visualize and compare *Solarban*® glass products' color, transparency and reflectance on different building types at various times of day and from both the interior and exterior of the building.



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.



University of California ISEB

Products

Solarban® 70* Glass

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Location

Irvine, California — USA

Architect

LMN

Vitro Certified™ Fabricator
Glassfab Tempering Services Inc.

Glazing Contractor
Walters & Wolf

Photography: Steve Zylius

*Formerly Solarban® 70XL glass



Together, We See Further

vitroglazings.com

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