PPG ARCHITECTURAL GLASS

Sustainable in Every Light

PPG IdeaScapes®
Glass • Coatings • Paint

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Owner/Developer: H&R Real Estate Investment Trust/Encana Corporation

Photo courtesy of Tom Kessler

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Photo courtesy of Tom Kessler

PPG Glass: A Legacy of Leadership

130 Years of Innovation

1883

The Pittsburgh Plate Glass Company is founded, establishing the first plate glass plant in the United States.

1920s

PPG becomes one of the first companies to successfully mass-produce glass. The patented *Pittsburgh* process accelerates production and minimizes waves and other imperfections common to plate glass.

1945

PPG unveils *Twindow*®, the world's first double-paned insulating glass, which foreshadows the green building movement by promising to keep "homes warmer in the winter and cooler in the summer."

1952

Solex glass (now *Solexia* glass) is installed on the historic Lever House in New York City, launching the era of the glass-clad modernist building.

1920 1930 1940 1950

1934

PPG introduces *Solex*® glass, the first environmental, green-tinted, heat-absorbing glass. The product, now known as *Solexia*® glass, remains popular with architects today as part of PPG's *Oceans of Color*® collection.

1939

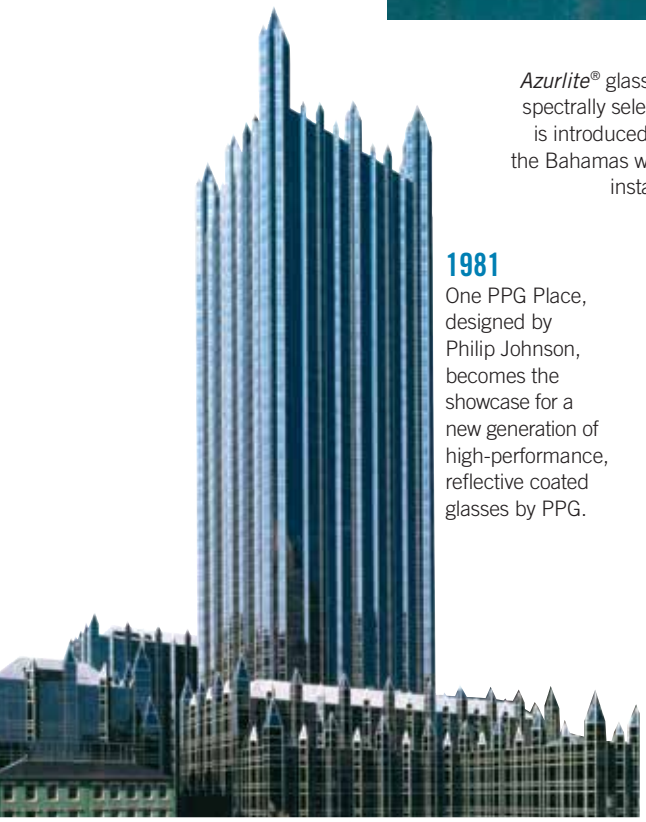
Whitewater low-iron glass by PPG glass, the precursor to today's *Starphire*® ultra-clear low-iron glass, is installed on Frank Lloyd Wright's Fallingwater. PPG glass, coatings and paint are still used to preserve the architect's signature masterpiece.

1963

PPG becomes the first glass manufacturer in the United States to use the float glass process, which remains the predominant method of making glass today.

1972

PPG launches *Solarcool*® reflective glasses. General Motors Headquarters, Detroit.



1989
Azurlite® glass (now *Azuria*® glass), a spectrally selective, blue-green glass, is introduced. The Atlantis Resort in the Bahamas was one of the first large installations of the product.

1990
Ultra-clear *Starphire*® glass is introduced at GlasTec '90 in Dusseldorf, Germany. It remains the industry's clearest, most transparent float glass.

1981
One PPG Place, designed by Philip Johnson, becomes the showcase for a new generation of high-performance, reflective coated glasses by PPG.

2000
PPG re-introduces *Solarban*® glass, originally launched in 1964, as a new category of solar control low-e glass that continues to set the standard for energy-saving performance. Heinz Field, Pittsburgh.

2013
Solarban® 67 glass features a proprietary solar control low-e coating that reflects the true timbre and brightness of ambient light and color more accurately and authentically than any architectural glass of its kind.

1960 1970 1980 1990 2000 2010

1974
PPG glass is installed on Sears Tower (now Willis Tower), the tallest building in the United States.

2005
Solarban® 70XL glass, the industry's first triple-silver, solar control low-e glass, is introduced at the GreenBuild International Conference and Expo. With a light-to-solar gain (LSG) ratio of 2.37, *Solarban* 70XL glass remains unrivaled for its combination of solar control and visible light transmittance. The Terry Thomas in Seattle (pictured below) is a 2009 AIA COTE winner.

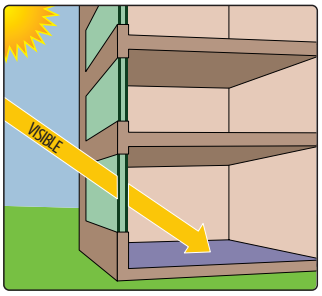
2010
PPG introduces *Solarban*® R100 glass, based on the same advanced coating technology as *Solarban* 70XL glass, to provide high visible light transmittance and neutral reflectivity. Soo Medical Center, Seoul, South Korea.

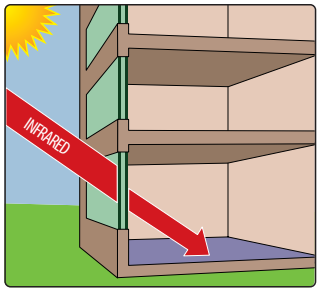
Glass and Energy Management

Over the past half-century, glass has enhanced its profile and capabilities as a critical asset in the design and development of green buildings. Beyond its obvious versatility as a building and decorative material, glass offers architects the environmental advantage of being forged from basic ingredients, such as silica sand, soda-ash and limestone, that are both plentiful and relatively inexpensive.

Yet, the most significant reason for glass's increased favor with architects is its dual ability to transmit light and mitigate the effects of solar heat gain. Few building materials balance these competing functions so deftly, and, thanks to ongoing advances from PPG in glass formulation, engineering and design, there is tangible promise for even more eco-effective glasses in the future.

Caesars Palace
Location: Las Vegas, Nevada
Product: Graylite® Glass
Architect: Bergman Walls Youngblood
Glazing Contractor: Accuracy Glass
Glass Fabricator: Oldcastle BuildingEnvelope®





The energy performance of architectural glass is measured according to four critical factors:

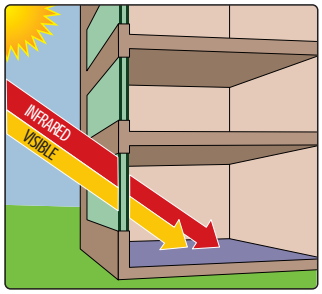
- **Visible light transmittance (VLT)** gauges the amount of natural light a glass transmits into a building. To compare, the glass with the industry's highest VLT, ***Starphire***® ultra-clear glass by PPG, transmits 84 percent of the sun's available light in a 1-inch insulating glass unit (IGU). On the other end of the scale, ***Graylite***® ***II*** glass, a dark-tinted gray glass made by PPG, transmits only 8 percent of the available sunlight.

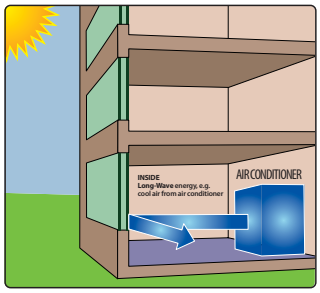
- **Solar heat gain coefficient (SHGC)** quantifies the amount of solar energy (heat) that passes directly through or is absorbed into a building through the glass. Glasses with the lowest SHGCs block the highest percentage of solar heat. Continuing with the examples above, in a 1-inch IGU, ***Starphire*** glass has an SHGC of 0.82, which means it blocks only 18 percent of the sun's heat energy. Conversely, because of its dark gray tint, ***Graylite II*** glass offers an SHGC of 0.21, which means it deflects 79 percent of the ambient solar radiation.

Georgia Gwinnett College Library
Location: Lawrenceville, Georgia
Product: Solarban® 70XL Glass
Architect: Leo A Daly
Glazing Contractor: Glass Systems
Glass Fabricator: Oldcastle BuildingEnvelope®
Owner/Developer: The University System of Georgia/Board of Regents

Photo courtesy of AJS Studios Inc.

University of South Florida, Interdisciplinary Science Teaching and Research Facility
Location: Tampa, Florida
Products: Solarban® 70XL, Solarban® 60, Solexia®, Optiblue® Glasses
Architect: HOK
Glazing Contractor: West Tampa Glass
Glass Fabricator: Technoglass





- **Light-to-solar gain (LSG) ratio** is derived by dividing a glass' solar heat gain coefficient (SHGC) into its visible light transmittance (VLT). This calculation measures a glass' ability to transmit light in relation to its ability to deflect heat energy.

  Glazings with a light-to-solar gain (LSG) ratio of 1.25 or greater have been defined as *spectrally selective* by the U.S. Department of Energy's Federal Energy Management Program (FEMP) guidelines for commercial glazings.

- **U-Value** quantifies a glass' insulating ability (or ability to act as a thermal barrier between indoor air and outdoor air). Glasses with lower U-values are better insulators than glasses with higher U-values.

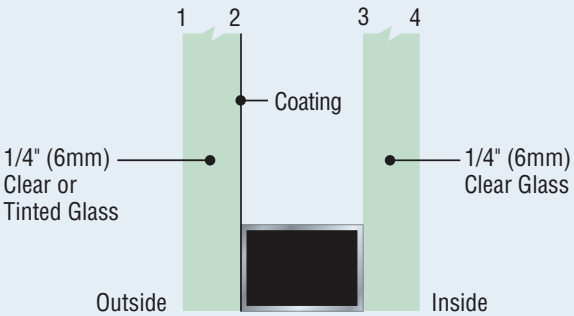
Leipziger Messe Neues Messegelaende
Location: Leipzig, Germany
Product: Starphire® Ultra-Clear Glass
Architect: Von Gerkan, Marg & Partner
Glazing Contractor: Ian Ritchie Architects

The primary purpose of solar control low-e glasses, such as the ***Solarban*** glasses described on pages 8-13, is to reduce solar heat gain, which is quantified by SHGC (lower numbers correspond to lower solar heat gain). Passive low-e glasses, including ***Sungate*** 400 glass detailed on page 14, are designed to passively transmit heat into buildings, generating higher SHGCs.

Understanding Glass Performance

Insulating glass units (IGUs) provide four potential coating surfaces. The first (#1) surface faces outdoors; the fourth (#4) faces directly indoors. The two surfaces inside the IGU, which face each other and are separated by an airspace and an insulating spacer, are referred to as the second (#2) and third (#3) surfaces.

Because they are "soft" magnetron sputtering vacuum deposition (MSVD) coatings, ***Solarban*** solar control low-e coatings must be glazed within the IGU on the second (#2) or third (#3) surface.



An Industry First – Meeting the Cradle to Cradle Certified™ Product Standard

PPG once again led the industry by becoming the first float glass manufacturer to have its products meet the *Cradle to Cradle Certified Product Standard*. Today, PPG offers more C2C-certified architectural glasses than any float glass manufacturer.

To earn C2C certification, PPG glass products were independently evaluated to measure their total life-cycle impact on human health and the environment. The assessment considered critical variables, such as how efficiently water and energy are used in their manufacture, the sustainability and reusability of their material ingredients and the commitment of PPG corporate management to socially responsible business practices, environmental stewardship, social fairness and ethical business standards.

PPG glass products have been *Cradle to Cradle Certified* since 2008.

CERTIFIED™ cradle to cradle SILVER

500 5th Avenue North
Location: *Seattle, Washington*
Product: Solarban® *70XL Glass*
Architect: *NBBJ*
Glass Fabricator: *Oldcastle BuildingEnvelope®*
Owner/Developer: *Bill & Melinda Gates Foundation*

Photo courtesy of Sellen

Wake Medical Patient Tower
Location: *Raleigh, North Carolina*
Product: Solarban® *70XL Glass*
Architect: *BBH Design*
Glazing Contractor: *Holesteen*
Glass Fabricator: *Oldcastle BuildingEnvelope®*

Photo courtesy of J. West Productions

Solarban® Solar Control Low-E Glasses

For sustainable buildings, architects seek transparent glass that transmits high levels of natural light while blocking the energy-draining effects of the sun.

For more than 20 years, ***Solarban*** solar control low-e glasses have set the standard for solar control performance in the architectural glass industry. Since being introduced in the 1990s, more than 300 million square feet of ***Solarban*** glass products have been installed on buildings throughout the world, adding sleekness and beauty while delivering immeasurable energy savings.

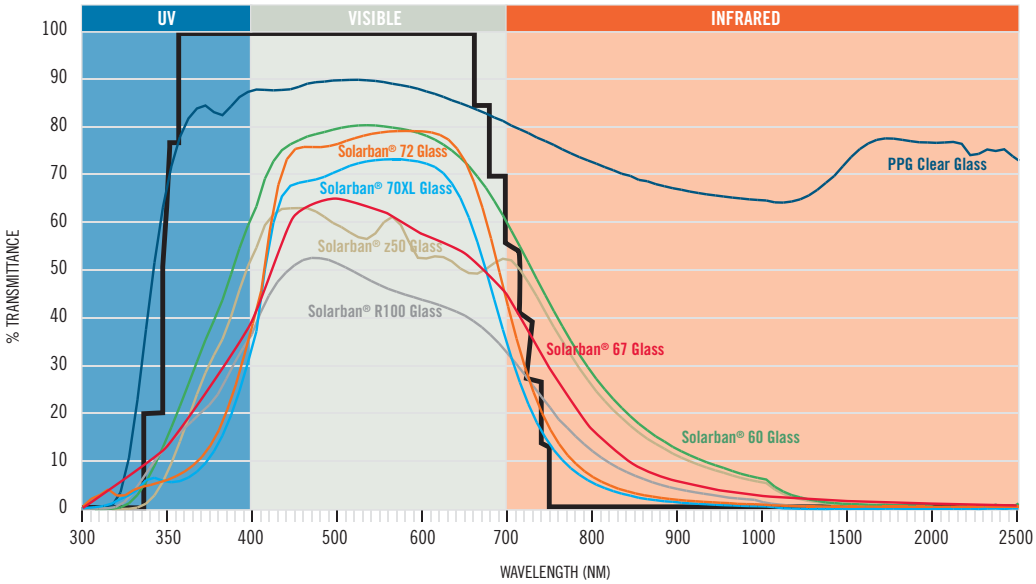
SOLARBAN® 70XL
Solar Control Low-E Glass

Solarban 70XL glass, a technological breakthrough in solar control low-e glass, offers the most balanced combination of visible light transmittance, solar control and clarity.

With a solar heat gain coefficient (SHGC) of 0.27 and visible light transmittance (VLT) of 64 percent in a 1-inch insulating glass unit (IGU), ***Solarban*** 70XL glass produces a light-to-solar gain (LSG) ratio of 2.37, which places it among the highest-performing glasses available.

For a tinted glass appearance in an IGU, ***Solarban*** 70XL glass can be used on the second (#2) or third (#3) surface with many tinted glasses from PPG, including those from the ***Oceans of Color*** or ***Earth & Sky*** collections of performance tinted glasses.

Spectral Curve



As this chart illustrates, when compared to conventional clear glass, ***Solarban*** *solar control, low-e glasses significantly limit the amount of solar radiation that enters a building from the infrared (heat energy) portion of the solar spectrum while* ***Sungate*** *passive low-e glasses allow more solar radiation. Light transmittance from the visible portion of the solar spectrum remains comparatively high. Typically in commercial buildings, it is ideal to maximize visible light transmittance to optimize daylighting while limiting infrared energy to reduce cooling load.*

Palomar Medical Center
Location: *Escondido, California*
Products: Solarban® *60,* ***Solarban®*** *70XL Glasses*
Architects: *CO Architects; Anshen + Allen*
Glazing Contractor: *Shengxing Glass and Cladding Systems*
Glass Fabricator: *Northwestern Industries, Inc.*
Owner/Developer: *Palomar Pomerado Health*

Photo courtesy of David Cox, DPR Construction

University of Alabama, Bryant-Denny Stadium
Location: *Tuscaloosa, Alabama*
Products: Solarban® *R100,* ***Solargray®*** *Glasses*
Architect: *Davis Architects*
Glass Fabricator: *Trulite Glass and Aluminum Solutions*
Owner/Developer: *University of Alabama*

Photo courtesy of Mason Fischer Photography

Corporativo Legaria Fase I
Location: Mexico City, Mexico
Product: Solarban® R100 Glass
Architect: ZVA Arquitectos
Glass Fabricator: Lindes (formerly Vidrios Marte)
Glazing Contractor: HEG

Solarban® 67 solar control low-e glass has low levels of interior and exterior reflectance, which enhance its ability to reflect true-to-life light and color.

SOLARBAN® 67
Solar Control Low-E Glass

Solarban 67 glass represents an entirely new vision for solar control low-e glass, combining excellent solar performance with a soft, neutral coating that endows commercial buildings with a crisp, clean and brilliantly clear exterior appearance that "pops."

Proprietary coating technology enables ***Solarban*** 67 glass to generate visible light transmittance (VLT) of 54 percent, a solar heat gain coefficient (SHGC) of 0.29 and a light-to-solar gain (LSG) ratio of 1.86 in a 1-inch insulating glass unit (IGU) — which is superb for such a transparent glass.

SOLARBAN® R100
Solar Control Low-E Glass

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. The resulting light-to-solar gain (LSG) ratio of 1.83 is 17 percent to 29 percent greater than competing products in its category.

Because of its unmatched balance of low reflectivity and color-neutrality, ***Solarban*** R100 glass can function both as a privacy glass and as a non-tinted glass that harmonizes with spandrels and other building materials.

Inside the building, ***Solarban*** R100 glass has reflectance of just 14 percent and transmits a pleasant cool-blue appearance that reduces glare without creating an obtrusive reflected color for building occupants. Exterior reflectance of 32 percent combines with the neutral aesthetic to deliver an extraordinarily sharp exterior appearance.

SOLARBAN® 72
Solar Control Low-E Glass

Solarban 72 glass builds on the advances of ***Solarban*** 70XL glass to provide even greater levels of transparency and color neutrality with minimal sacrifice of solar control performance. Formulated with a triple-silver coating that is engineered for use on ***Starphire®*** ultra-clear glass, ***Solarban*** 72 glass has visible light transmittance (VLT) of 71 percent — 11 percent higher than ***Solarban*** 70XL glass — as well as solar control that is up to 25 percent higher than ***Solarban*** 60 glass.

SOLARBAN® 60
Solar Control Low-E Glass

As the original ***Solarban*** glass, ***Solarban*** 60 glass features a clear, color-neutral appearance that can be combined in an insulating glass unit (IGU) with clear glass — or an outboard lite of tinted or reflective glass — to give architects an almost limitless selection of aesthetic and environmental performance options. It can also be combined with ***Starphire*** glass for the utmost in VLT and clarity.

In a 1-inch IGU, ***Solarban*** 60 glass has VLT of 70 percent, a solar heat gain coefficient (SHGC) of 0.39 and a light-to-solar gain (LSG) ratio of 1.79. Like ***Solarban*** 70XL glass, ***Solarban*** 60 glass can be used on the second (#2) surface for a clear aesthetic or on the second (#2) or third (#3) surface for maximum design flexibility with a tinted lite.

Capital Reforma
Location: *Mexico City, Mexico*
Product: Solarban® *60 Glass*
Architect: *GICSA*
Glazing Contractor: *Grupo Aluvisa*
Glass Fabricator: *Millet Industria*
Owner/Developer: *Parks*

Rosecrans
Location: *Los Angeles, CA*
Product: Solarban® *72 Glass*
Architect: *Gensler*
Glazing Contractor: *Walters & Wolf*
Glass Fabricator: *Trulite Glass and Aluminum Solutions*

Chartwell School
Location: *Seaside, California*
Product: Solarban® *60 Glass*
Architect: *EHDD*

Photo courtesy of Michael David Rose

Korean Register of Shipping
Location: *Busan, South Korea*
Product: Solarban® *z75,* ***Solarban®*** *R100 Optiblue®,* ***Solarban®*** *60 glasses*
ICF: *Jason Glass*
Architect: *SD Architecture Partners*
Glazier: *Jasan Glass*

SOLARBAN® z75 Solar Control Low-E Glass

SOLARBAN® z50 Solar Control Low-E Glass

Solarban z75 and ***Solarban*** z50 glasses provide a neutral, steel blue-gray appearance with high levels of visible light transmittance (VLT) designed to complement surrounding building materials, including other high-performance glazings, and offer superior daylighting and solar control properties to support sustainable design.

While the two glasses have a similar appearance, the coatings for each provide different levels of solar control to maximize performance in local climates.

In a standard 1-inch insulating glass unit (IGU) with clear glass, ***Solarban*** z75 glass has a solar heat gain coefficient (SHGC) of 0.24 and VLT of 48 percent, with a light-to-solar gain (LSG) ratio of 2.00. These characteristics make ***Solarban*** z75 glass a great choice for warmer climates.

In the same configuration, ***Solarban*** z50 glass has an SHGC of 0.32, VLT of 51 percent and an LSG ratio of 1.59. Consequently, ***Solarban*** z50 glass is more suited for climates with balanced heating and cooling seasons.

Low interior reflectance levels for both glasses deliver clear, natural outdoor views.

SUNGATE® 400
Low-E Glass

Sungate® 400 glass is a highly transparent, passive low-e glass designed specifically for use in heating-dominated climates. Manufactured with an MSVD "soft coat," ***Sungate*** 400 glass helps buildings retain solar and furnace heat to reduce winter heating costs. ***Sungate*** 400 delivers a winter U-value that is 9 percent higher than passive low-e glasses manufactured with a “hard” pyrolytic coating.

Sungate 400 glass also has an exceptionally clear aesthetic. When used with a standard clear glass substrate, ***Sungate*** 400 glass has visible light transmittance (VLT) of 76 percent. VLT climbs to more than 80 percent when it is used on ***Starphire***® ultra-clear glass by PPG. It can also be used with tinted glass for a range of aesthetic options.

Sungate passive low-e glass by PPG helped the Center for Sustainable Landscapes at Phipps Conservatory and Botanical Gardens achieve “Living Building” status; it also meets the LEED® Platinum certification for sustainable design and SITES™ certifications for landscapes.

Center for Sustainable Landscapes
Phipps Conservatory & Botanical Gardens
Location: *Pittsburgh, Pennsylvania*
Product: Solarban® *60/****Starphire***® *Glass,*
Sungate® *Passive Low-e Clear/****Starphire***® *Glass,*
Architect: *The Design Alliance Architects*
Glazing Contractor: *D-M Products, Inc.*
Glass Fabricator: *United Plate Glass*

STARPHIRE®

ULTRA-CLEAR GLASS BY PPG

Starphire glass represents the ultimate achievement in ultra-clear glass technology. PPG makes ***Starphire*** glass in a variety of thicknesses for vision glass, safety and security glass, point-fixed glazing and other specialty and decorative applications.

Extra-Heavy Starphire and Clear Glasses Up to 3/4-Inch (19-Millimeter) Thicknesses

When conventional clear glass is laminated into multiple layers, or specified in increasing thicknesses, its appearance becomes progressively greener; ***Starphire*** glass gains a distinctive blue edge, while the surface of the glass maintains its clarity and true-color transmittance.

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. Clear glass by PPG is available in the same thicknesses.

Comcast Center
Location: *Philadelphia, Pennsylvania*
Products: Solarban® *60,* ***Starphire®*** *Glasses*
Architect: *Robert A.M. Stern Architects*
Glazing Contractor: *Enclos*
Glass Fabricator: *JE Berkowitz, LP*
Owner/Developer: *Liberty Property Trust & Commerzbank*

Photo courtesy of Tom Kessler

Oceans of Color®

Aqua-Tinted Performance Glasses from PPG

Oceans of Color is an ocean-inspired spectrum of green and blue performance tints that lower solar heat loads in commercial buildings, achieving light-to-solar gain (LSG) ratios of up to 2.18 when combined with ***Solarban*** glass.

Azuria®

Azuria glass offers a stunning aqua-blue hue with visible light transmittance (VLT) of 61 percent and a low solar heat gain coefficient (SHGC) of 0.39.

Atlantica®

Emerald-green ***Atlantica*** glass delivers a 0.41 SHGC in a 1-inch insulating glass unit (IGU), while maintaining 60 percent VLT.

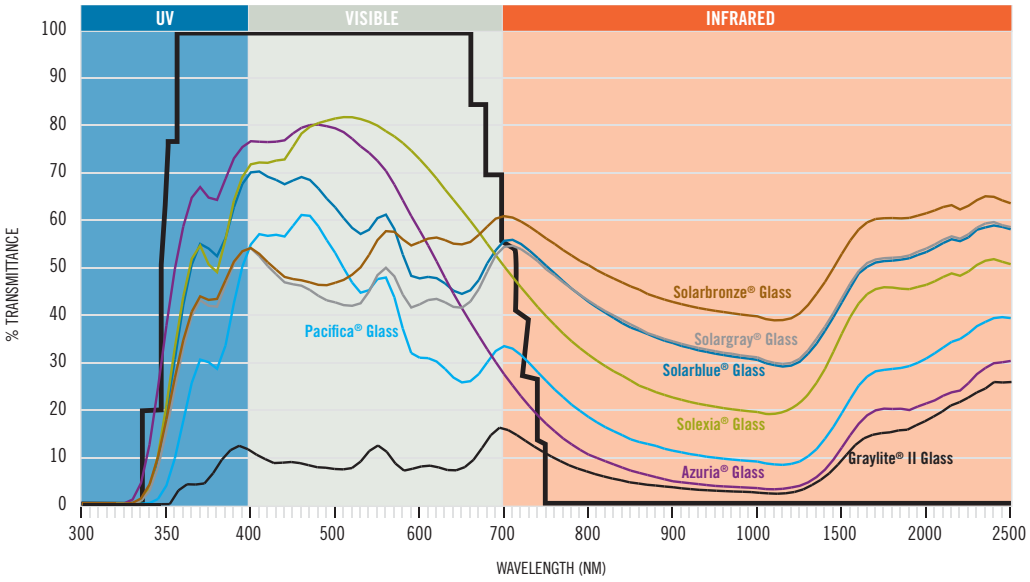
Solexia®

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

Pacifica®

Pacifica glass is a deeply saturated true-blue tint with an SHGC of 0.36 and a VLT of 38 percent.

Spectral Curve



This chart compares visible light transmittance (VLT) of tinted PPG glasses relative to their ability to block solar heat. Glasses with a light-to-solar gain (LSG) ratio of greater than 1.25 are considered spectrally selective and offer a balance of light transmittance and solar control that can help lower energy consumption in buildings. All tinted glasses can also be paired with solar control or passive low-e glasses to maximize performance.

Omni Dallas Convention Center Hotel
Location: *Dallas, Texas*
Products: Pacifica®, Solarban® z50, Solarban® 70XL Glasses
Architects: *BOKA Powell Architects; 5Gstudio*
Glass Fabricator: *JE Berkowitz, LP*
Owner/Developer: *City of Dallas/Matthews Southwest*

Photo courtesy of 5G Collaborative Studio

EARTH & SKY

PERFORMANCE TINTED GLASSES FROM PPG

To complement the ***Oceans of Color*** collection, PPG offers an expansive series of earth- and sky-toned performance tinted glasses.

OPTIGRAY®

PERFORMANCE TINTED GLASSES FROM PPG

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

SOLARGRAY®

PERFORMANCE TINTED GLASSES FROM PPG

Solargray glass combines a cool, light-gray appearance with visible light transmittance (VLT) of 40 percent and a solar heat gain coefficient (SHGC) of 0.46 in a 1-inch insulating glass unit (IGU).

SOLARBLUE®

PERFORMANCE TINTED GLASSES FROM PPG

Solarblue glass features a sparkling, light, sky-blue tint that balances high VLT of 50 percent with an SHGC of 0.49 in a 1-inch IGU.

SOLARBRONZE®

PERFORMANCE TINTED GLASSES FROM PPG

With a warm, bronze appearance, ***Solarbronze*** glass reduces solar heat gain and glare while providing VLT of 47 percent and an SHGC of 0.51 in a 1-inch IGU.

GRAYLITE® II

PERFORMANCE TINTED GLASSES FROM PPG

Rich, dark-gray ***Graylite II*** glass delivers extreme heat load reduction, solar control and distinctive color contrast. With an SHGC of 0.22 in a 1-inch IGU and VLT of 8 percent, ***Graylite II*** glass is ideal for glare control and privacy.

Stevenson University Mustang Stadium
Location: *Owings Mills, Maryland*
Products: Solarban® R100, Solargray® Glasses
Architect: *Curry Architects*
Glass Fabricator: *Rochester Insulated Glass, Inc.*
Glazing Contractor: *DJ's Glass and Mirror, Inc.*
Owner/Developer: *Stevenson University*

Photo courtesy of Curry Architects

Omni Fort Worth Hotel
Location: *Fort Worth, Texas*
Products: Solarban® z50, Vistacool® Azuria® Glasses
Architect: *HOK*
Glazing Contractor: *Trainor Glass*
Glass Fabricator: *Oldcastle BuildingEnvelope®*

Photo courtesy of Tom Kessler

Vistacool® GLASSES

Subtly Reflective, Color-Enriched Glass

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. ***Vistacool*** glasses are available in two distinct tints that may be combined with ***Solarban*** or ***Sungate*** brand low-e coatings to achieve light-to-solar gain (LSG) ratios of as high as 1.62.

Vistacool Azuria Glass

Vistacool Azuria glass offers an exceptionally rich and soothing aqua-blue appearance, together with excellent VLT of 42 percent when teamed with ***Solarban*** 60 glass in a 1-inch insulating glass unit (IGU). With a solar heat gain coefficient (SHGC) of 0.26, this combination produces an LSG ratio of 1.62, among the highest of any reflective glass on the market.

Vistacool Pacifica Glass

Vistacool Pacifica glass offers a deep, true-blue appearance along with an SHGC of 0.19 when joined in a 1-inch IGU with ***Solarban*** 70XL glass. This exceptional solar control — the best of all the ***Vistacool*** glasses — combines with a VLT of 24 percent.

Gateway Corporate Center
Location: *Dallas, Texas*
Product: Vistacool® Azuria® *Glass*
Architect: *O'Brien + Associates*
Glazing Contractor: *B+B Glass*
Glass Fabricator: *Trulite Glass and Aluminum Solutions*
Owner/Developer: *Transwestern Dallas*

Photo courtesy of Wes Thompson

Solarcool® Reflective Glasses

Solarcool reflective coated glasses were introduced in 1972. For nearly 40 years, these proven and highly durable products have enhanced the appearance of thousands of buildings, as well as the comfort of their inhabitants.

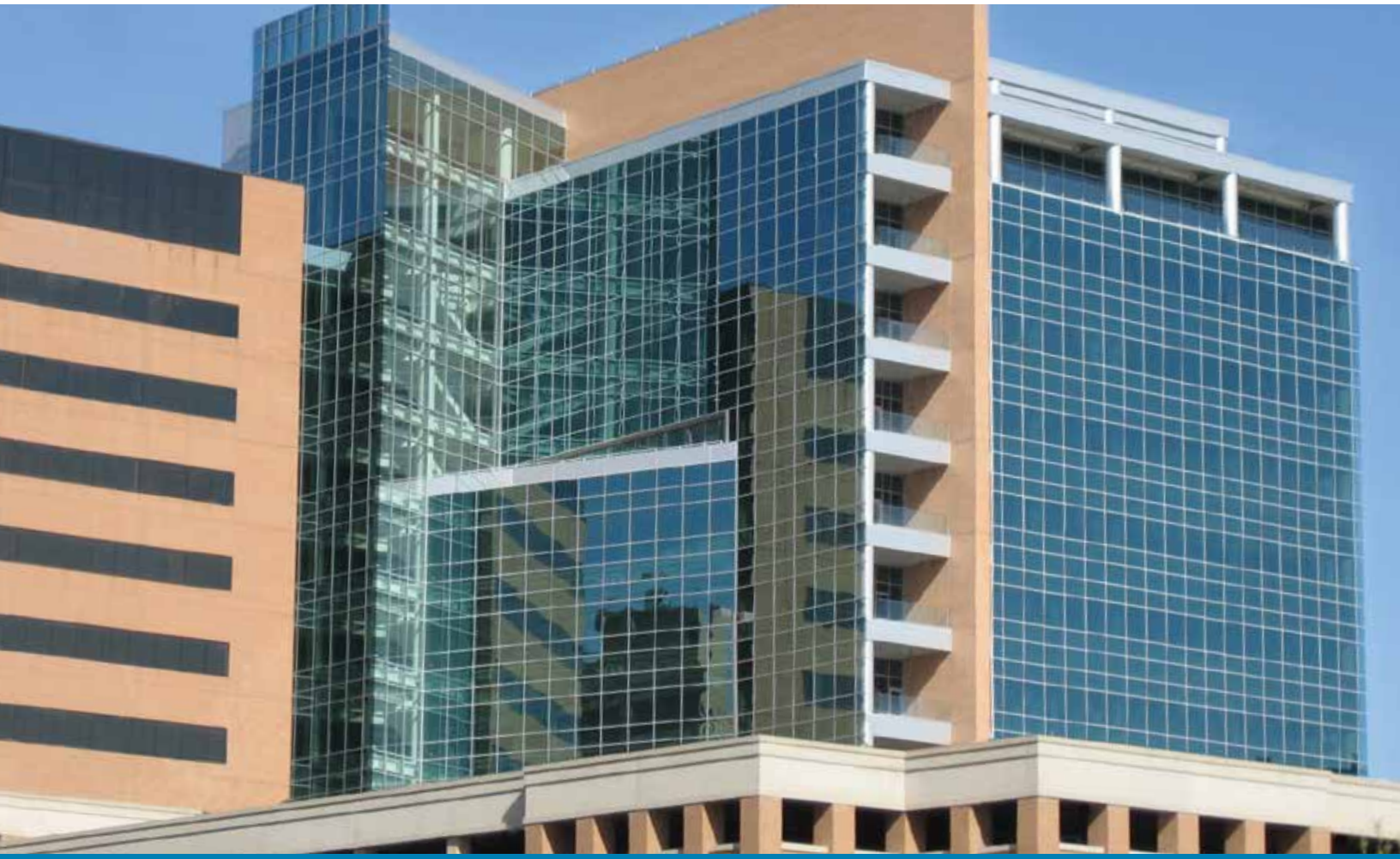
Combined in a 1-inch insulating glass unit (IGU) with clear glass, ***Solarcool*** reflective glasses offer an expansive palette of appearance and performance options with solar heat gain coefficients (SHGCs) ranging from 0.28 to 0.15 and exterior reflectance of up to 37 percent.

When applied to the first-surface (#1), ***Solarcool*** glass produces a reflective, metallic sheen. On the second-surface (#2), ***Solarcool*** coatings can combine with PPG tinted glasses to produce an even greater range of aesthetic options:

- ***Solarcool Azuria*** Glass
- ***Solarcool Pacifica*** Glass
- ***Solarcool Solarblue*** Glass
- ***Solarcool Solarbronze*** Glass
- ***Solarcool Solargray*** Glass
- ***Solarcool Solexia*** Glass

Winthrop P. Rockefeller Cancer Institute
Location: *Little Rock, Arkansas*
Products: Solarban® 60/Solarcool® Azuria® *Glasses*
Architect: *Cromwell Architects Engineers Inc.*
Glazing Contractor: *BHN Corporation*
Glass Fabricator: *Oldcastle BuildingEnvelope®*

Photo courtesy of Keith Norman, BHN Corporation




UPMC East
MAIN ENTRANCE

UPMC East
Location: *Pittsburgh, Pennsylvania*
Product: Solarban® *70XL Glass*
Architect: *BBH Design*
Glazing Contractotr: *D-M Products, Inc.*
Glass Fabricator: *Trulite Glass and Aluminum Solutions*
Owner/Developer: *University of Pittsburgh*

Photo courtesy of Jim Schafer

PPG Certified FABRICATOR® NETWORK

PPG Certified Fabricator® Network

Regional Sourcing. Superior Products. Unmatched Service.

A quality glazing project involves more than just quality glass. Architects and building owners need a partner they can rely on to deliver high-performance products, on time and on budget, and tailored to the varied parameters of their projects. The **PPG *Certified Fabricator Network*** represents a select group of elite suppliers rigorously trained in the processing of all PPG glass products.

Each year, PPG conducts comprehensive audits that examine every portion of their supply process to ensure the highest–quality products and service. In return, PPG–certified partners offer architects and other customers exclusive access to proprietary high-performance products, such as ***Solarban*** 70XL, ***Solarban*** 67, ***Solarban*** z75, ***Solarban*** z50 and ***Solarban*** R100 glasses, along with shorter lead times, improved dry-in times and rapid delivery of replacement glass.

PPG ICFP INTERNATIONAL CERTIFIED FABRICATOR™ PROGRAM

PPG CFP CERTIFIED FABRICATOR® PROGRAM

PPG CCWF CERTIFIED COMMERCIAL WINDOW FABRICATOR™

PPG CLP CERTIFIED LAMINATOR® PROGRAM

PPG Monolithic Glass Comparisons

Table of Performance Values*[1]												
Glass Thickness		Transmittance[2]			Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[4]		U-Value[5] EN 673 (W/m²*K)	Shading Coefficient[6]	Solar Heat Gain Coefficient[7]	Light to Solar Gain (LSG)[8]
Inches	mm	Ultra-violet %	Visible %	Total Solar Energy %	Visible Light %	Total Solar Energy %	Winter Night time	Summer Day time				
Uncoated												
***STARPHIRE*® Glass**												
1/8	3	89	91	90	8	8	1.04	0.94	5.8	1.04	0.91	1.00
5/32	4	88	91	90	8	8	1.04	0.94	5.8	1.04	0.91	1.00
3/16	5	88	91	90	8	8	1.03	0.93	5.8	1.04	0.90	1.01
1/4	6	87	91	89	8	8	1.02	0.93	5.8	1.03	0.90	1.01
5/16	8	86	91	88	8	8	1.01	0.92	5.7	1.02	0.89	1.02
3/8	10	85	91	87	8	8	1.00	0.91	5.6	1.02	0.89	1.02
1/2	12	83	90	86	8	8	0.98	0.89	5.5	1.01	0.88	1.02
5/8	16	81	90	84	8	7	0.97	0.88	5.4	1.00	0.87	1.03
3/4	19	80	90	83	8	7	0.95	0.86	5.3	0.99	0.86	1.05
1	25	77	89	80	8	7	0.92	0.84	5.2	0.97	0.84	1.06
CLEAR Glass												
1/8	3	73	90	83	9	8	1.04	0.94	5.8	0.98	0.86	1.05
5/32	4	71	90	81	9	7	1.04	0.94	5.8	0.97	0.84	1.07
3/16	5	69	89	79	9	7	1.03	0.93	5.8	0.96	0.83	1.07
1/4	6	66	89	77	8	7	1.02	0.93	5.8	0.94	0.82	1.09
5/16	8	61	87	72	8	7	1.01	0.92	5.7	0.90	0.79	1.10
3/8	10	58	87	69	8	7	1.00	0.91	5.6	0.88	0.77	1.13
1/2	12	53	85	63	8	6	0.98	0.89	5.5	0.84	0.73	1.16
5/8	16	49	84	59	8	6	0.97	0.88	5.4	0.80	0.70	1.20
3/4	19	45	83	55	8	6	0.95	0.86	5.3	0.77	0.67	1.24
1	25	40	80	48	8	6	0.92	0.84	5.2	0.72	0.63	1.27
***OPTIBLUE*® Glass**												
1/4	6	44	64	64	6	6	1.02	0.93	5.8	0.84	0.73	0.88
***SOLEXIA*® Glass**												
1/8	3	43	83	60	8	6	1.04	0.94	5.8	0.81	0.70	1.19
5/32	4	39	81	56	8	6	1.04	0.94	5.8	0.78	0.68	1.19
3/16	5	35	79	52	8	6	1.03	0.93	5.8	0.75	0.65	1.22
1/4	6	31	77	47	8	6	1.02	0.93	5.8	0.71	0.62	1.24
***ATLANTICA*® Glass**												
1/4	6	16	67	34	7	5	1.02	0.93	5.8	0.61	0.53	1.26
***AZURIA*® Glass**												
5/32	4	50	75	40	7	5	1.04	0.94	5.8	0.66	0.57	1.32
3/16	5	46	72	36	7	5	1.03	0.93	5.8	0.62	0.54	1.33
1/4	6	42	68	32	7	5	1.02	0.93	5.8	0.59	0.52	1.31
5/16	8	35	61	26	6	5	1.01	0.92	5.7	0.55	0.48	1.27
3/8	10	31	57	23	6	5	1.00	0.91	5.6	0.53	0.46	1.24
***PACIFICA*® Glass**												
1/4	6	15	42	27	5	5	1.02	0.93	5.8	0.56	0.49	0.86
***SOLARBLUE*® Glass**												
1/4	6	31	56	47	6	5	1.02	0.93	5.8	0.71	0.61	0.92
***SOLARBRONZE*® Glass**												
1/8	3	39	67	64	7	6	1.04	0.94	5.8	0.84	0.73	0.92
5/32	4	35	63	60	7	6	1.04	0.94	5.8	0.81	0.70	0.90
3/16	5	30	58	55	6	6	1.03	0.93	5.8	0.77	0.67	0.87
1/4	6	25	53	50	6	6	1.02	0.93	5.8	0.73	0.63	0.84
5/16	8	18	43	39	6	5	1.01	0.92	5.7	0.65	0.57	0.75
3/8	10	14	37	34	5	5	1.00	0.91	5.6	0.61	0.53	0.70
1/2	12	9	27	24	5	5	0.98	0.89	5.5	0.54	0.47	0.57
***OPTIGRAY*® Glass**												
1/4	6	33	63	51	6	5	1.02	0.93	5.2	0.74	0.64	0.98
***SOLARGRAY*® Glass**												
1/8	3	37	60	58	6	6	1.04	0.94	5.8	0.79	0.69	0.87
5/32	4	33	56	53	6	6	1.04	0.94	5.8	0.75	0.66	0.85
3/16	5	29	50	48	6	5	1.03	0.93	5.8	0.71	0.62	0.81
1/4	6	24	44	42	6	5	1.02	0.93	5.8	0.67	0.58	0.76
5/16	8	17	33	31	5	5	1.01	0.92	5.7	0.59	0.51	0.65
3/8	10	13	28	26	5	5	1.00	0.91	5.6	0.55	0.48	0.58
1/2	12	8	18	17	5	5	0.98	0.89	5.5	0.49	0.42	0.43
***GRAYLITE* II Glass**												
1/8	3	8	24	22	5	4	1.04	0.94	5.8	0.51	0.45	0.53
5/32	4	5	18	17	4	4	1.04	0.94	5.8	0.48	0.41	0.44
3/16	5	3	13	12	4	4	1.03	0.93	5.8	0.44	0.39	0.33
1/4	6	2	9	8	4	4	1.02	0.93	5.8	0.41	0.36	0.25

PPG Monolithic Glass Comparisons

Table of Performance Values[1]												
Glass Thickness		Transmittance[2]			Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[4]		U-Value[5] EN 673 (W/m²*K)	Shading Coefficient[6]	Solar Heat Gain Coefficient[7]	Light to Solar Gain (LSG)[8]
Inches	mm	Ultra-violet %	Visible %	Total Solar Energy %	Visible Light %	Total Solar Energy %	Winter Night time	Summer Day time				
Coated												
***VISTACOOL®* (2) *AZURIA®* Glass**												
1/4	6	35	52	25	19	10	1.02	0.92	5.8	0.52	0.46	1.13
5/16	8	29	46	20	16	9	1.01	0.91	5.7	0.49	0.43	1.07
***VISTACOOL®* (2) *PACIFICA®* Glass**												
1/4	6	12	32	22	10	7	1.02	0.93	5.8	0.51	0.44	0.73
***SOLARCOOL®* (1) *SOLEXIA®* Glass**												
1/4	6	9	30	23	37	30	1.02	0.93	5.8	0.43	0.37	0.81
***SOLARCOOL®* (2) *SOLEXIA®* Glass**												
1/4	6	9	30	23	23	12	1.03	0.93	5.8	0.50	0.43	0.70
***SOLARCOOL®* (1) *AZURIA®* Glass**												
3/16	5	13	27	16	36	30	1.03	0.93	5.8	0.37	0.32	0.84
1/4	6	12	26	13	36	30	1.02	0.93	5.8	0.36	0.31	0.84
***SOLARCOOL®* (2) *AZURIA®* Glass**												
3/16	5	13	27	16	20	10	1.04	0.94	5.8	0.45	0.39	0.69
1/4	6	12	26	13	19	9	1.03	0.93	5.8	0.44	0.38	0.68
***SOLARCOOL®* (1) *PACIFICA®* Glass**												
1/4	6	4	16	13	36	30	1.02	0.93	5.8	0.35	0.31	0.52
***SOLARCOOL®* (2) *PACIFICA®* Glass**												
1/4	6	4	16	13	10	7	1.02	0.93	5.8	0.44	0.38	0.42
***SOLARCOOL®* (1) *SOLARBLUE®* Glass**												
1/4	6	9	21	24	36	30	1.02	0.93	5.8	0.44	0.38	0.55
***SOLARCOOL®* (2) *SOLARBLUE®* Glass**												
1/4	6	9	21	24	14	10	1.02	0.93	5.8	0.51	0.45	0.47
***SOLARCOOL®* (1) *SOLARBRONZE®* Glass**												
1/4	6	7	21	27	36	30	1.02	0.93	5.8	0.46	0.40	0.53
***SOLARCOOL®* (2) *SOLARBRONZE®* Glass**												
1/4	6	7	21	27	13	11	1.03	0.93	5.8	0.53	0.47	0.45
***SOLARCOOL®* (1) *SOLARGRAY®* Glass**												
1/4	6	7	17	23	36	30	1.02	0.93	5.8	0.43	0.37	0.46
***SOLARCOOL®* (2) *SOLARGRAY®* Glass**												
1/4	6	7	17	23	11	9	1.03	0.93	5.8	0.51	0.44	0.39

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 6.3 software.**
2. **Transmittance and reflectance** values based on spectrophotometric measurements and energy distribution of solar radiation.
3. **U-value** is the overall coefficient of heat transmittance or heat flow measured in BTU/hr. • ft² • °F. Lower U-values indicate better insulating performance.
4. **European U-value** is the overall coefficient of heat transmittance or heat flow measured in Watts/m² • °C, and is calculated using WinDat WIS version 3.0.1 software.
5. **Shading coefficient** is the ratio of the total amount of solar energy that passes through a glass relative to 1/8-inch (3.0mm) thick clear glass under the same design conditions. It includes both solar energy transmitted directly plus any absorbed solar energy re-radiated and convected. Lower shading coefficient values indicate better performance in reducing solar heat gain.
6. **Solar heat gain coefficient (SHGC)** represents the solar heat gain through the glass relative to the incident solar radiation. It is equal to 86% of the shading coefficient.
7. **Light-to-solar gain (LSG) ratio** is the ratio of visible light transmittance to solar heat gain coefficient.

Important glass design considerations and comprehensive technical information, including performance, thermal stress and wind load tools for all PPG glasses are available at www.ppgideascapes.com/glasstechnical. Monolithic Glass Data can also be found at www.ppgideascapes.com/glasstechnical or by calling 1-888-PPG-IDEA (1-888-774-4332).

One-Inch Insulating Glass Unit Comparisons with PPG Glass

Insulating Glass Unit Performance Comparisons 1-inch (25mm) units with 1/2-inch (13mm) air fill and two 1/4-inch (6mm) lites; interior lite clear unless otherwise noted

Glass Type: Outdoor Lite: Coating if Any (Surface) Glass + Indoor Lite: Coating if Any (Surface) Glass	Transmittance[2]			Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[3]		U-Value[4] EN 673 (W/m²°C)	Shading Coefficient[5]	Solar Heat Gain Coefficient[6]	Light to Solar Gain (LSG)[7]
	Ultra-violet %	Visible %	Total Solar Energy %	Exterior Light %	Interior Light %	Winter Night-time	Summer Day-time				
Uncoated											
CLEAR Glass + Clear	50	79	61	15	15	0.47	0.50	2.8	0.81	0.70	1.13
STARPHIRE® + *STARPHIRE*	77	84	80	15	15	0.47	0.50	2.8	0.94	0.82	1.02
SOLEXIA® + Clear	25	69	39	13	15	0.47	0.50	2.8	0.57	0.50	1.38
ATLANTICA® + Clear	13	60	29	11	14	0.47	0.50	2.8	0.47	0.41	1.46
AZURIA® + Clear	34	61	28	11	14	0.47	0.50	2.8	0.45	0.39	1.56
PACIFICA® + Clear	12	38	23	7	13	0.47	0.50	2.8	0.41	0.36	1.06
SOLARBLUE® + Clear	25	50	37	9	13	0.47	0.50	2.8	0.56	0.49	1.02
SOLARBRONZE® + Clear	21	47	39	8	13	0.47	0.50	2.8	0.59	0.51	0.92
OPTIGRAY® + Clear	27	56	41	10	13	0.47	0.50	2.8	0.60	0.52	1.08
SOLARGRAY® + Clear	20	40	33	7	13	0.47	0.50	2.8	0.53	0.46	0.87
GRAYLITE® II + Clear	2	8	7	4	12	0.47	0.50	2.8	0.25	0.22	0.36
Coated											
SUNGATE® 400 Low-E Glass											
SUNGATE 400 (2) Clear + Clear	28	76	51	14	14	0.32	0.31	1.8	0.69	0.60	1.27
SUNGATE 400 (2) *STARPHIRE* + *STARPHIRE*	39	80	65	14	14	0.32	0.31	1.8	0.78	0.68	1.18
CLEAR + *SUNGATE* 400 (3) Clear	28	76	51	14	14	0.32	0.31	1.8	0.73	0.63	1.21
SOLEXIA + *SUNGATE* 400 (3) Clear	15	66	33	11	13	0.32	0.31	1.8	0.50	0.44	1.50
ATLANTICA + *SUNGATE* 400 (3) Clear	8	58	25	10	12	0.32	0.31	1.8	0.40	0.35	1.66
AZURIA + *SUNGATE* 400 (3) Clear	20	59	25	10	12	0.32	0.31	1.8	0.39	0.34	1.74
PACIFICA + *SUNGATE* 400 (3) Clear	7	37	19	7	11	0.32	0.31	1.8	0.34	0.30	1.23
SOLARBLUE + *SUNGATE* 400 (3) Clear	15	48	31	8	12	0.32	0.31	1.8	0.49	0.42	1.14
SOLARBRONZE + *SUNGATE* 400 (3) Clear	12	46	32	8	12	0.32	0.31	1.8	0.50	0.44	1.05
SOLARGRAY + *SUNGATE* 400 (3) Clear	12	38	27	7	12	0.32	0.31	1.8	0.44	0.39	0.97
OPTIGRAY + *SUNGATE* 400 (3) Clear	16	54	34	9	12	0.32	0.31	1.8	0.52	0.46	1.17
GRAYLITE II + *SUNGATE* 400 (3) Clear	1	8	5	4	11	0.32	0.31	1.8	0.17	0.15	0.53
SOLARBAN® 60 Solar Control Low-E Glass											
SOLARBAN 60 (2) Clear + Clear	18	70	34	11	12	0.29	0.27	1.6	0.45	0.39	1.79
SOLARBAN 60 (2) *STARPHIRE* + *STARPHIRE*	24	74	39	11	12	0.29	0.27	1.6	0.48	0.41	1.80
SOLARBAN 60 (2) *SOLEXIA* + Clear	10	61	25	9	12	0.29	0.27	1.6	0.37	0.32	1.91
SOLARBAN 60 (2) *ATLANTICA* + Clear	5	53	20	8	11	0.29	0.27	1.6	0.32	0.27	1.96
SOLARBAN 60 (2) *AZURIA* + Clear	13	54	21	8	11	0.29	0.27	1.6	0.32	0.28	1.93
SOLARBAN 60 (2) *PACIFICA* + Clear	5	34	15	6	10	0.29	0.27	1.6	0.26	0.22	1.55
SOLARBAN 60 (2) *SOLARBLUE* + Clear	10	45	21	7	11	0.29	0.27	1.6	0.33	0.28	1.61
SOLARBAN 60 (2) *SOLARBRONZE* + Clear	8	42	21	7	11	0.29	0.27	1.6	0.32	0.28	1.50
SOLARBAN 60 (2) *OPTIGRAY* + Clear	10	50	23	8	11	0.29	0.27	1.6	0.35	0.30	1.67
SOLARBAN 60 (2) *SOLARGRAY* + Clear	8	35	18	6	10	0.29	0.27	1.6	0.29	0.25	1.40
SOLEXIA + *SOLARBAN* 60 (3) Clear	10	61	25	10	10	0.29	0.27	1.6	0.42	0.37	1.65
ATLANTICA + *SOLARBAN* 60 (3) Clear	5	53	20	9	10	0.29	0.27	1.6	0.36	0.31	1.71
AZURIA + *SOLARBAN* 60 (3) Clear	13	54	21	9	10	0.29	0.27	1.6	0.36	0.31	1.74
PACIFICA + *SOLARBAN* 60 (3) Clear	5	34	15	6	9	0.29	0.27	1.6	0.29	0.25	1.36
SOLARBLUE + *SOLARBAN* 60 (3) Clear	10	45	21	7	9	0.29	0.27	1.6	0.38	0.33	1.36
SOLARBRONZE + *SOLARBAN* 60 (3) Clear	8	42	21	7	9	0.29	0.27	1.6	0.37	0.32	1.31
OPTIGRAY + *SOLARBAN* 60 (3) Clear	10	50	23	8	9	0.29	0.27	1.6	0.40	0.35	1.43
SOLARGRAY + *SOLARBAN* 60 (3) Clear	8	35	18	7	9	0.29	0.27	1.6	0.33	0.29	1.21
GRAYLITE II + *SOLARBAN* 60 (3) Clear	1	7	4	4	8	0.29	0.27	1.6	0.14	0.13	0.54
SOLARBAN® 67 Solar Control Low-E Glass											
SOLARBAN 67 (2) Clear + Clear	11	54	24	19	16	0.29	0.27	1.6	0.33	0.29	1.86
SOLARBAN 67 (2) *STARPHIRE* + *STARPHIRE*	15	57	28	20	16	0.29	0.27	1.6	0.34	0.30	1.90
SOLARBAN 67 (2) *SOLEXIA* + Clear	6	47	19	16	16	0.29	0.27	1.6	0.29	0.25	1.88
SOLARBAN 67 (2) *ATLANTICA* + Clear	3	41	15	13	16	0.29	0.27	1.6	0.26	0.22	1.86
SOLARBAN 67 (2) *AZURIA* + Clear	8	42	16	13	16	0.29	0.27	1.6	0.26	0.23	1.83
SOLARBAN 67 (2) *OPTIBLUE* + Clear	8	39	19	12	15	0.29	0.27	1.6	0.28	0.25	1.56
SOLARBAN 67 (2) *PACIFICA* + Clear	3	26	11	8	15	0.29	0.27	1.6	0.21	0.19	1.37
SOLARBAN 67 (2) *SOLARBLUE* + Clear	6	34	16	10	15	0.29	0.27	1.6	0.26	0.22	1.55
SOLARBAN 67 (2) *SOLARBRONZE* + Clear	5	32	15	10	15	0.29	0.27	1.6	0.25	0.22	1.45
SOLARBAN 67 (2) *SOLARGRAY* + Clear	5	27	13	8	15	0.29	0.27	1.6	0.23	0.20	1.35
SOLARBAN 67 (2) *OPTIGRAY* + Clear	6	38	17	12	15	0.29	0.27	1.6	0.27	0.24	1.58
ATLANTICA + *SOLARBAN* 67 (3) Clear	3	41	15	11	18	0.29	0.27	1.6	0.33	0.29	1.41
AZURIA + *SOLARBAN* 67 (3) Clear	8	42	16	11	18	0.29	0.27	1.6	0.33	0.29	1.45
PACIFICA + *SOLARBAN* 67 (3) Clear	3	26	11	7	18	0.29	0.27	1.6	0.27	0.23	1.13
SOLARBLUE + *SOLARBAN* 67 (3) Clear	6	34	16	9	18	0.29	0.27	1.6	0.34	0.30	1.13
SOLARBRONZE + *SOLARBAN* 67 (3) Clear	5	32	15	9	18	0.29	0.27	1.6	0.33	0.29	1.10
OPTIGRAY + *SOLARBAN* 67 (3) Clear	6	38	17	10	18	0.29	0.27	1.6	0.36	0.32	1.19
SOLARGRAY + *SOLARBAN* 67 (3) Clear	5	27	13	8	18	0.29	0.27	1.6	0.30	0.26	1.04
GRAYLITE II + *SOLARBAN* 67 (3) Clear	0	5	3	4	18	0.29	0.27	1.6	0.14	0.12	0.42

One-Inch Insulating Glass Unit Comparisons with PPG Glass

Insulating Glass Unit Performance Comparisons 1-inch (25mm) units with 1/2-inch (13mm) air fill and two 1/4-inch (6mm) lites; interior lite clear unless otherwise noted

Glass Type: Outdoor Lite: Coating if Any (Surface) Glass + Indoor Lite: Coating if Any (Surface) Glass	Transmittance[2]			Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[3]		U-Value[4] EN 673 (W/m² °C)	Shading Coefficient[5]	Solar Heat Gain Coefficient[6]	Light to Solar Gain (LSG)[7]
	Ultra-violet %	Visible %	Total Solar Energy %	Exterior Light %	Interior Light %	Winter Night-time	Summer Day-time				
Coated											
***SOLARBAN*® 70XL Solar Control Low-E Glass†**											
SOLARBAN 70XL (2) + Clear	6	64	25	12	13	0.28	0.26	1.5	0.32	0.27	2.37
SOLARBAN 70XL (2) *SOLEXIA* + Clear	4	58	21	10	13	0.28	0.26	1.5	0.31	0.27	2.15
SOLARBAN 70XL (2) ATLANTICA + Clear	2	51	17	9	12	0.28	0.26	1.5	0.28	0.24	2.13
SOLARBAN 70XL (2) *AZURIA* + Clear	5	52	18	9	12	0.28	0.26	1.5	0.29	0.25	2.08
SOLARBAN 70XL (2) *PACIFICA* + Clear	2	32	12	6	12	0.28	0.26	1.5	0.22	0.19	1.68
SOLARBAN 70XL (2) *SOLARBLUE* + Clear	4	42	17	8	12	0.28	0.26	1.5	0.26	0.23	1.83
SOLARBAN 70XL (2) *SOLARBRONZE* + Clear	3	40	15	7	12	0.28	0.26	1.5	0.25	0.21	1.90
SOLARBAN 70XL (2) *OPTIGRAY* + Clear	4	47	18	8	12	0.28	0.26	1.5	0.28	0.24	1.96
SOLARBAN 70XL (2) *SOLARGRAY* + Clear	3	34	13	6	12	0.28	0.26	1.5	0.23	0.20	1.70
SOLEXIA + *SOLARBAN* 70XL (3)	3	56	20	11	12	0.28	0.26	1.5	0.37	0.32	1.75
ATLANTICA + *SOLARBAN* 70XL (3)	2	49	17	10	11	0.28	0.26	1.5	0.32	0.28	1.75
AZURIA + *SOLARBAN* 70XL (3)	4	49	17	9	11	0.28	0.26	1.5	0.33	0.29	1.69
PACIFICA + *SOLARBAN* 70XL (3)	2	31	12	6	10	0.28	0.26	1.5	0.26	0.22	1.41
SOLARBLUE + *SOLARBAN* 70XL (3)	3	40	16	8	11	0.28	0.26	1.5	0.32	0.27	1.48
SOLARBRONZE + *SOLARBAN* 70XL (3)	3	38	15	8	11	0.28	0.26	1.5	0.30	0.26	1.46
OPTIGRAY + *SOLARBAN* 70XL (3)	3	45	17	9	11	0.28	0.26	1.5	0.33	0.29	1.55
SOLARGRAY + *SOLARBAN* 70XL (3)	2	32	13	7	11	0.28	0.26	1.5	0.27	0.24	1.33
GRAYLITE II + *SOLARBAN* 70XL (3)	0	6	3	4	10	0.28	0.26	1.5	0.13	0.11	0.55
***SOLARBAN*® 72 Solar Control Low-E Glass**											
SOLARBAN 72 (2) *STARPHIRE*††	9	71	28	13	13	0.29	0.27	1.5	0.34	0.30	2.37
***SOLARBAN*® z50 Solar Control Low-E Glass†††**											
SOLARBAN z50 (2) *OPTIBLUE* + Clear	14	51	25	8	11	0.29	0.27	1.6	0.36	0.32	1.59
SOLARBAN z50 (2) *OPTIBLUE* + *OPTIBLUE*	11	37	20	7	8	0.29	0.27	1.6	0.35	0.31	1.19
***SOLARBAN*® z75 Solar Control Low-E Glass†††**											
SOLARBAN z75 (2) *OPTIBLUE* + Clear	6	48	19	9	12	0.28	0.26	1.5	0.28	0.24	2.00
***SOLARBAN*® R100 Solar Control Low-E Glass**											
SOLARBAN R100 (2) + Clear	12	42	19	32	14	0.29	0.27	1.6	0.27	0.23	1.83
SOLARBAN R100 (2) *STARPHIRE* + *STARPHIRE*	16	44	21	33	14	0.29	0.27	1.6	0.27	0.23	1.91
SOLARBAN R100 (2) *SOLEXIA* + Clear	6	36	15	25	13	0.29	0.27	1.6	0.24	0.21	1.71
SOLARBAN R100 (2) *ATLANTICA* + Clear	3	32	12	20	13	0.29	0.27	1.6	0.22	0.19	1.68
SOLARBAN R100 (2) *AZURIA* + Clear	8	32	12	21	13	0.29	0.27	1.6	0.22	0.19	1.68
SOLARBAN R100 (2) *OPTIBLUE* + Clear	8	30	14	19	13	0.29	0.27	1.6	0.23	0.20	1.50
SOLARBAN R100 (2) *PACIFICA* + Clear	3	20	9	11	13	0.29	0.27	1.6	0.19	0.16	1.25
SOLARBAN R100 (2) *SOLARBLUE* + Clear	6	26	12	15	13	0.29	0.27	1.6	0.22	0.19	1.37
SOLARBAN R100 (2) *SOLARBRONZE* + Clear	5	25	11	15	13	0.29	0.27	1.6	0.21	0.18	1.39
SOLARBAN R100 (2) *OPTIGRAY* + Clear	6	29	13	18	13	0.29	0.27	1.6	0.22	0.20	1.45
SOLARBAN R100 (2) *SOLARGRAY* + Clear	5	21	10	12	13	0.29	0.27	1.6	0.19	0.17	1.24

Yin Yang House
Location: *Venice, California*
Product: Solarban® *Solar Control Low-e Glass, DURANAR® Coatings*
Architect: *Brooks+Scarpa*
GeneralContractotr: *Lyons Construction*

Photo courtesy of John Linden

The American Institute of Architects Committee on the Environment (COTE) named the Yin Yang House one of the Top 10 Green Buildings for 2013.

One-Inch Insulating Glass Unit Comparisons with PPG Glass

Insulating Glass Unit Performance Comparisons 1-inch (25mm) units with 1/2-inch (13mm) air fill and two 1/4-inch (6mm) lites; interior lite clear unless otherwise noted

Glass Type: Outdoor Lite: Coating if Any (Surface) Glass + Indoor Lite: Coating if Any (Surface) Glass	Transmittance[2]			Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[3]		U-Value[4] EN 673 (W/m² °C)	Shading Coefficient[5]	Solar Heat Gain Coefficient[6]	Light to Solar Gain (LSG)[7]
	Ultra-violet %	Visible %	Total Solar Energy %	Exterior Light %	Interior Light %	Winter Night-time	Summer Day-time				
Coated											
***VISTACOOL*®** Subtly Reflective Glass											
VISTACOOL (2) *AZURIA* + Clear	29	47	22	21	32	0.47	0.50	2.8	0.39	0.34	1.38
VISTACOOL (2) *PACIFICA* + Clear	10	29	19	11	31	0.47	0.50	2.8	0.37	0.32	0.91
***SOLARCOOL*®** Reflective Glass											
SOLARCOOL (1) *SOLEXIA* + Clear	7	27	18	37	27	0.47	0.50	2.8	0.32	0.28	0.96
SOLARCOOL (2) *SOLEXIA* + Clear	7	27	19	24	38	0.47	0.50	2.8	0.36	0.31	0.87
SOLARCOOL (1) *AZURIA* + Clear	10	23	11	37	24	0.47	0.50	2.8	0.25	0.21	1.10
SOLARCOOL (2) *AZURIA* + Clear	10	24	12	20	38	0.47	0.50	2.8	0.29	0.25	0.96
SOLARCOOL (1) *PACIFICA* + Clear	4	14	10	36	17	0.47	0.50	2.8	0.24	0.21	0.67
SOLARCOOL (2) *PACIFICA* + Clear	4	15	11	10	38	0.47	0.50	2.8	0.29	0.25	0.60
SOLARCOOL (1) *SOLARBLUE* + Clear	7	19	19	37	20	0.47	0.50	2.8	0.33	0.29	0.66
SOLARCOOL (2) *SOLARBLUE* + Clear	7	20	19	15	38	0.47	0.50	2.8	0.37	0.32	0.63
SOLARCOOL (1) *SOLARBRONZE* + Clear	6	18	21	37	19	0.47	0.50	2.8	0.35	0.31	0.58
SOLARCOOL (2) *SOLARBRONZE* + Clear	6	19	21	14	38	0.47	0.50	2.8	0.40	0.34	0.56
SOLARCOOL (1) *SOLARGRAY* + Clear	6	15	17	36	17	0.47	0.50	2.8	0.32	0.28	0.54
SOLARCOOL (2) *SOLARGRAY* + Clear	6	16	18	11	38	0.47	0.50	2.8	0.36	0.32	0.50
***VISTACOOL*®** and ***SOLARCOOL*®** with ***SOLARBAN*®** 60 Solar Control Low-E (3)											
VISTACOOL (2) *AZURIA* + *SOLARBAN* 60 (3) Clear	11	42	16	20	24	0.29	0.27	1.6	0.30	0.26	1.62
VISTACOOL (2) *PACIFICA* + *SOLARBAN* 60 (3) Clear	4	26	12	11	23	0.29	0.27	1.6	0.25	0.21	1.24
SOLARCOOL (2) *PACIFICA* + *SOLARBAN* 60 (3) Clear	2	13	6	10	29	0.29	0.27	1.6	0.17	0.15	0.87
SOLARCOOL (2) *SOLEXIA* + *SOLARBAN* 60 (3) Clear	3	24	10	24	29	0.29	0.27	1.6	0.22	0.19	1.26
SOLARCOOL (2) *AZURIA* + *SOLARBAN* 60 (3) Clear	4	21	8	19	29	0.29	0.27	1.6	0.19	0.17	1.24
SOLARCOOL (2) *SOLARBLUE* + *SOLARBAN* 60 (3) Clear	3	17	9	14	29	0.29	0.27	1.6	0.21	0.18	0.94
SOLARCOOL (2) *SOLARBRONZE* +*SOLARBAN* 60 (3) Clear	2	17	9	14	29	0.29	0.27	1.6	0.21	0.18	0.94
SOLARCOOL (2) *SOLARGRAY* + *SOLARBAN* 60 (3) Clear	2	14	8	11	29	0.29	0.27	1.6	0.20	0.17	0.82
***VISTACOOL*®** and ***SOLARCOOL*®** with ***SOLARBAN*®** 70XL Solar Control Low-E (3)†											
VISTACOOL (2) *AZURIA* + *SOLARBAN* 70XL (3)	4	38	14	21	23	0.28	0.26	1.5	0.27	0.24	1.58
VISTACOOL (2) *PACIFICA* + *SOLARBAN* 70XL (3)	1	24	9	11	22	0.28	0.26	1.5	0.22	0.19	1.26
SOLARCOOL (2) *SOLEXIA* + *SOLARBAN* 70XL (3)	1	22	8	24	27	0.28	0.26	1.5	0.20	0.17	1.29
SOLARCOOL (2) *AZURIA* + *SOLARBAN* 70XL (3)	1	19	6	19	27	0.28	0.26	1.5	0.18	0.15	1.27
SOLARCOOL (2) *PACIFICA* + *SOLARBAN* 70XL (3)	1	12	4	10	27	0.28	0.26	1.5	0.15	0.13	0.92
SOLARCOOL (2) *SOLARBLUE* + *SOLARBAN* 70XL (3)	1	16	6	14	27	0.28	0.26	1.5	0.18	0.15	1.07
SOLARCOOL (2) *SOLARBRONZE* + *SOLARBAN* 70XL (3)	1	15	6	14	27	0.28	0.26	1.5	0.17	0.15	1.00
SOLARCOOL (2) *SOLARGRAY* + *SOLARBAN* 70XL (3)	1	13	5	11	27	0.28	0.26	1.5	0.16	0.14	0.93

All performance data calculated using LBNL Window 6.3 software, except European U-value, which is calculated using WinDat version 3.0.1 software. For detailed information on the methodologies used to calculate the aesthetic and performance values in this table, please visit www.ppgideascapes.com.

† ***Solarban*** 70XL for annealed applications is applied to ***Starphire*** glass; heat treated applications will require either clear or ***Starphire*** glass depending on manufacturing process.

†† ***Solarban*** 72 ***Starphire*** data based on using ***Starphire*** glass for both interior and exterior lites.

††† ***Optiblue*** is a unique substrate by PPG designed specifically for ***Solarban*** z50 and ***Solarban*** z75 glasses.

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 6.3 software.**
2. **Transmittance and Reflectance** values based on spectrophotometric measurements and energy distribution of solar radiation.
3. **U-value** is the overall coefficient of heat transmittance or heat flow measured in BTU/hr. • ft² • °F. Lower U-values indicate better insulating performance.
4. **European U-value** is the overall coefficient of heat transmittance or heat flow measured in Watts/m² • °C, and is calculated using WinDat WIS version 3.0.1 software.
5. **Shading coefficient** is the ratio of the total amount of solar energy that passes through a glass relative to 1/8-inch (3.0mm) thick clear glass under the same design conditions. It includes both solar energy transmitted directly plus any absorbed solar energy re-radiated and convected. Lower shading coefficient values indicate better performance in reducing solar heat gain.
6. **Solar heat gain coefficient (SHGC)** represents the solar heat gain through the glass relative to the incident solar radiation. It is equal to 86% of the shading coefficient.
7. **Light-to-solar gain (LSG) ratio** is the ratio of visible light transmittance to solar heat gain coefficient.

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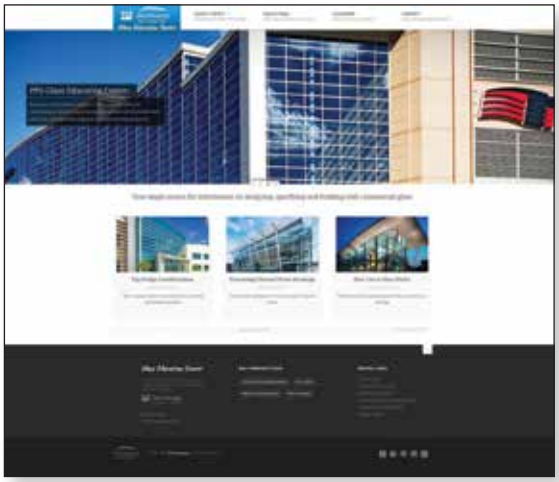

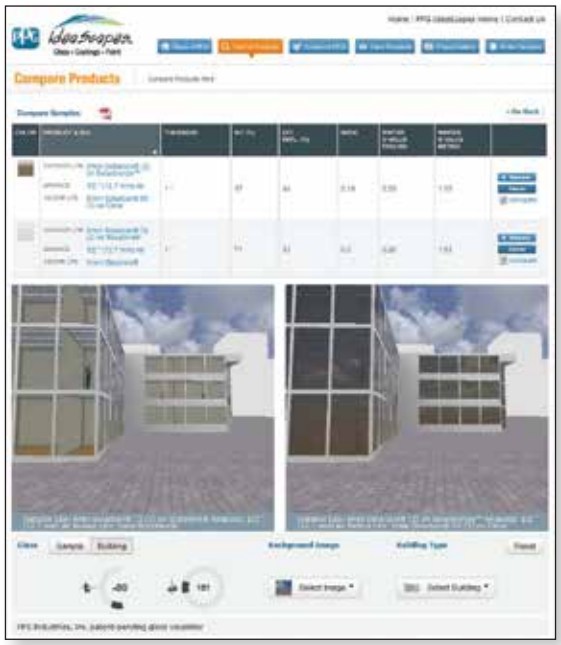

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Glass Education Center

The PPG Glass Education Center is a comprehensive website to help architects, specifiers, students and construction industry professionals learn more about designing, specifying and building with glass.

Covering *Glass Topics, Glass FAQs* and a complete industry glossary, the site features a compelling mix of instructive video shorts, colorful illustrations and educational features that address issues, such as preventing thermal glass breakage, specifying large insulating glass units and understanding how low-e glass works.

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Consol Energy Center
Location: *Pittsburgh, Pennsylvania*
Product: Solarban® *z50 Glass*
Architects: *Populous; Astorino*
Glazing Contractor: *Universal Glass and Metals Inc./D-M Products Inc.*
Glass Fabricator: *Trulite Glass and Aluminum Solutions*
Owner/Developer: *Sports & Exhibition Authority of Pittsburgh and Allegheny County*

Photo courtesy of Jim Schafer

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