PPG ARCHITECTURAL GLASS

Sustainable in Every Light

PPG IdeaScapes™

Glass • Coatings • Paint

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Architect: HOK
Glazing Contractor: Trainor Glass
Glass Fabricator: Oldcastle Glass

Cover Inset Photo Credits
(top to bottom)

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Photo Courtesy of Robert Lemermeyer

PPG Place
Location: Pittsburgh, PA
Architect: Philip Johnson & John Burgee

PPG Industries: A Global Sustainability Leader

PPG Industries, Inc., headquartered in Pittsburgh, Pa., USA, is a global supplier of paints, coatings, optical products, specialty materials, chemicals, glass and fiber glass. The company has more than 140 manufacturing facilities and equity affiliates, employing approximately 40,000 people in over 60 countries around the globe.

Throughout its history, beginning as a glass manufacturer in 1883, and now as a globally diverse coatings and specialty products provider, PPG has blazed a trail of leadership and innovation. Today, that legacy continues, not just in an ever-expanding array of sustainable products, but also through corporate business practices, manufacturing advances and supplier partnerships that help protect the environment, build strong communities and enhance individual lives.

With research and development centers strategically located around the world, PPG continues to invest hundreds of millions of dollars each year in developing new and improved products and processes, and to adapting existing technologies to fit the needs of new markets and applications. Largely as a result of this commitment, PPG has earned an R&D 100 Award from *R&D Magazine* for eight consecutive years and generates 30 percent of sales from products introduced in the last four years.

PPG IdeaScapes™
Glass • Coatings • Paint

PPG IdeaScapes™
Colors. Coatings. Surfaces. Solutions.

As one of the world's most diverse building product manufacturers, PPG is home to **PPG *IdeaScapes***, the industry's only single-source solution for sustainable glass, coatings and paint.

From initial design and construction to on-going operations and renewal, **PPG *IdeaScapes*** is a proven, trusted and reliable resource for beautiful, durable and environmentally progressive solutions for every building surface.

PPG *IdeaScapes* also is unsurpassed in its ability to match color across almost any surface imaginable, from wood, stone and steel to aluminum, drywall, concrete and more. This devotion to ***Color Across Surfaces*** centers not just on how color looks, but also how it performs and protects architectural components as well as non-building-related products in the automotive, aerospace, appliance and consumer electronics industries. No one knows more about color — and how to select it, match it and apply it — than **PPG *IdeaScapes***.

PPG *IdeaScapes* has its personal side, too; knowledgeable personnel with the experience and training to address all your sustainable building and design needs, backed by an exceptional array of tools, product selectors and online resources.

For architectural products with a track record of proven performance, sustainability, color consistency and good looks, turn to **PPG *IdeaScapes***.

PPG Glass at ppgideascapes.com

PPG offers one of the industry's most comprehensive portals for glass research, product selection and specification. By visiting www.ppgideascapes.com, architects, specifiers, glazing contractors and other building professionals gain access to the following tools:

PPG Glass Configurator — With a click of the mouse, architects can search and compare more than 120 PPG architectural glass and coating combinations by product description and performance data, including winter U-value, outdoor visible light reflectance, Solar Heat Gain Coefficient (SHGC), Visible Light Transmittance (VLT) and Light to Solar Gain (LSG) ratio.

PPG Glass Performance Calculator — This online tool allows architects to analyze and compare the performance of countless monolithic and insulating glass unit specifications by inputting glass type, thickness, coating surface, gas fill and gas cavity dimensions, and other variables. Outputted performance measures include U-value, reflectance, Solar Heat Gain Coefficient (SHGC), Visible Light Transmittance (VLT) and Light to Solar Gain (LSG) ratio.

LEED Resource (Green Certification) Center — PPG is eager to help architects, building owners and contractors earn green certification for their projects through documentation support and other services. They can speak with a LEED support professional or visit www.ppgideascapes.com to link to *Cradle to Cradle Certified*CM architectural glass products, green product directories and other valuable resources.

For glass specifiers, there is a complete library of technical data, thermal stress and wind load analysis tables, glass design guidelines and a glass specification guide.

ASTM E 2129-05 Completed Questionnaire — Architects seeking green certification for their buildings can download this white paper, which documents PPG glass data as they apply to the *ASTM E 2129-05 Standard Practice for Data Collection for Sustainability Assessment of Building Products*.

Photo Gallery — Visitors can preview real-world PPG glass combinations and configurations by sorting through photos from hundreds of building projects by project name, type or location, or by product name or type (glass, coatings or paint).

➤
Park Alexandria
Location: *Chicago, IL*
Products: Solarban® *60 Glass*
Architect: *HOK*
Glazing Contractor: *Whitting-Turner Contracting Company*
Glass Fabricator: *TRACO*

Photo courtesy of TRACO

Green Products.
Green Manufacturing.

In the world of green construction, PPG is known for its energy-saving, solar control, low-e glasses, as well as a stunning variety of tints that range from the clearest ultra-clear glass to the most radiant ocean- and nature-inspired hues.

In 1934, PPG introduced ***Solex*** glass, now known as ***Solexia*** glass, the world's first *spectrally selective* architectural glass. The company also pioneered the development of today's advanced low-e and solar control, low-e coatings, including ***Solarban*** 70XL glass, which features the industry's first triple-silver, low-e coating.

More recently, PPG raised the bar by becoming the first company to achieve *Cradle to Cradle Certification* for its entire collection of architectural glasses.

PPG also leads in the arena of advanced architectural coatings. ***Duranar*®** ***ULTRA-Cool*** coatings, listed by *ENERGY STAR* and the Cool Roof Rating Council (CRRC), are made with proprietary infrared-reflective pigments. These advanced architectural coatings keep buildings cooler while offering architects an expansive palette of environmentally progressive metal panel and roof colors.

In addition to these metal coatings, PPG offers many paints that are *Ecologo*-certified or CHPS-compliant as low-emitting materials. In fact, ***Pure Performance*®** paint by ***PPG Pittsburgh*® *Paints*** made history as the first high-quality, zero-VOC interior latex paint to earn Class A certification from *Green Seal*. These and other innovative products are part of ***PPG EcoLogical Building Solutions***℠, a collection of select environmentally progressive architectural products.

At PPG, sustainability means more than "greener" buildings. Beyond the construction market, the company's fiber glass and coatings are used in lightweight turbines for the production of wind energy. Advanced glass substrates and coatings from PPG also are instrumental in the production of photovoltaic cells for the concentration and collection of solar power.

The engineering prowess that made these products commercially viable is zealously directed at making their manufacture more environmentally sound, too. For instance, PPG pioneered oxy-fuel furnace technology for glass making, a process the company now licenses to save energy and reduce greenhouse gas (GHG) emissions for other glass manufacturers around the world.

On the strength of these and other manufacturing advances, PPG has established aggressive targets for dramatically reducing GHG emissions. This commitment, along with countless philanthropic, community, recycling, conservation and material recovery programs, has secured a top score for PPG in the Carbon Disclosure Project's (CDP) Leadership Index, a global clearinghouse of information that tracks corporate sustainability policies and GHG reporting.

CERTIFIED cradle to cradle SILVER

ecological Building Solutions℠

energy ENERGY STAR PARTNER

West 8th Street
Location: *Seattle, WA*
Products: Solarban® *70XL /* ***Solarban®*** *80 Glass*
Architect: *Callison Architecture, Inc.*
Glass Fabricator: *Northwestern Industries, Inc.*

Photo Courtesy of Denny Sternstein

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

Caesars Palace
Location: Las Vegas, NV
Products: Graylite® Glass
Architect: Bergman Walls Youngblood
Glazing Contractor: Accuracy Glass
Glass Fabricator: Oldcastle Glass

Glass and Energy Management

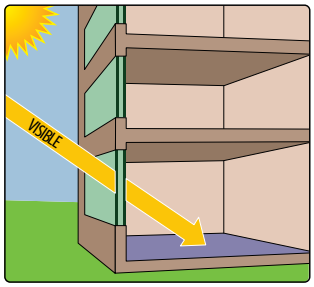
In modern architectural practice, green is more than a color. It represents the nomenclature for an entire canon of principles dedicated to the pursuit of environmentally responsible architecture.

Over the past half-century, glass has enhanced its profile and capabilities as a critical asset in the design and development of green buildings.

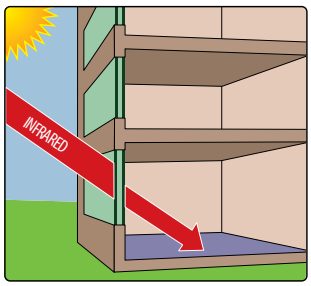
Beyond its obvious versatility as a building and decorative material, glass offers architects the environmental advantage of being forged from basic ingredients such as silica sand, soda-ash and limestone that are both plentiful and relatively inexpensive.

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. No building material balances these competing functions so deftly, and, thanks to on-going advances from PPG in glass formulation, engineering and design, there is tangible promise for even more eco-effective glasses in the future.

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



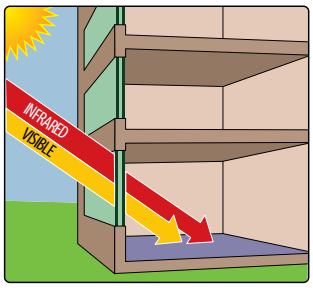
- **Visible Light Transmittance (VLT)** gauges the amount of natural light a glass transmits into a building. To compare, the glass with the industry's highest Visible Light Transmittance (VLT), ***Starphire*** ultra-clear glass by PPG, transmits 84 percent of the sun's available light in a one-inch insulating glass unit. On the other end of the scale, ***Graylite*** glass, a dark-tinted gray glass made by PPG, transmits only 12 percent of the available sunlight.



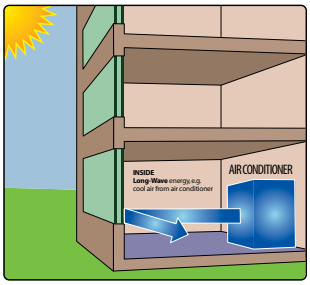
- **Solar Heat Gain Coefficient (SHGC)** quantifies the amount of solar energy (heat) that passes directly through or is absorbed into a building through the glass. Glasses with lower Solar Heat Gain Coefficients block the highest percentage of solar heat. Continuing with the examples above, ***Starphire*** glass has a Solar Heat Gain Coefficient (SHGC) of 0.82, which means it blocks only 18 percent of the sun's heat energy. On the other hand, because of its dark gray tint, ***Graylite*** glass offers a Solar Heat Gain Coefficient (SHGC) of 0.34, which means it deflects 66 percent of the solar radiation.

Whitehead Biomedical Research Building, Emory University
Location: Atlanta, GA
Products: Solarban® 60 Glass
Architect: HOK
Glazing Contractor: Whitting-Turner Contracting Company
Glass Fabricator: TRACO

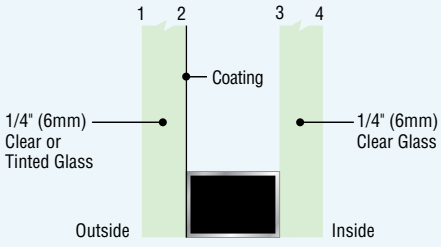
Photo courtesy of TRACO



➤ **Light to Solar Gain (LSG) Ratio** is derived by dividing a glass's Solar Heat Gain Coefficient (SHGC) into its Visible Light Transmittance (VLT). This calculation measures a glass's ability to transmit light in relation to its ability to deflect heat energy. If engineers could create a perfect spectral glass, it would transmit 100 percent of the sun's visible light while blocking 100 percent of its solar energy, producing a Light to Solar Gain (LSG) ratio of ∞. While this "spectral ideal" is physically unattainable, Light to Solar Gain (LSG) ratios provide a useful measure for comparing the potential energy and environmental performance of competing architectural glasses.



➤ **U-Value** quantifies a glass's 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.



Understanding Glass Performance

Insulating glass units provide four potential coating surfaces. The first (#1) surface faces outdoors; the fourth (#4) faces directly indoors. The two surfaces inside the insulating glass unit, 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" MSVD coatings, ***Solarban*** solar control, low-e coatings must be glazed within the insulating glass unit on the second (#2) or third (#3) surface so they are protected from damage during handling and installation, and from the environment throughout their service life.

"Hard" or pyrolytic, low-e coatings can be glazed on the first (#1) surface, but that practice is discouraged to protect them from direct weather exposure.

Chartwell School
Location: *Seaside, CA*
Products: Solarban® *60 Glass*
Architect: *EHDD*

The Chartwell School in Seaside, Calif., glazed with ***Solarban*** 60 glass, is the first educational campus to earn LEED Platinum certification from the U.S. Green Building Council (USBGC).

PPG Performance Glazings

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 nearly 20 years, ***Solarban*** solar control, low-e glasses have set the standard for solar control performance in the architectural glass industry. Since ***Solarban*** glasses were introduced in the 1990s, more than 100 million square-feet of these products has been installed on buildings throughout the world, adding sleekness and beauty while delivering immeasurable energy savings.

That legacy of innovation continues today with ***Solarban*** 70XL glass, a technological breakthrough in solar control, low-e glass that offers the industry's best combination of visible light transmittance and solar control, together with a clear glass appearance.

With a Solar Heat Gain Coefficient (SHGC) of 0.27 and Visible Light Transmittance (VLT) of 64 percent in a one-inch insulating glass unit, ***Solarban*** 70XL produces a Light to Solar Gain (LSG) ratio of 2.37, which exceeds all other solar control, low-e glasses on the market.

For a tinted glass appearance in an insulating glass unit, ***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*** collection or PPG ***Earth & Sky*** performance tinted glasses.

Spectrally Selective Glass

The U.S. Department of Energy defines *spectrally selective* glass as any glass with a Light to Solar Gain (LSG) ratio of 1.25 or better. PPG manufactures a wide variety of architectural glasses that attain or surpass Light to Solar Gain (LSG) ratios of 1.25, allowing them to meet the new energy efficient guidelines for commercial glazings set forth by the Federal Energy Management Program (FEMP).

To examine and compare the exact performance values for all PPG glasses in a variety of sizes and configurations, see the data tables beginning on page 30.

▼

Harvard University, Northwest Science Building
Location: *Cambridge, MA*
Products: *Solarban® 70XL Glass*
Architect: *Skidmore Owings and Merrill LLP*
Glazing Contractor: *Ipswich Bay Glass Co.*
Glass Fabricator: *Solarseal*
Owner/Developer: *Harvard University*

More Light. Less Energy. Lower Equipment Costs.

Solarban 70XL glass is engineered to provide an unprecedented combination of high visible light transmittance and exceptional solar control. As a consequence, architects and building owners can dramatically lower their energy and capital equipment costs.

An independent energy and environmental research firm compared the energy performance of ***Solarban*** 70XL glass to that of other leading solar control, low-e glasses. The study modeled nearly 300 energy consumption simulations for two common building types in 12 cities across North America. Testing showed that one of the greatest benefits of specifying ***Solarban*** 70XL glass can be realized in upfront construction costs, where its exceptional solar control attributes reduced initial capital costs for cooling equipment by as much as $125,000 in a prototypical window-walled, eight-story office building.

The study also demonstrated that ***Solarban*** 70XL glass has the potential — depending on the climate and the size, design and window type of a building — to reduce annual cooling costs by as much as 7 percent compared to competitive products. These savings can approach $1 million or more over the life of a building.

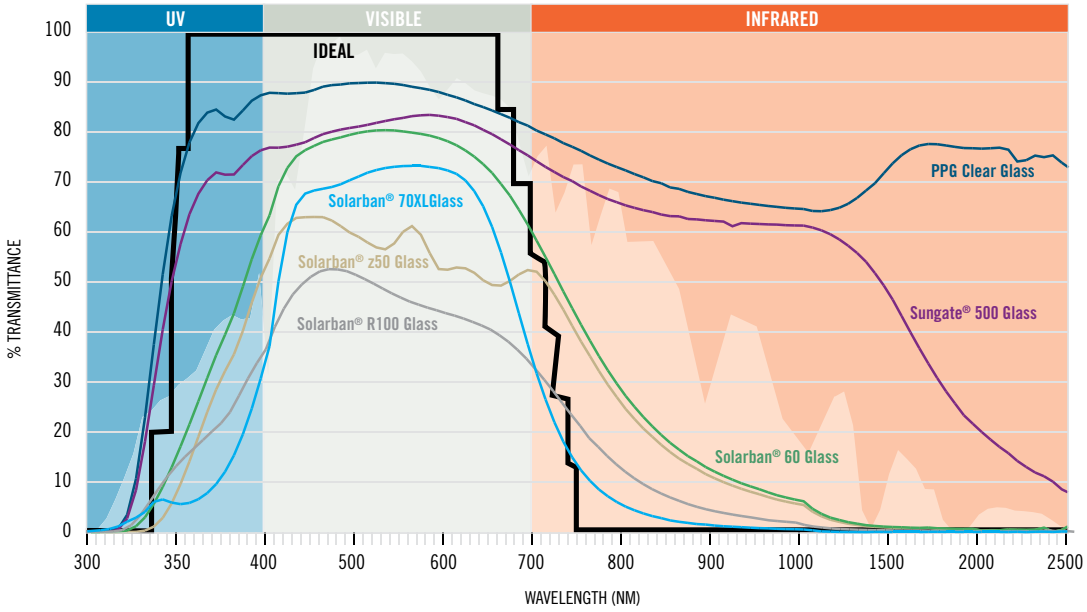
(from left to right)

Hanna Gabriel Wells
Location: *San Diego, CA*
Products: Solarban® *70XL Glass*
Architect: *Hanna Gabriel Wells*
Glazing Contractor: *Sunset Glazing*
Glass Fabricator: *Vitro America*

Photo courtesy of Tom Kessler

Greater Tacoma Convention and Trade Center
Location: *Tacoma, WA*
Products: Solarban® *60 Glass*
Architect: *MulvannyG2 Architecture*
Glazing Contractor: *Walters and Wolf*
Glass Fabricator: *Hartung Glass Industries*
Owner/Developer: *City of Tacoma*

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. Light transmittance from the visible portion of the solar spectrum remains comparatively high.*

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 with clear glass — or an outboard lite of PPG tinted or reflective glass — to give architects an almost limitless selection of aesthetic and environmental performance options.

In a one-inch insulating glass unit, ***Solarban*** 60 glass has Visible Light Transmittance (VLT) of 70 percent, a Solar Heat Gain Coefficient (SHGC) of 0.38 and a Light to Solar Gain (LSG) ratio of 1.84. ***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 behind a tinted lite.

SOLARBAN® z50 Solar Control Low-E Glass

With its soothing, neutral, steel-blue-gray appearance, ***Solarban*** z50 glass brings a new aesthetic to the ***Solarban*** family, along with minimal exterior reflectance, superb solar control and the high levels of visible light transmittance architects have come to expect from this product line.

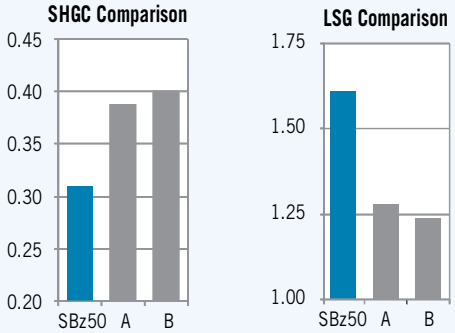
Solarban z50 glass was developed to meet growing demand for a neutral-gray architectural glass that controls glare while providing the daylighting and solar control needed to support sustainable design.

In a one-inch insulating glass unit, ***Solarban*** z50 glass combines Visible Light Transmittance (VLT) of 51 percent with a Solar Heat Gain Coefficient (SHGC) of 0.31, which is up to 23 percent better than competitive products with a similarly tinted aesthetic. The resulting Light to Solar Gain (LSG) ratio of 1.65 is up to 30 percent higher than current competitive products with a similar aesthetic (see charts below).

A low interior reflectance of 8 percent provides interior occupants with a clear, natural view of the outdoors.

➤ *As these charts demonstrate, **Solarban** z50 glass has a lower Solar Heat Gain Coefficient (SHGC) (left chart) and a higher Light to Solar Gain (LSG) ratio (right chart) than leading competitive products with a similar tint, labeled A and B, respectively.*

➤ ***Rosewood Court***
Location: *Dallas, TX*
Products: ***Solarban**® z50 Glass*
Architect: *HKS Inc.*
Glazing Contractor: *Oak Cliff Glass & Mirror*
Glass Fabricator: *Vitro America*
Owner/Developer: *Rosewood Court, LLC*



SOLARBAN® R100 NEUTRAL REFLECTIVE LOW-E GLASS

Solarban R100 glass is a neutral-reflective, low-e glass that provides significant improvements in solar performance compared to competing products in the same architectural glass category.

Because ***Solarban*** R100 glass uniquely balances reflectivity and color-neutrality, it can function both as a privacy glass and as a non-tinted material 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. Outside, ***Solarban*** R100 glass has exterior reflectance of 32 percent that combines with the neutral aesthetic to deliver a clean, crisp exterior for any building project.

Solarban R100 glass also is among the best-performing architectural glass products on the market. An excellent Solar Heat Gain Coefficient (SHGC) of 0.23 and Visible Light Transmittance (VLT) of 42 percent produce a Light to Solar Gain (LSG) ratio of 1.79 that is from 17 to 29 percent greater than competitive reflective, low–e glasses.

The House by Stark and Yoo
Location: *Dallas, TX*
Products: Solarban® *z50 Glass*
Architect: *WDG and Elkus/Manfredi*
Glazing Contractor: *Trainor Glass*
Glass Fabricator: *Oldcastle Glass*

Sungate® 500 Passive Low-E Glass

More than 200 million square-feet of ***Sungate*** 500 glass have been shipped in the last decade, a fitting testament to its status as one of the industry's most trusted and proven low-e glass products. And thanks to the increased emphasis on energy efficiency, the value of this proven technology continues to multiply.

The clear, color-neutral coating of ***Sungate*** 500 coated glass can be combined with nautically inspired tints from the ***Oceans of Color*** collection or nature-inspired ***Earth & Sky*** performance tints to deliver an expansive array of aesthetic choices, from dark-gray and golden-bronze to lustrous blue or rich aqua-green. Several of these tinted glasses, joined with ***Sungate*** 500 glass, can be further paired with traditional ***Solarcool*** reflective or subtly reflective ***Vistacool*** coatings to create an even larger menu of appearance options.

Suvarnabhumi Airport
Location: *Bangkok, Thailand*
Products: ***Sungate®*** *500 Glass*
Architect: *Murphy Jahn*
Glass Fabricator: *PMK Central Glass Co., Ltd.*

The key advantage of ***Sungate*** 500 glass is its performance versatility. With a U-value of 0.35, the ***Sungate*** 500 coating on tinted glass traps furnace heat in the winter while effectively transmitting the warming rays of the sun to produce lower heating bills.

Architects and building owners seeking a *spectrally selective* balance of visible light transmittance and solar control can specify one-inch insulating glass units that unite ***Sungate*** 500 glass with ***Azuria***, ***Atlantica***, ***Caribia*** and ***Solexia*** glasses to achieve Light to Solar Gain (LSG) ratios of 1.45 to 1.66.

OCEANS OF COLOR®

Nautically Inspired Tinted Glass from PPG

Nautically inspired ***Oceans of Color*** tinted glass provides high levels of transmitted daylight while lowering solar heat loads in commercial buildings. This minimizes reliance on artificial cooling and lighting, resulting in reduced operating costs.

Light to Solar Gain (LSG) ratios of up to 2.18 can be achieved by combining an ***Oceans of Color*** tint in an insulating glass unit with a solar control, low-e inboard lite such as ***Solarban*** 70XL glass.

AZURIA™ (formerly *Azurlite*® glass)

Azuria glass offers an ideal blend of solar control and daylight performance in a stunning aqua-blue tint. With Visible Light Transmittance (VLT) of 61 percent and a low Solar Heat Gain Coefficient (SHGC) of 0.39, ***Azuria*** glass yields a Light to Solar Gain (LSG) ratio of 1.56.

Note:
For added performance and aesthetic options, all tints can be teamed in an insulating glass unit with ***Solarban*** 70XL or ***Solarban*** 60 solar control, low-e glass as a second (#2) surface coating. The resulting Light to Solar Gain (LSG) ratios of 1.92 to 2.18 are among the highest in the industry.

Torre JV III
Location: Puebla, Mexico
Products: Azuria™/Vistacool™ Azuria™ Glass
Glazing Contractor: Cristaleria Mexico
Glass Fabricator: Cristaleria Mexico
Owner/Developer: Grupo JV

Photo courtesy of Cristaleria Mexico S.A de C.V.

(from left to right, top to bottom)
Atlantis Resort
Location: Nassau, Bahamas
Products: Azuria™ Glass
Architect: Wimberly Allison Tong & Goo
Glazing Contractor: Commonwealth Building Supplies
Glass Fabricator: Arch Aluminum and Glass L.C.

Staples Center
Location: Los Angeles, CA
Products: Solexia™ Glass
Glazing Contractor: APEX
Glass Fabricator: Glasswerks, Inc
Owner/Developer: L.A. Arena Co., LLC

Hong Kong Convention Center
Location: Wanchai, Hong Kong
Products: Azuria™ Glass
Architect: Skidmore, Owings, and Merrill
Glazing Contractor: Builders Federal (HK) Ltd.
Glass Fabricator: Viracon

This chart compares visible light transmittance 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.

Caribia®

The striking aqua-green color of ***Caribia*** glass blends naturally with other building components to produce remarkably attractive commercial structures. With Visible Light Transmittance (VLT) of 60 percent and a Solar Heat Gain Coefficient (SHGC) of 0.39 in a one-inch insulating glass unit, ***Caribia*** glass produces a Light to Solar Gain (LSG) ratio of 1.54, among the best-performing *spectrally selective* glasses.

Atlantica™ (formerly *Solargreen*® glass)

Emerald-green ***Atlantica*** glass has a Light to Solar Gain (LSG) ratio of 1.50 in a one-inch insulating glass unit, the result of its 60 percent Visible Light Transmittance (VLT) and low 0.39 Solar Heat Gain Coefficient (SHGC). This sparkling tint is a perfect complement to buildings with light-colored facades.

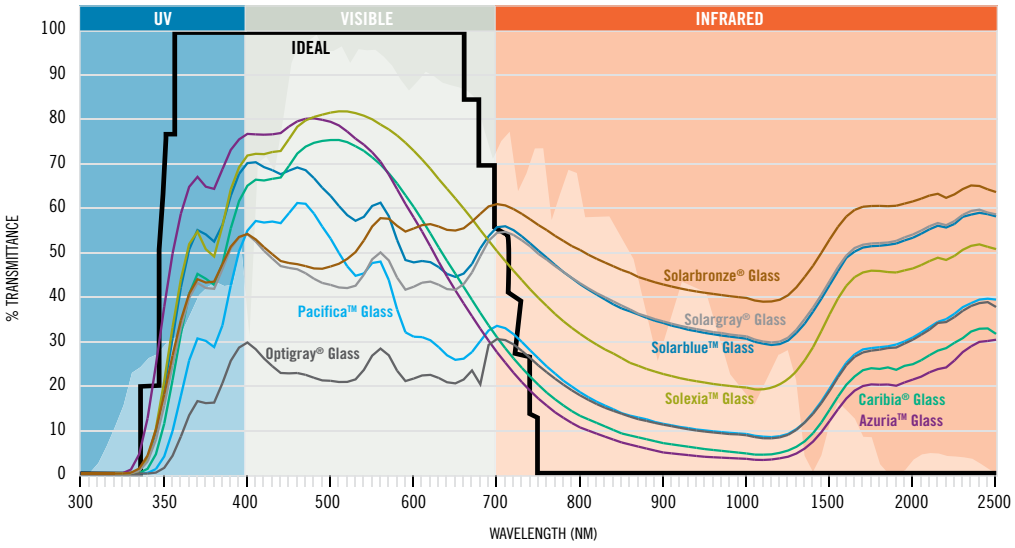
Solexia™ (formerly *Solex*® glass)

Solexia glass is a light-green tinted glass that has provided performance and aesthetic solutions for decades to architects and building owners worldwide. While ***Solexia*** glass has the highest Visible Light Transmittance (VLT) in the ***Oceans of Color*** collection (69 percent in a one-inch insulating glass unit), its light-green color helps subdue interior brightness to foster more pleasant work and living environments. The Light to Solar Gain (LSG) ratio for ***Solexia*** glass is 1.41, with a Solar Heat Gain Coefficient (SHGC) of 0.49.

Pacifica™

Pacifica glass expands the ***Oceans of Color*** collection to include a deeply saturated true blue tint. With a Solar Heat Gain Coefficient (SHGC) of 0.35 and Visible Light Transmittance (VLT) of 38 percent, ***Pacifica*** glass has a Light to Solar Gain (LSG) ratio of 1.07 in a one-inch insulating glass unit with conventional clear glass. Architects who want to make ***Pacifica*** glass *spectrally selective* can team it in an insulating glass unit with ***Solarban*** 70XL glass or ***Solarban*** 60 glass on the second (#2) or third (#3) surface.

Spectral Curve



EARTH & SKY
NATURE-INSPIRED TINTED GLASS BY PPG

To complement the ***Oceans of Color*** collection, PPG offers an expansive series of nature-inspired performance tinted glasses.

SOLARGRAY®
NATURE-INSPIRED TINTED GLASS BY 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 0.45 in a one-inch insulating glass unit.

SOLARBRONZE®
NATURE-INSPIRED TINTED GLASS BY PPG

With a warm, bronze appearance, ***Solarbronze*** glass reduces solar heat gain and glare while providing Visible Light Transmittance (VLT) of 47 percent and Solar Heat Gain Coefficient (SHGC) of 0.51 in a one-inch insulating unit.

SOLARBLUE™
NATURE-INSPIRED TINTED GLASS BY PPG

Solarblue glass features a sparkling, light, sky-blue tint that balances high Visible Light Transmittance (VLT) of 50 percent with a Solar Heat Gain Coefficient (SHGC) of 0.49 in a one-insulating glass unit.

OPTIGRAY® 23
NATURE-INSPIRED TINTED GLASS BY PPG

A medium gray-tinted glass with a warm undertone, ***Optigray*** 23 glass maintains Visible Light Transmittance (VLT) of 21 percent in a one-inch insulating unit and, with a Solar Heat Gain Coefficient (SHGC) of 0.29, blocks 71 percent of the sun's heat energy, the most of any architectural tinted glass product.

OPTIBLUE®
NATURE-INSPIRED TINTED GLASS BY PPG

Developed as a complement to ***Solarban*** z50 glass, ***Optiblue*** glass features a distinctive light, blue-gray tint that blends seamlessly with other ***Solarban*** solar control, low-e coatings.

GRAYLITE®
NATURE-INSPIRED TINTED GLASS BY PPG

Rich, dark-gray ***Graylite*** glass delivers extreme heat load reduction and solar control with distinctive color contrast. With a Solar Heat Gain Coefficient (SHGC) of 0.34 in a one-inch insulating unit and Visible Light Transmittance (VLT) of 12 percent, ***Graylite*** is ideal for glare control and privacy.

(top)
Rosemeade Office Building
Location: *Dallas, TX*
Products: Graylite® *Glass*
Architect: *Haldeman Powell + Partners*
Glass Fabricator: *Vitro America*

(center)
American Family Childrens Hospital
Location: *Madison, WI*
Products: Solarbronze®/Solarban® *60 Glass*
Architect: *HDR Architecture, Inc.*
Glazing Contractor: *Klein-Dickert Glass*
Glass Fabricator: *Oldcastle Glass*

(bottom)
Beverly Headquarters
Location: *Fort Smith, AR*
Products: Graylite® *Glass*
Architect: *Cromwell Architects Engineers*
Glazing Contractor: *Fort Smith Glass*
Glass Fabricator: *Oldcastle Glass*

Victory Building
Location: *Little Rock, AR*
Products: Solarban® *60 Glass/**Solargray®** Glass*
Architect: *Cromwell Architects Engineers*
Glazing Contractor: *Ace Glass*
Glass Fabricator: *Arch Aluminum & Glass Co., Inc.*

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 with a softly reflective appearance that is more understated than the mirror-like aesthetic of traditional reflective glass. ***Vistacool*** glasses are available in four distinct tints that may be combined with ***Solarban*** solar control, low-e coatings to achieve Light to Solar Gain (LSG) ratios as high as 1.66.

Vistacool Azuria Glass

Vistacool Azuria glass offers an exceptionally rich and soothing aqua-blue appearance, together with excellent Visible Light Transmittance (VLT) of 44 percent when teamed with ***Sungate*** 500 glass in a standard one-inch insulating glass unit. With a Solar Heat Gain Coefficient (SHGC) of 0.29, this combination produces a Light to Solar Gain (LSG) ratio of 1.53, among the highest of any reflective glass on the market.

Vistacool Caribia Glass

Vistacool Caribia glass saturates the popular aqua-green tint of ***Caribia*** glass with an added dimension of warmth and luster. When united with ***Solarban*** 60 glass in a one-inch insulating glass unit, ***Vistacool Caribia*** glass offers a rare combination of visible light transmittance and solar control, which is highlighted in its 1.66 Light to Solar Gain (LSG) ratio.

Vistacool Pacifica Glass

Vistacool Pacific glass offers a deep true blue appearance along with a Solar Heat Gain Coefficient (SHGC) of 0.19 when joined in a one-inch insulating glass unit with ***Solarban*** 70XL glass. This exceptional solar control, the best of all the ***Vistacool*** glasses, combines with Visible Light Transmittance (VLT) of 24 percent.

Vistacool Solargray Glass

Vistacool Solargray features an elegant light-gray tint that delivers relatively high levels of interior brightness together with exceptional solar control characteristics. Combined with ***Solarban*** 70XL glass in a one-inch insulating glass unit, ***Vistacool Solargray*** provides Visible Light Transmittance (VLT) of 25 percent and a Solar Heat Gain Coefficient (SHGC) of 0.20.

Vistacool Glasses with Solarban z50 Glass

For more blue-gray appearance options, the ***Vistacool*** coating can be applied to ***Azuria, Caribia, Pacifica*** or ***Solargray*** glass substrates, then assembled with ***Solarban*** z50 glass in a one-inch insulating glass unit. These decadently dark tints have Solar Heat Gain Coefficients (SHGC) as low as 0.21 and can transmit up to 30 percent of visible light. That is significantly higher than similar glasses that project a dark exterior aesthetic.

◀ *Gateway Corporate Center*
Location: Dallas, TX
Products: Vistacool™ Azuria™ Glass
Architect: O'Brien + Associates
Glazing Contractor: B+B Glass Glass
Fabricator: Vitro America
Owner/Developer: Transwestern Dallas

Emerald Stone Condos
Location: Calgary, Alberta
Products: Solarcool®/Azuria™ Glass
Architect: BDKI Architects
Glazing Contractor: Bahrys Glass
Glass Fabricator: Oldcastle Glass
Owner/Developer: Procura Real Estate Services Ltd.

Washington Mutual
Location: Vernon Hills, IL
Products: Solarcool®/Azuria™ Glass
Architect: FCL Builders, Inc.
Glazing Contractor: Alliance Glass & Metal
Glass Fabricator: Oldcastle Glass
Owner/Developer: Washington Mutual

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 one-inch insulating glass unit with clear glass, ***Solarcool*** reflective glasses offer an expansive palette of appearance and performance options with Solar Heat Gain Coefficients (SHGC) ranging from 0.34 to 0.14 and exterior reflectance of up to 37 percent.

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

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

With its unique blue-edge and superior clarity, ***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 PPG-Clear Glasses Up to One-Inch (25 Millimeter) Thicknesses

When conventional clear glass is laminated into multiple layers, or specified in increasing thicknesses, its appearance becomes progressively greener. The opposite occurs with ***Starphire*** glass, whose clarity intensifies as the glass gets thicker.

Architects can now take advantage of this unique attribute by specifying ***Starphire*** Extra-Heavy glass in thicknesses of up to one inch or 25 millimeters. PPG clear glass is available in the same thicknesses.

Solarban® 60 Starphire® Glass

For the ultimate combination of color fidelity and solar control, PPG offers ***Solarban*** 60 ***Starphire*** glass, joining the incomparable transparency of ***Starphire*** glass and the proven solar control performance of ***Solarban*** 60 glass. This competitively priced product enables architects to specify a true ultra-clear aesthetic for vision glass, skylights, atriums, storefronts, entryways and building facades, without sacrificing energy performance.

Comcast Center
Location: *Philadelphia, PA*
Products: ***Solarban®*** *60* ***Starphire®*** *Glass*
Architect: *Robert A.M. Stern Architects*
Glazing Contractor: *Enclos*
Glass Fabricator: *JE Berkowitz*

The 120-foot-high winter garden in Philadelphia's Comcast Center is sheathed in ***Starphire*** *ultra-clear glass by PPG with a* ***Solarban*** *60 solar control, low-e coating. The architects also used* ***Solarban*** *60* ***Starphire*** *glass on a series of three, three-story atria above the winter garden and on the crown and corners of the distinctive 975-foot tower.*

St. Joseph Patient Care Center
Location: *Orange, CA*
Products: Solarban® 80/Solarban® 60 Glass
Architect: *NBBJ*
Glazing Contractor: *Model Glass, LA*
Glass Fabricator: *Northwestern Industries, Inc.*

Photo Courtesy of Tom Kessler

PPG Certified Fabricator® Programs

Regional Sourcing. High-Performance Products. Superior Service.

PPG Certified Fabricator® Network

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 according to the varied parameters of their construction projects.

Collectively, the ***PPG Certified Fabricator*** programs encompass five different initiatives designed to help architects and building owners find a regional supplier for the high-performance fabricated glass products and services they need.

The ***PPG Certified Fabricator Program*** (CFP) represents a nationwide group of elite fabricators who are rigorously trained in the processing of all PPG glass products, including high-performance coated glasses such as ***Solarban*** 70XL glass, ***Solarban*** z50 glass and ***Solarban*** 60 ***Starphire*** glass.

Each year, these PPG partners are subject to comprehensive audits that examine every portion of their business to ensure the highest quality products and services. In return, they offer architects and other customers exclusive access to proprietary high-performance products as well as shorter lead times, improved dry-in times and rapid delivery of replacement glass.

International Certified Fabricator Program

An expansion of the original ***PPG Certified Fabricator Program***, the ICFP provides quality fabricated ***Solarban*** products and services through a network of fabricators located in Asia, Australia, the Mediterranean, the Middle East and South America.

Certified Laminator Program

PPG responded to the growing demand for laminated solar control, low-e glass by creating the ***PPG Certified Laminator Program*** (CLP). This program capitalizes on the industry-leading performance of ***Solarban*** 60 solar control, low-e glass and the expertise of select glass laminator partners to provide an ideal solution for overhead skylights, and safety and security glass applications.

International Certified Laminator Program

A group of PPG-trained and audited laminators in select regions of the world providing quality laminated ***Solarban*** 60 and ***Solarban*** 70XL glasses.

Certified Commercial Window Fabricator Program

The ***Certified Commercial Window Fabricator Program*** (CCWF) was created to help architects and building owners enjoy all the benefits of PPG high-performance glass in the form of a manufactured window. They deliver superior windows along with the same fast turnarounds and outstanding service provided by other PPG certified glass fabricators.

PPG CFP Certified Fabricator® Program · PPG ICFP International Certified Fabricator™ Program · PPG CLP Certified Laminator™ Program · PPG ICLP International Certified Laminator™ Program · PPG CCWF Certified Commercial Window Fabricator™

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**													
3/16	5	88	91	90	8	8	1.03	0.93	5.78	1.04	0.90	1.01
1/4	6	87	91	89	8	8	1.02	0.93	5.75	1.03	0.90	1.01
5/16	8	86	91	88	8	8	1.01	0.91	5.68	1.02	0.89	1.02
3/8	10	85	91	87	8	8	1.00	0.91	5.63	1.02	0.89	1.02
1/2	12	83	90	86	8	8	0.98	0.89	5.53	1.01	0.88	1.03
5/8	16	81	90	84	8	8	0.97	0.88	5.43	1.00	0.87	1.03
3/4	19	80	90	83	8	7	0.95	0.86	5.34	0.99	0.86	1.04
1	25	77	89	80	8	7	0.92	0.84	5.16	0.97	0.84	1.06
CLEAR Glass												
3/16	5	69	89	79	9	7	1.03	0.93	5.78	0.96	0.83	1.07
1/4	6	66	89	77	9	7	1.02	0.93	5.75	0.94	0.81	1.09
5/16	8	61	88	72	8	7	1.01	0.91	5.68	0.90	0.78	1.12
3/8	10	58	87	69	8	7	1.00	0.91	5.63	0.88	0.76	1.14
1/2	12	53	85	64	8	6	0.98	0.89	5.53	0.84	0.72	1.18
5/8	16	48	84	59	8	6	0.97	0.88	5.43	0.80	0.69	1.22
3/4	19	46	83	55	8	6	0.95	0.86	5.34	0.77	0.67	1.24
1	25	40	80	48	8	6	0.92	0.84	5.16	0.72	0.62	1.29
***OPTIBLUE*® Glass**												
1/4	6	44	64	64	6	6	1.02	0.93	5.75	0.84	0.72	0.89
***SOLEXIA*™ Glass**												
3/16	5	35	80	52	8	6	1.03	0.93	5.78	0.75	0.64	1.24
1/4	6	31	77	47	8	6	1.02	0.93	5.75	0.71	0.61	1.26
***ATLANTICA*™ Glass**												
3/16	5	20	71	39	7	5	1.03	0.93	5.78	0.65	0.56	1.27
1/4	6	16	67	34	7	5	1.02	0.93	5.75	0.61	0.52	1.29
***CARIBIA*® Glass**												
3/16	5	28	71	37	7	5	1.03	0.93	5.78	0.63	0.54	1.32
1/4	6	24	68	32	7	5	1.02	0.93	5.75	0.60	0.51	1.33
***AZURIA*™ Glass**												
3/16	5	46	72	36	7	5	1.03	0.93	5.78	0.62	0.54	1.33
1/4	6	42	68	32	7	5	1.02	0.93	5.75	0.59	0.51	1.34
5/16	8	35	61	26	6	5	1.01	0.91	5.68	0.55	0.47	1.30
3/8	10	31	57	23	6	5	1.00	0.91	5.63	0.53	0.45	1.26
***PACIFICA*™ Glass**												
1/4	6	15	42	27	5	5	1.02	0.93	5.75	0.56	0.48	0.88
***SOLARBLUE*™ Glass**												
1/4	6	31	56	47	6	5	1.02	0.93	5.75	0.71	0.61	0.92
***SOLARBRONZE*® Glass**												
3/16	5	30	59	55	6	6	1.03	0.93	5.78	0.77	0.66	0.89
1/4	6	26	53	50	6	6	1.02	0.93	5.75	0.73	0.63	0.84
5/16	8	18	43	39	6	5	1.01	0.91	5.68	0.65	0.56	0.77
3/8	10	14	37	34	5	5	1.00	0.91	5.63	0.61	0.52	0.72
1/2	12	9	27	24	5	5	0.98	0.89	5.53	0.54	0.46	0.59
***SOLARGRAY*® Glass**												
3/16	5	29	50	48	6	5	1.03	0.93	5.78	0.71	0.62	0.81
1/4	6	24	44	42	6	5	1.02	0.93	5.75	0.67	0.58	0.77
5/16	8	17	33	31	5	5	1.01	0.91	5.68	0.59	0.51	0.65
3/8	10	13	28	26	5	5	1.00	0.91	5.63	0.55	0.47	0.59
1/2	12	8	18	17	5	5	0.98	0.89	5.53	0.49	0.41	0.44
***OPTIGRAY*® 23 Glass**												
1/4	6	8	23	19	5	5	1.02	0.93	5.75	0.50	0.42	0.55
***GRAYLITE*® Glass**												
1/4	6	7	14	26	5	5	1.02	0.93	5.75	0.55	0.47	0.29

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).

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	26	19	10	1.02	0.92	5.73	0.52	0.45	1.16
5/16	8	29	46	20	16	9	1.01	0.91	5.66	0.49	0.42	1.10
VISTACOOL™ (2) CARIBIA® Glass												
1/4	6	20	52	26	19	9	1.02	0.92	5.73	0.53	0.45	1.15
5/16	8	14	46	20	16	8	1.01	0.91	5.66	0.49	0.42	1.09
VISTACOOL™ (2) PACIFICA™ Glass												
1/4	6	12	32	22	10	7	1.02	0.93	5.75	0.51	0.44	0.74
VISTACOOL™ (2) SOLARGRAY® Glass												
1/4	6	20	34	35	11	8	1.02	0.92	5.73	0.60	0.52	0.65
5/16	8	14	26	26	8	7	1.01	0.91	5.66	0.54	0.46	0.55
SOLARCOOL® (1) SOLEXIA™ Glass												
1/4	6	9	30	23	37	30	1.03	0.93	5.75	0.43	0.37	0.80
SOLARCOOL® (2) SOLEXIA™ Glass												
1/4	6	9	30	23	23	12	1.03	0.93	5.78	0.50	0.43	0.69
SOLARCOOL® (1) CARIBIA® Glass												
1/4	6	7	26	14	36	30	1.03	0.93	5.75	0.36	0.31	0.83
SOLARCOOL® (2) CARIBIA® Glass												
1/4	6	7	26	14	19	9	1.03	0.93	5.78	0.44	0.38	0.68
SOLARCOOL® (1) AZURIA™ Glass												
3/16	5	13	27	16	36	30	1.03	0.93	5.78	0.37	0.32	0.85
1/4	6	12	26	14	36	30	1.03	0.93	5.75	0.36	0.30	0.86
SOLARCOOL® (2) AZURIA™ Glass												
3/16	5	13	27	16	20	10	1.04	0.94	5.81	0.45	0.38	0.72
1/4	6	12	26	14	19	10	1.03	0.93	5.78	0.44	0.37	0.70
SOLARCOOL® (1) PACIFICA™ Glass												
1/4	6	4	16	13	36	30	1.02	0.93	5.75	0.35	0.30	0.53
SOLARCOOL® (2) PACIFICA™ Glass												
1/4	6	4	16	13	10	7	1.02	0.93	5.75	0.44	0.37	0.43
SOLARCOOL® (1) SOLARBLUE™ Glass												
1/4	6	9	21	24	36	30	1.02	0.93	5.75	0.44	0.38	0.57
SOLARCOOL® (2) SOLARBLUE™ Glass												
1/4	6	9	21	24	14	11	1.02	0.93	5.75	0.51	0.44	0.49
SOLARCOOL® (1) SOLARBRONZE® Glass												
1/4	6	7	21	27	36	30	1.03	0.93	5.75	0.46	0.40	0.52
SOLARCOOL® (2) SOLARBRONZE® Glass												
1/4	6	7	21	27	13	11	1.03	0.93	5.78	0.53	0.46	0.45
SOLARCOOL® (1) SOLARGRAY® Glass												
1/4	6	7	17	23	36	30	1.03	0.93	5.75	0.43	0.37	0.46
SOLARCOOL® (2) SOLARGRAY® Glass												
1/4	6	7	17	23	11	9	1.03	0.93	5.78	0.51	0.43	0.40
SOLARCOOL® (1) GRAYLITE® Glass												
1/4	6	<1	3	4	36	30	1.03	0.93	5.75	0.29	0.24	0.14
SOLARCOOL® (2) GRAYLITE® Glass												
1/4	6	<1	3	4	5	4	1.03	0.93	5.78	0.39	0.33	0.10

* Performance data is based on representative samples of factory production. Actual values may vary slightly due to variations in the production process.

1. **Figures may vary due to manufacturing tolerances. All tabulated data is based on NFRC methodology using the LBNL's Window 5.2 software.**
2. Transmittance and reflectance values based on spectrophotometric measurements and energy distribution of solar radiation.
3. Solar infrared transmittance between 800 and 2150 nm (Parry Moon AM 2 irradiance).
4. **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. Winter nighttime U-values are calculated using an outdoor air temperature of 0°F (-17.8°C), indoor air temperature of of 70°F (21°C), outdoor air velocity of 15 mph (6.7 m/s), indoor air velocity of 0 mph (0 m/s) and a solar intensity of 0 BTU/hour/square foot (0 w/m²). Summer daytime U-values are calculated using an outdoor air temperature of 89°F (32°C), indoor air temperature of 75°F (24°C), outdoor air velocity of 7.5 mph (3.4 m/s), indoor air velocity of 0 mph (0 m/s), and a solar intensity of 248 BTU/hour/square foot (783 w/m²).
5. **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.
6. **Shading Coefficient** is the ratio of the total amount of solar energy that passes through a glass relative to 1/8-in. (3.0 mm) thick clear glass under the same design conditions. It includes both solar energy transmitted directly plus any absorbed solar energy re-radiated and converted. Lower shading coefficient values indicate better performance in reducing summer heat gain. Shading coefficients at outdoor air temperature of 89°F (32°C), outdoor air velocity of 7.5 mph (3.4 m/s), indoor air temperature of 75°F (24°C), indoor air velocity of 0 mph (0 m/s) and solar intensity of 248 BTU /hour/ square foot (783 w/m2).
7. **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.
8. **Light to Solar Gain (LSG) ratio** is the ratio of visible light transmittance to solar heat gain coefficient.

One–inch insulating glass data and comparisons can be found at www.ppgideascapes.com or by calling the PPG Solutions Hotline at 1-888-774-4332.

For data on: *Solargreen*® Glass — see *Atlantica*™ Glass
Solex® Glass — see *Solexia*™ Glass
Azurlite® Glass — see *Azuria*™ Glass

One-Inch Insulating Glass Unit Comparisons with PPG Glass

Insulating Vision Unit Performance Comparisons 1-inch (25mm) units with 1/2-inch (13mm) airspace 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]			Exterior Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[3]		U-Value[4] EN 673 (W/m²*K)	Shading Coeffi-cient[5]	Solar Heat Gain Coeffi-cient[6]	Light to Solar Gain (LSG)[7]
	Ultra-violet %	Visible %	Total Solar Energy %	Visible Light %	Total Solar Energy %	Winter Night-time	Summer Day-time				
Uncoated											
Clear Glass + Clear	50	79	61	15	12	0.47	0.50	2.81	0.81	0.70	1.13
STARPHIRE® + *STARPHIRE*	77	84	80	15	14	0.47	0.50	2.81	0.94	0.82	1.02
SOLEXIA™ + Clear	25	69	39	13	8	0.47	0.50	2.81	0.57	0.49	1.41
ATLANTICA™ + Clear	13	60	29	11	7	0.47	0.50	2.81	0.47	0.40	1.50
CARIBIA® + Clear	20	60	28	11	7	0.47	0.50	2.81	0.45	0.39	1.55
AZURIA™ + Clear	34	61	28	11	7	0.47	0.50	2.81	0.45	0.39	1.56
PACIFICA™ + Clear	12	38	23	7	6	0.47	0.50	2.81	0.41	0.35	1.07
SOLARBLUE™ + Clear	25	50	37	9	7	0.47	0.50	2.81	0.56	0.49	1.03
SOLARBRONZE® + Clear	21	47	39	8	7	0.47	0.50	2.81	0.59	0.51	0.93
SOLARGRAY® + Clear	20	40	33	7	7	0.47	0.50	2.81	0.53	0.45	0.88
OPTIGRAY® 23 + Clear	6	21	15	6	5	0.47	0.50	2.81	0.34	0.29	0.71
GRAYLITE® + Clear	6	12	19	5	5	0.47	0.50	2.81	0.39	0.34	0.36
Coated											
SUNGATE® 500 Low-E Glass											
SUNGATE 500 (2) + Clear	42	74	52	17	14	0.35	0.35	1.96	0.71	0.62	1.19
SOLEXIA + *SUNGATE* 500 (3) Clear	21	64	33	14	9	0.35	0.35	1.96	0.51	0.44	1.45
ATLANTICA + *SUNGATE* 500 (3) Clear	11	56	25	12	7	0.35	0.35	1.96	0.41	0.35	1.60
CARIBIA + *SUNGATE* 500 (3) Clear	17	56	24	12	7	0.35	0.35	1.96	0.40	0.34	1.65
AZURIA + *SUNGATE* 500 (3) Clear	29	57	24	12	7	0.35	0.35	1.96	0.40	0.34	1.66
PACIFICA + *SUNGATE* 500 (3) Clear	10	35	19	7	6	0.35	0.35	1.96	0.35	0.30	1.16
SOLARBLUE + *SUNGATE* 500 (3) Clear	21	46	32	10	9	0.35	0.35	1.96	0.51	0.44	1.06
SOLARBRONZE + *SUNGATE* 500 (3) Clear	18	44	33	9	9	0.35	0.35	1.96	0.53	0.46	0.96
SOLARGRAY + *SUNGATE* 500 (3) Clear	17	37	28	8	8	0.35	0.35	1.96	0.47	0.40	0.92
OPTIGRAY 23 + *SUNGATE* 500 (3) Clear	6	19	13	6	6	0.35	0.35	1.96	0.28	0.24	0.80
GRAYLITE + *SUNGATE* 500 (3) Clear	5	11	16	5	6	0.35	0.35	1.96	0.33	0.28	0.41
SOLARBAN® 60 Solar Control Low-E Glass											
SOLARBAN 60 (2) *STARPHIRE* + *STARPHIRE*	25	74	38	11	43	0.29	0.27	1.55	0.46	0.40	1.85
SOLARBAN 60 (2) Clear + Clear	19	70	33	11	29	0.29	0.27	1.55	0.44	0.38	1.85
SOLARBAN 60 (2) *ATLANTICA* + Clear	5	54	20	8	7	0.29	0.27	1.55	0.31	0.27	1.98
SOLARBAN 60 (2) *AZURIA* + Clear	13	54	21	8	7	0.29	0.27	1.55	0.32	0.28	1.93
SOLARBAN 60 (2) *CARIBIA* + Clear	8	54	20	8	4	0.29	0.27	1.55	0.31	0.27	1.99
SOLARBAN 60 (2) *SOLEXIA* + Clear	10	61	25	10	11	0.29	0.27	1.55	0.36	0.32	1.92
SOLARBAN 60 (2) *PACIFICA* + Clear	5	34	15	6	7	0.29	0.27	1.55	0.26	0.22	1.52
SOLARBAN 60 (2) *SOLARBLUE* + Clear	10	45	21	7	13	0.29	0.27	1.55	0.32	0.28	1.60
SOLARBAN 60 (2) *SOLARBRONZE* + Clear	8	42	20	7	16	0.29	0.27	1.55	0.31	0.27	1.56
SOLARBAN 60 (2) *SOLARGRAY* + Clear	8	35	17	6	12	0.29	0.27	1.55	0.28	0.24	1.47
SOLEXIA + *SOLARBAN* 60 (3) Clear	10	61	25	11	11	0.29	0.27	1.55	0.42	0.36	1.70
ATLANTICA + *SOLARBAN* 60 (3) Clear	5	53	20	9	7	0.29	0.27	1.55	0.35	0.30	1.78
CARIBIA + *SOLARBAN* 60 (3) Clear	8	54	20	9	7	0.29	0.27	1.55	0.35	0.31	1.74
AZURIA + *SOLARBAN* 60 (3) Clear	13	54	21	9	7	0.29	0.27	1.55	0.36	0.31	1.75
PACIFICA + *SOLARBAN* 60 (3) Clear	5	34	15	6	7	0.29	0.27	1.55	0.29	0.25	1.36
SOLARBLUE + *SOLARBAN* 60 (3) Clear	10	45	21	8	13	0.29	0.27	1.55	0.37	0.32	1.39
SOLARBRONZE + *SOLARBAN* 60 (3) Clear	8	42	20	7	17	0.29	0.27	1.55	0.36	0.31	1.36
SOLARGRAY + *SOLARBAN* 60 (3) Clear	8	35	17	7	13	0.29	0.27	1.55	0.32	0.28	1.26
OPTIGRAY 23 + *SOLARBAN* 60 (3) Clear	3	18	9	5	6	0.29	0.27	1.55	0.21	0.18	1.02
GRAYLITE + *SOLARBAN* 60 (3) Clear	2	11	7	5	10	0.29	0.27	1.55	0.20	0.17	0.64
SOLARBAN® 70XL Solar Control Low-E Glass †											
SOLARBAN 70XL (2) + Clear	6	64	25	12	52	0.28	0.26	1.50	0.32	0.27	2.37
SOLARBAN 70XL (2) *SOLEXIA* + Clear	3	54	19	10	12	0.28	0.26	1.50	0.29	0.25	2.18
SOLARBAN 70XL (2) ATLANTICA + Clear	2	48	16	9	8	0.28	0.26	1.50	0.26	0.23	2.07
SOLARBAN 70XL (2) *CARIBIA* + Clear	2	48	16	9	7	0.28	0.26	1.50	0.27	0.23	2.07
SOLARBAN 70XL (2) *AZURIA* + Clear	4	48	17	9	7	0.28	0.26	1.50	0.27	0.23	2.09
SOLARBAN 70XL (2) *PACIFICA* + Clear	1	30	11	6	7	0.28	0.26	1.50	0.21	0.18	1.63
SOLARBAN 70XL (2) *SOLARBLUE* + Clear	3	40	15	7	15	0.28	0.26	1.50	0.25	0.21	1.84
SOLARBAN 70XL (2) *SOLARBRONZE* + Clear	2	37	14	7	19	0.28	0.26	1.50	0.23	0.20	1.87
SOLARBAN 70XL (2) *SOLARGRAY* + Clear	2	31	12	7	15	0.28	0.26	1.50	0.22	0.19	1.65
SOLEXIA + *SOLARBAN* 70XL (3)	3	56	20	11	13	0.28	0.26	1.50	0.37	0.32	1.74
ATLANTICA + *SOLARBAN* 70XL (3)	2	49	17	10	8	0.28	0.26	1.50	0.32	0.28	1.74
CARIBIA + *SOLARBAN* 70XL (3)	2	49	17	9	8	0.28	0.26	1.50	0.32	0.28	1.75
AZURIA + *SOLARBAN* 70XL (3)	4	49	17	10	8	0.28	0.26	1.50	0.33	0.29	1.70
PACIFICA + *SOLARBAN* 70XL (3)	2	31	12	6	7	0.28	0.26	1.50	0.26	0.22	1.30
SOLARBLUE + *SOLARBAN* 70XL (3)	3	41	16	8	16	0.28	0.26	1.50	0.32	0.27	1.48
SOLARBRONZE + *SOLARBAN* 70XL (3)	3	38	15	8	20	0.28	0.26	1.50	0.30	0.26	1.48
SOLARGRAY + *SOLARBAN* 70XL (3)	2	32	13	7	15	0.28	0.26	1.50	0.27	0.24	1.34
OPTIGRAY 23 + *SOLARBAN* 70XL (3)	1	17	7	5	7	0.28	0.26	1.50	0.19	0.16	1.04
GRAYLITE + *SOLARBAN* 70XL (3)	1	10	5	5	11	0.28	0.26	1.50	0.16	0.14	0.71

One-Inch Insulating Glass Unit Comparisons with PPG Glass

Insulating Vision Unit Performance Comparisons 1-inch (25mm) units with 1/2-inch (13mm) airspace 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]			Exterior Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[3]		U-Value[4] EN 673 (W/m²*K)	Shading Coeffi-cient[5]	Solar Heat Gain Coeffi-cient[6]	Light to Solar Gain (LSG)[7]
	Ultra-violet %	Visible %	Total Solar Energy %	Visible Light %	Total Solar Energy %	Winter Night-time	Summer Day-time				
Coated											
SOLARBAN® 80 Solar Control Low-E Glass											
SOLARBAN 80 (2) Clear + Clear	13	48	20	33	38	0.29	0.27	1.52	0.28	0.24	1.98
SOLARBAN 80 (2) Clear + *OPTIBLUE*[††]	10	34	15	32	38	0.29	0.27	1.52	0.27	0.23	1.48
SOLARBAN 80 (2) *OPTIBLUE* + Clear	9	34	15	19	28	0.29	0.27	1.52	0.23	0.20	1.70
SOLARBAN 80 (2) *OPTIBLUE* + *OPTIBLUE*	7	25	11	19	28	0.29	0.27	1.52	0.23	0.20	1.23
SOLARBAN® z50 Solar Control Low-E Glass[††]											
SOLARBAN z50 (2) *OPTIBLUE* + Clear	14	51	26	8	23	0.29	0.27	1.55	0.36	0.31	1.64
SOLARBAN z50 (2) *OPTIBLUE* + *OPTIBLUE*	11	37	20	7	23	0.29	0.27	1.55	0.35	0.31	1.18
AZURIA + *SOLARBAN* z50 (3) *OPTIBLUE*	10	39	16	8	7	0.29	0.27	1.55	0.35	0.30	1.31
ATLANTICA + *SOLARBAN* z50 (3) *OPTIBLUE*	4	39	15	8	7	0.29	0.27	1.55	0.34	0.30	1.28
CARIBIA +*SOLARBAN* z50 (3) *OPTIBLUE*	6	39	15	8	7	0.29	0.27	1.55	0.34	0.30	1.29
SOLEXIA + *SOLARBAN* z50 (3) *OPTIBLUE*	8	44	19	10	11	0.29	0.27	1.55	0.41	0.35	1.26
PACIFICA + *SOLARBAN* z50 (3) *OPTIBLUE*	4	25	12	6	7	0.29	0.27	1.55	0.28	0.24	1.01
SOLARBLUE + *SOLARBAN* z50 (3) *OPTIBLUE*	8	32	17	7	13	0.29	0.27	1.55	0.36	0.31	1.03
SOLARBRONZE + *SOLARBAN* z50 (3) *OPTIBLUE*	7	30	16	7	17	0.29	0.27	1.55	0.35	0.31	0.98
SOLARGRAY + *SOLARBAN* z50 (3) *OPTIBLUE*	6	25	14	6	13	0.29	0.27	1.55	0.32	0.28	0.91
SOLARBAN® R100 Solar Control Low-E Glass											
SOLARBAN R100 (2) + Clear	12	42	19	32	41	0.29	0.27	1.55	0.27	0.23	1.79
SOLARBAN R100 (2) *STARPHIRE* + *STARPHIRE*	16	44	21	33	57	0.29	0.27	1.55	0.27	0.23	1.87
SOLARBAN R100 (2) *AZURIA* + Clear	8	32	12	21	11	0.29	0.27	1.55	0.22	0.19	1.66
SOLARBAN R100 (2) *ATLANTICA* + Clear	3	31	12	20	11	0.29	0.27	1.55	0.22	0.19	1.67
SOLARBAN R100 (2) *CARIBIA* + Clear	5	32	12	20	11	0.29	0.27	1.55	0.22	0.19	1.67
SOLARBAN R100 (2) *SOLEXIA* + Clear	6	36	15	25	17	0.29	0.27	1.55	0.24	0.21	1.72
SOLARBAN R100 (2) *OPTIBLUE* + Clear	8	30	14	19	31	0.29	0.27	1.55	0.23	0.20	1.50
SOLARBAN R100 (2) *PACIFICA* + Clear	3	20	9	11	9	0.29	0.27	1.55	0.19	0.16	1.24
SOLARBAN R100 (2) *SOLARBLUE* + Clear	6	26	12	15	17	0.29	0.27	1.55	0.22	0.19	1.40
SOLARBAN R100 (2) *SOLARBRONZE* + Clear	5	25	11	15	20	0.29	0.27	1.55	0.21	0.18	1.38
SOLARBAN R100 (2) *SOLARGRAY* + Clear	5	21	10	12	16	0.29	0.27	1.55	0.19	0.17	1.23
VISTACOOL™ Subtly Reflective Glass											
VISTACOOL (2) *AZURIA* + Clear	29	47	22	21	11	0.47	0.50	2.81	0.39	0.34	1.39
VISTACOOL (2) *CARIBIA* + Clear	16	47	22	21	10	0.47	0.50	2.81	0.39	0.34	1.38
VISTACOOL (2) *PACIFICA* + Clear	10	29	19	11	8	0.47	0.50	2.81	0.37	0.31	0.93
VISTACOOL (2) *SOLARGRAY* + Clear	17	31	28	17	9	0.47	0.50	2.81	0.47	0.40	0.77
SOLARCOOL® Reflective Glass											
SOLARCOOL (1) *SOLEXIA* + Clear	7	27	18	37	31	0.47	0.50	2.81	0.32	0.28	0.96
SOLARCOOL (2) *SOLEXIA* + Clear	7	27	19	24	12	0.48	0.50	2.82	0.36	0.31	0.87
SOLARCOOL (1) *CARIBIA* + Clear	6	23	12	37	30	0.47	0.50	2.81	0.25	0.22	1.05
SOLARCOOL (2) *CARIBIA* + Clear	6	24	12	19	9	0.48	0.50	2.82	0.30	0.25	0.94
SOLARCOOL (1) *AZURIA* + Clear	10	23	11	37	30	0.47	0.50	2.81	0.25	0.21	1.10
SOLARCOOL (2) *AZURIA* + Clear	10	24	12	20	10	0.48	0.50	2.82	0.29	0.25	0.95
SOLARCOOL (1) *PACIFICA* + Clear	4	14	10	36	30	0.47	0.50	2.81	0.24	0.21	0.69
SOLARCOOL (2) *PACIFICA* + Clear	4	15	11	10	7	0.47	0.50	2.81	0.29	0.25	0.59
SOLARCOOL (1) *SOLARBLUE* + Clear	7	19	19	37	31	0.47	0.50	2.81	0.33	0.28	0.67
SOLARCOOL (2) *SOLARBLUE* + Clear	7	20	19	15	11	0.47	0.50	2.81	0.37	0.32	0.61
SOLARCOOL (1) *SOLARBRONZE* + Clear	6	18	21	37	31	0.47	0.50	2.81	0.35	0.31	0.59
SOLARCOOL (2) *SOLARBRONZE* + Clear	6	19	21	14	12	0.48	0.50	2.82	0.40	0.34	0.55
SOLARCOOL (1) *SOLARGRAY* + Clear	6	15	17	37	30	0.47	0.50	2.81	0.32	0.27	0.57
SOLARCOOL (2) *SOLARGRAY* + Clear	6	16	18	11	10	0.48	0.50	2.82	0.36	0.31	0.50
SOLARCOOL (1) *GRAYLITE* + Clear	<1	3	4	36	30	0.47	0.50	2.81	0.17	0.14	0.21
SOLARCOOL (2) *GRAYLITE* + Clear	1	3	4	5	4	0.48	0.50	2.82	0.22	0.19	0.17
VISTACOOL™ and ***SOLARCOOL***® with ***SUNGATE***® 500 Low-E (3)											
VISTACOOL (2) *AZURIA* + *SUNGATE* 500 (3) Clear	24	44	19	22	11	0.35	0.35	1.96	0.34	0.29	1.53
VISTACOOL (2) *CARIBIA* + *SUNGATE* 500 (3) Clear	14	44	19	22	11	0.35	0.35	1.96	0.34	0.29	1.51
VISTACOOL (2) *PACIFICA* + *SUNGATE* 500 (3) Clear	9	27	16	11	8	0.35	0.35	1.96	0.31	0.27	1.03
VISTACOOL (2) *SOLARGRAY* + *SUNGATE* 500 (3) Clear	14	29	23	12	10	0.35	0.35	1.96	0.41	0.35	0.83
SOLARCOOL (2) *PACIFICA* + *SUNGATE* 500 (3) Clear	3	14	9	10	7	0.35	0.35	1.96	0.23	0.20	0.70
SOLARCOOL (2) *SOLEXIA* + *SUNGATE* 500 (3) Clear	6	25	15	24	13	0.35	0.35	1.96	0.31	0.26	0.98
SOLARCOOL (2) *CARIBIA* + *SUNGATE* 500 (3) Clear	5	22	10	19	10	0.35	0.35	1.96	0.24	0.20	1.11
SOLARCOOL (2) *AZURIA* + *SUNGATE* 500 (3) Clear	8	22	10	20	10	0.35	0.35	1.96	0.23	0.20	1.11
SOLARCOOL (2) *SOLARBLUE* + *SUNGATE* 500 (3) Clear	6	18	15	15	12	0.35	0.35	1.96	0.32	0.27	0.67
SOLARCOOL (2) *SOLARBRONZE* + *SUNGATE* 500 (3) Clear	5	18	17	14	13	0.35	0.35	1.96	0.34	0.29	0.61
SOLARCOOL (2) *SOLARGRAY* + *SUNGATE* 500 (3) Clear	5	15	14	11	10	0.35	0.35	1.96	0.30	0.26	0.56
SOLARCOOL (2) *GRAYLITE* + *SUNGATE* 500 (3) Clear	<1	3	3	5	5	0.35	0.35	1.96	0.16	0.14	0.21

One-Inch Insulating Glass Unit Comparisons with PPG Glass

Insulating Vision Unit Performance Comparisons 1-inch (25mm) units with 1/2-inch (13mm) airspace 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]			Exterior Reflectance[2]		(BTU/hr•ft²°F) NFRC U-Value[3]		U-Value[4] EN 673 (W/m²*K)	Shading Coeffi-cient[5]	Solar Heat Gain Coeffi-cient[6]	Light to Solar Gain (LSG)[7]
	Ultra-violet %	Visible %	Total Solar Energy %	Visible Light %	Total Solar Energy %	Winter Night-time	Summer Day-time				
Coated											
VISTACOOL™ and ***SOLARCOOL***® with ***SOLARBAN***® 60 Solar Control Low-E (3)											
VISTACOOL (2) *AZURIA* + *SOLARBAN* 60 (3) Clear	11	42	16	20	11	0.29	0.27	1.55	0.30	0.26	1.61
VISTACOOL (2) *CARIBIA* + *SOLARBAN* 60 (3) Clear	7	42	16	20	11	0.29	0.27	1.55	0.29	0.25	1.66
VISTACOOL (2) *PACIFICA* + *SOLARBAN* 60 (3) Clear	4	26	12	11	9	0.29	0.27	1.55	0.24	0.21	1.23
VISTACOOL (2) *SOLARGRAY* +*SOLARBAN* 60 (3) Clear	7	27	14	11	15	0.29	0.27	1.55	0.28	0.24	1.13
SOLARCOOL (2) *PACIFICA* + *SOLARBAN* 60 (3) Clear	2	13	6	10	8	0.29	0.27	1.55	0.17	0.15	0.89
SOLARCOOL (2) *SOLEXIA* + *SOLARBAN* 60 (3) Clear	3	24	10	24	15	0.29	0.27	1.55	0.22	0.19	1.26
SOLARCOOL (2) *CARIBIA* + *SOLARBAN* 60 (3) Clear	2	21	8	19	10	0.29	0.27	1.55	0.19	0.16	1.30
SOLARCOOL (2) *AZURIA* + *SOLARBAN* 60 (3) Clear	4	21	8	19	10	0.29	0.27	1.55	0.19	0.16	1.31
SOLARCOOL (2) *SOLARBLUE* + *SOLARBAN* 60 (3) Clear	3	17	9	14	15	0.29	0.27	1.55	0.21	0.18	0.97
SOLARCOOL (2) *SOLARBRONZE* +*SOLARBAN* 60 (3) Clear	3	17	9	14	18	0.29	0.27	1.55	0.21	0.18	0.92
SOLARCOOL (2) *SOLARGRAY* + *SOLARBAN* 60 (3) Clear	2	14	7	11	14	0.29	0.27	1.55	0.19	0.16	0.86
SOLARCOOL (2) *GRAYLITE* + *SOLARBAN* 60 (3) Clear	<1	3	2	5	5	0.29	0.27	1.55	0.12	0.10	0.28
VISTACOOL™ and ***SOLARCOOL***® with ***SOLARBAN***® z50 Solar Control Low-E											
VISTACOOL (2) *AZURIA* + *SOLARBAN* z50 (3) *OPTIBLUE*	9	30	12	20	11	0.29	0.27	1.55	0.29	0.25	1.20
VISTACOOL (2) *CARIBIA* + *SOLARBAN* z50 (3) *OPTIBLUE*	5	30	12	20	11	0.29	0.27	1.55	0.29	0.25	1.20
VISTACOOL (2) *PACIFICA* + *SOLARBAN* z50 (3) *OPTIBLUE*	4	19	9	11	9	0.29	0.27	1.55	0.24	0.21	0.91
VISTACOOL (2) *SOLARGRAY* + *SOLARBAN* z50 (3) *OPTIBLUE*	5	20	11	11	15	0.29	0.27	1.55	0.27	0.24	0.82
SOLARCOOL (2) *PACIFICA* + *SOLARBAN* z50 (3) *OPTIBLUE*	1	9	4	10	8	0.29	0.27	1.55	0.17	0.14	0.65
SOLARCOOL (2) *SOLARBLUE* + *SOLARBAN* z50 (3) *OPTIBLUE*	2	12	7	14	15	0.29	0.27	1.55	0.20	0.17	0.71
SOLARCOOL (2) *GRAYLITE* + *SOLARBAN* z50 (3) *OPTIBLUE*	<1	2	1	5	5	0.29	0.27	1.55	0.12	0.10	0.20
VISTACOOL™ and ***SOLARCOOL***® with ***SOLARBAN***® 70XL Solar Control Low-E (3) †											
VISTACOOL (2) *AZURIA* + *SOLARBAN* 70XL (3)	4	38	14	21	12	0.28	0.26	1.50	0.27	0.24	1.59
VISTACOOL (2) *CARIBIA* +*SOLARBAN* 70XL (3)	2	38	13	20	11	0.28	0.26	1.50	0.27	0.23	1.65
VISTACOOL (2) *PACIFICA* + *SOLARBAN* 70XL (3)	1	24	9	11	9	0.28	0.26	1.50	0.22	0.19	1.24
VISTACOOL (2) *SOLARGRAY* + *SOLARBAN* 70XL (3)	2	25	10	11	17	0.28	0.26	1.50	0.23	0.20	1.24
SOLARCOOL (2) *SOLEXIA* + *SOLARBAN* 70XL (3)	1	22	8	24	16	0.28	0.26	1.50	0.20	0.17	1.28
SOLARCOOL (2) *CARIBIA* + *SOLARBAN* 70XL (3)	1	19	6	19	10	0.28	0.26	1.50	0.18	0.15	1.27
SOLARCOOL (2) *AZURIA* + *SOLARBAN* 70XL (3)	1	19	7	19	10	0.28	0.26	1.50	0.18	0.15	1.27
SOLARCOOL (2) *PACIFICA* + *SOLARBAN* 70XL (3)	1	12	4	10	8	0.28	0.26	1.50	0.15	0.13	0.89
SOLARCOOL (2) *SOLARBLUE* + *SOLARBAN* 70XL (3)	1	16	6	14	16	0.28	0.26	1.50	0.18	0.15	1.03
SOLARCOOL (2) *SOLARBRONZE* + *SOLARBAN* 70XL (3)	1	15	6	14	19	0.28	0.26	1.50	0.17	0.15	1.01
SOLARCOOL (2) *SOLARGRAY* + *SOLARBAN* 70XL (3)	1	13	5	11	15	0.28	0.26	1.50	0.16	0.14	0.89
SOLARCOOL (2) *GRAYLITE* + *SOLARBAN* 70XL (3)	< 1	3	1	5	5	0.28	0.26	1.50	0.11	0.09	0.27

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

†† ***Optiblue*** is a unique substrate by PPG designed specifically for ***Solarban*** z50 glass. It can also be used for spandrel glass and as an interior lite for ***Solarban*** 80 glass.

1. **Performance data is based on representative samples of factory production. Actual values may vary due to the production process and manufacturing tolerances. All tabulated data is based on NFRC methodology using the LBNL Window 5.2 software. Variations from previously published data are due to minor changes in the LBNL Window 5.2 software versus Version 4.1.**
2. **Transmittance and Reflectance** values are 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. Note: Performance values were calculated using the LBNL Window 5.2 program using NFRC 100-2001 standard winter and summer design condition.
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.

Seattle Space Needle Visitors Center
Location: *Seattle, WA*
Products: Solarban® *60 Glass*
Architect: *Callison Architecture Inc.*
Glazing Contractor: *All New Glass, Evergreen House, Inc.*
Glass Fabricator: *Northwestern Industries, Inc.*

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