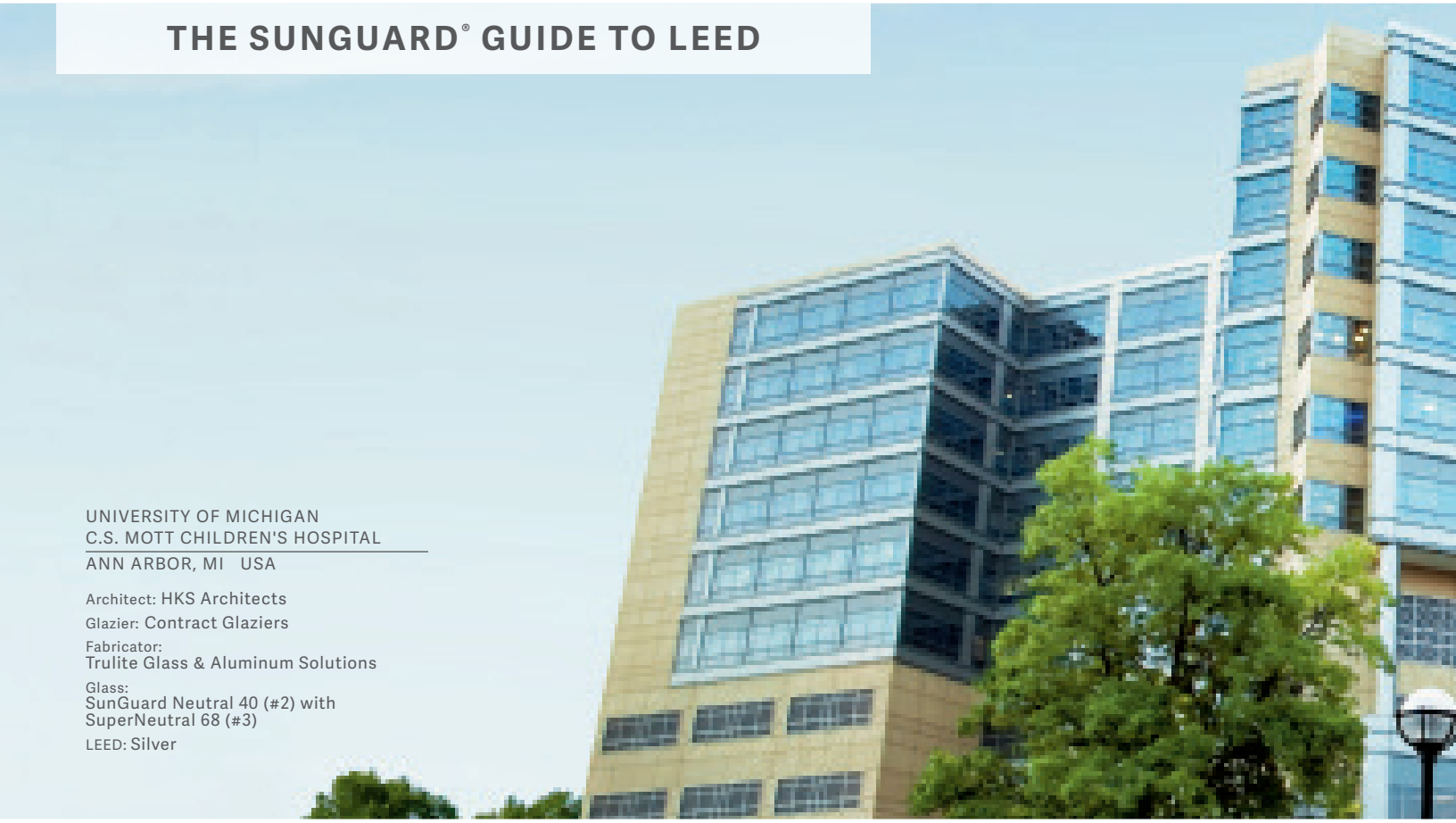
GUARDIAN SUNGUARD®

Advanced Architectural Glass

www.SunGuardGlass.com
1-866-GuardSG (482-7374)

THE SUNGUARD® GUIDE TO LEED



UNIVERSITY OF MICHIGAN
C.S. MOTT CHILDREN'S HOSPITAL
ANN ARBOR, MI USA

Architect: HKS Architects
Glazier: Contract Glaziers
Fabricator:
Trulite Glass & Aluminum Solutions
Glass:
SunGuard Neutral 40 (#2) with
SuperNeutral 68 (#3)
LEED: Silver

GUARDIAN GLASS

See what's possible™

 v1.2019

EARN LEED POINTS WHEN YOU **BUILD WITH LIGHT®**

THE SUNGUARD® GUIDE TO LEED

We make buildings greener. With Advanced Architectural Glass.

v3 - LEED 2009
and
v4 - LEED v4

GUARDIAN SUNGUARD®
Advanced Architectural Glass

When you're looking at LEED, look to SunGuard from Guardian Glass.

LEED means leadership in greener buildings.

Building design that enhances the indoor environment while protecting the natural environment – that's the goal of the Leadership in Energy and Environmental Design (LEED) rating system, developed by the U.S. Green Building Council.

The LEED system promotes sustainable buildings, awarding points for reducing energy use, improving indoor environmental quality and promoting a whole-building approach to sustainability. LEED-certified buildings typically cost less to operate, have faster lease-up rates, may qualify for incentives like tax rebates and zoning allowances and retain higher property values. While LEED does not certify specific products, using SunGuard Advanced Architectural Glass along with other factors may help your project earn LEED points.

In most cases, LEED compliance is voluntary, although more and more public- and private-sector clients are making it mandatory. In either case, we believe that ecologically responsible building is simply the right thing to do.

Committed to the environment.

Guardian Glass is proud to be a member of the U.S. Green Building Council, a coalition of building-industry leaders that promotes and creates environmentally responsible structures.

SunGuard glass improves the environment – inside and out.

Few materials can make a building greener faster than high-performance glass. And as one of the world's leading producers of architectural glass, Guardian is well qualified to help your project earn LEED points. Our SunGuard products offer the largest selection of post-temperable sputter-coated glass in the world, giving you the striking appearance you want, while delivering the comfort, functionality and energy savings you need.

This brochure shows you how SunGuard Advanced Architectural Glass can help your project earn credit points in six LEED categories. If you'd like more details, call Guardian Glass at +97172058000 or visit www.guardianglass.com.

DUBAI OPERA
DOWNTOWN DUBAI, UAE

Architect: Atkins Dubai
Glazier: Al Ghurair
Fabricator: GlassBel
Glass: Sunguard SN 70/37

Guardian Glass SunGuard Manufacturing.

Float glass begins with mountains of silica sand and select raw materials, heated to a liquid state and floated on a bath of molten tin to produce a perfect ribbon of glass. Guardian brings the process and results of glassmaking to new levels, applying deep knowledge of chemistry, physics and advanced technologies to create glass with optimal light transmission, clarity and integrity for custom treatments and fabrication. After the float glass is made, Guardian applies a wide variety of SunGuard low-E vacuum-deposition sputter coatings to improve solar and thermal performance.

Guardian makes float glass and SunGuard coated products at multiple locations in North America and around the world. Manufacturing location and the source of materials and resources may have an impact on LEED credits earned.

AFRICA & MIDDLE EAST FLOAT GLASS MANUFACTURING	
Al Jubail, Saudi Arabia	P.O.BOX 11963, ALJUBAIL 31961, gulfguardinsidesales@guardian.com
Ras Al Khaimah, UAE	P.O.BOX 6297, ALJAZIRAH AL HAMRA, raktac@guardian.com
Cairo, Egypt	P.O.BOX 1015, INDUSTRIAL AREA A1
Gujarat, India	Isanpur, Ahmedabad, Gujarat 382405, India
Nong Khae, Thailand	42 Moo 7 Nong Plamoh Subdistrict, Nongkhae, Saraburi 18140
Rayong, Thailand	Nong Lalok, Ban Khai District, Rayong 21120

Earning LEED points in six categories.

LEED for New Construction is a voluntary standard for developing high-performance sustainable buildings. Using SunGuard glass can boost your LEED score in up to six categories. Some are very apparent; others you may not think of at first. Ultimately, SunGuard Advanced Architectural Glass can help you maximize your building's appearance without compromising its energy performance.

There are two versions of LEED currently in effect: v3-LEED 2009 and the new LEED v4. Design professionals can choose to register new projects under either version until October 31, 2016. At that time, all new project registrations must use v4. Projects registered with LEED 2009 may continue to provide submittals for certification until June 6, 2021, when this rating system closes.

The LEED scoring system.

To qualify as LEED-certified, a building must score at least 40 of 110 possible points. Higher levels of compliance are possible, indicating higher levels of energy efficiency and environmental sustainability.

LEVEL OF COMPLIANCE	LEED POINTS
CERTIFIED	40-49
SILVER	50-59
GOLD	60-79
PLATINUM	80+

Guardian Glass Sustainability Calculator.

Although LEED does not certify specific products, using SunGuard Advanced Architectural Glass may help your project earn LEED points. Guardian Glass offers design professionals our Sustainability Calculator online to help evaluate and document environmental performance during the project design phase. Go to SunGuardGlass.com to find a SunGuard Advanced Architectural Glass product, and other Guardian glass products, to help your project achieve LEED certification.

The charts on the following pages further illustrate LEED categories and credits, in addition to SunGuard solutions for complying with LEED standards.

GUARDIAN SUNGUARD
Advanced Architectural Glass

v3 - LEED 2009: Scoring and Solutions

LEED CATEGORY	LEED CREDIT	LEED POINTS	THE INTENT
SUSTAINABLE SITES	SSpc55: Bird Collision Deterrence.	1 point.	Reduce bird injury and mortality from in-flight collisions with buildings.
ENERGY AND ATMOSPHERE	EAc1: Optimize Energy Performance.	Up to 19 points.	To increase energy performance above the prerequisite standard, reducing the environmental impact of excessive energy use.
MATERIALS AND RESOURCES	MRc4: Recycled Content: 10% - 20% (post-consumer + 1/2 pre-consumer).	Up to 2 points.	To increase demand for building products using recycled materials, reducing the need to extract and process new materials.
	MRc5: Regional Materials: 10% - 20% extracted, processed and manufactured regionally.	Up to 2 points.	To increase demand for building materials and products extracted or manufactured regionally, reducing the pollution caused by transporting them.

THE REQUIREMENTS	GUARDIAN SUNGUARD SOLUTIONS
Develop a building façade design strategy to make the building visible as a physical barrier and eliminate conditions that create confusing reflections to birds.	Guardian has SunGuard® products tested by the American Bird Conservancy to help deter bird collisions and meet the requirements for this pilot credit.
Here are three ways to comply: Option 1: Reduce energy costs compared to baseline performance rating per ANSI/ASHRAE/IESNA Standard 90.1-2007, as demonstrated by a whole-building simulation using the Building Performance Rating Method in Appendix G of the Standard. **- OR -** Option 2: Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide appropriate to the project scope. **- OR -** Option 3: Comply with the prescriptive measures identified in the Advanced Buildings™ Core Performance™ Guide developed by the New Buildings Institute.	Our SuperNeutral®,High Performance and Solar products give you a wide spectrum of beautiful, energy-saving choices, with varying degrees of light transmission and reflectivity. So you're truly able to build with light. Choose from 12 types of SunGuard Advanced Architectural Glass. Most SunGuard Advanced Architectural Glass will meet the U.S. Department of Energy's "spectrally selective" definition: a light to solar gain (LSG) ratio of 1.25 or higher. SunGuard LSG ratios can approach 2.0. And all SunGuard products meet or exceed local and/or national energy codes. SunGuard SuperNeutral 68, SNX 62/27, SuperNeutral 54 and SNX 51/23 allow high visible light transmittance with maximum solar control. In addition, several SunGuard coatings can be placed on the #3 surface in combination with a tinted or coated outboard lite to optimize energy savings in your region. For varying degrees of color and solar heat gain coefficients, consider SunGuard's High Performance series: Neutral 78/65, Neutral 50 & Neutral 40. AG 43 and AG 50 combine energy-efficient performance with medium reflectivity and light transmission.
Use materials in such a way that the sum of post-consumer recycled content plus one-half of pre-consumer content constitutes at least 10% or 20%, based on cost, of the total value of materials in the project.	Guardian float glass, including SunGuard Advanced Architectural Glass, may contain recycled glass, of which a small amount may be pre-consumer content. Under LEED guidelines, only scrap glass brought in from other manufacturing facilities can qualify as pre-consumer, so the percentage varies depending on the location of the factory and available supply. To find the pre-consumer percentage for the Guardian factory nearest you, call 1-866-GuardSG (482-7374), or use SunGuardGlass.com's Sustainability Calculator to evaluate your project for this credit and more.
Use building materials or products that have been extracted, harvested or recovered, as well as manufactured, within 500 miles of the project site for a minimum of 10% or 20% (based on cost) of the total materials value. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the region value.	The primary raw material for architectural glass is silica sand. Most Guardian plants are within 500 miles of their sand supply, which reduces energy spent in transit – and can earn LEED points. Also, with our extensive network of independent Guardian Select® Fabricators, chances are excellent that there's one within 500 miles of your project – which can contribute to the Regional Materials LEED credit. Guardian manufactures SunGuard coatings at multiple locations in the U.S. For a Guardian Select Fabricator near you (there are over 100), call SunGuard at 1-866-GuardSG (482-7374) or visit SunGuardGlass.com.

While LEED does not certify specific products, using SunGuard Advanced Architectural Glass along with other factors may help your project earn LEED points.

v3 - LEED 2009: Scoring and Solutions

LEED CATEGORY	LEED CREDIT	LEED POINTS	THE INTENT
INDOOR ENVIRONMENTAL QUALITY	EQc8.1: Daylight and Views: Daylight for 75% of spaces.	1 point.	To provide a building's occupants with a connection between indoor and outdoor spaces, by allowing daylight into, and providing views from, regularly occupied spaces in the building.
	EQc8.2: Daylight and Views: Views for 90% of spaces.	1 point.	
INNOVATION AND DESIGN PROCESS	IDc1: Innovation in Design.	Up to 5 points.	To award points for exceptional performance above LEED-NC requirements and/or innovative performance in Green Building categories not specifically addressed by the LEED-NC Green Building Rating System.
REGIONAL PRIORITY	RPc1: Regional Priority.	Up to 4 points.	To award bonus points for achieving existing credits that USGBC chapters and regional councils have designated as important environmental issues facing the region in which the project is located.

THE REQUIREMENTS	GUARDIAN SUNGUARD SOLUTIONS
To achieve daylight penetration to 75% of regularly occupied spaces. There are three ways to comply: Option 1: Achieve a minimum of 2% glazing factor by calculation method. **- OR -** Option 2: Computer simulation demonstrating a minimum daylight illumination level of 25 footcandles. **- OR -** Option 3: Records of indoor light measurements indicating a minimum of 25 footcandles. Some spaces are excluded from these requirements, such as copy rooms, storage areas, mechanical plant rooms, laundry rooms and other low-occupancy support areas. Exceptions can also be made for areas where daylight could actually hinder tasks. Decisions are made based on the merits of each individual case. Same as above but achieve a direct line of sight to vision glazing for building occupants in 90% of all regularly occupied spaces.	SunGuard® Advanced Architectural Glass provides a wide range of thermal and light control, giving you maximum design flexibility. SunGuard Neutral 78/65 provides the highest visible light transmittance at 78%. SunGuard SuperNeutral® 68, SNX 62/27, SuperNeutral 54 and SNX 51/23 all allow high visible light transmittance, yet are also among the highest-performing coated glass products available. Guardian also offers other SunGuard coated glass products with various light transmissions and appearances to to help you realize your vision. And, of course, SunGuard Advanced Architectural Glass: • Meets or exceeds local and/or national energy codes. • Many coatings are available on UltraClear™, clear, green, CrystalGray®, gray and CrystalBlue™ substrates. • Meets the U.S. Department of Energy's "spectrally selective" definition with light to solar gain ratios of up to 2.30. For more details, call 1-866-GuardSG (482-7374) or go to SunGuardGlass.com to find a Guardian Architectural Design Manager.
In writing, identify the intent of the proposed innovation credit, the proposed requirement for compliance, the proposed submittals to demonstrate compliance and the design approach (strategies) that might be used to meet the requirements.	SunGuard Advanced Architectural Glass products can provide energy performance that substantially exceeds energy code requirements. Please contact your Guardian Architectural Design Manager for more information on the right product for your project.
Implement green building strategies that address the important environmental issues facing the region in which the project is located. There are six LEED credits that are prioritized, based on the environmental issues for each region and a project can be awarded as many as four extra points, one point each for achieving up to four of the six priority credits.	SunGuard Advanced Architectural Glass products can provide high transmittance of light with low solar heat gain to achieve priority credits. The glass and coatings are also manufactured at several U.S. locations and distributed through a nationwide network of fabricators which may facilitate regional sourcing.

While LEED does not certify specific products, using SunGuard Advanced Architectural Glass along with other factors may help your project earn LEED points.

v4 - LEED v4: Scoring and Solutions

LEED CATEGORY	LEED CREDIT	LEED POINTS	THE INTENT
SUSTAINABLE SITES	SSpc55: Bird Collision Deterrence.	1 point.	Reduce bird injury and mortality from in-flight collisions with buildings.
	SSc5: Heat Island Reduction.	Up to 2 points.	To minimize effects on microclimates and human and wildlife habitats by reducing heat islands.
INTEGRATIVE PROCESS	IPc1: Integrative Process.	1 point.	To support high-performance, cost–effective project outcome through an early analysis of the interrelationships among systems.
ENERGY AND ATMOSPHERE	EAc2: Optimize Energy Performance.	Up to 20 points.	To achieve increasing levels of energy performance beyond the prerequisite standard to reduce environmental and economic harms associated with excessive energy use.
MATERIALS AND RESOURCES	MRc2: Building Product Disclosure and Optimization - Environmental Product Declarations.	Up to 2 points.	To encourage the use of products and materials from manufacturers who have verified improved environmental, economic and socially preferable life-cycle impacts.
	MRc3: Building Product Disclosure and Optimization - Sourcing of Raw Material.	Up to 2 points.	To encourage the use of products and materials for which life-cycle information is available and are verified to have been extracted or sourced in a responsible manner.
	MRc4: Building Product Disclosure and Optimization - Material Ingredients.	Up to 2 points.	To encourage the use of products and materials for which life-cycle information is available and that have environmentally, economically and socially preferable life-cycle impacts; and are verified to minimize the use and generation of harmful substances.

THE REQUIREMENTS	GUARDIAN SUNGUARD SOLUTIONS
Develop a building façade design strategy to make the building visible as a physical barrier and eliminate conditions that create confusing reflections to birds.	Guardian Glass has SunGuard® products tested by the American Bird Conservancy to help deter bird collisions and meet the requirements for this pilot credit.
Roof and nonroof measures can be added together to calculate compliance. Nonroof measures can be considered architectural structures or devices that provide shade and have a three-year aged solar reflectance (SR) of at least 0.28. If a three-year SR is not available, 0.33 at installation is acceptable.	SunGuard has 7 different coatings that have a SR of 0.33 or above. SNX 62/27, SNX 51/23, SN 68, SN 54, SNR 43, AG 50 and AG 43 on either Clear or UltraClear™. These products can be used to reflect solar energy and reduce the heat island effect.
Discovery; perform a preliminary "simple box" energy modeling analysis that explores how to reduce energy loads. Assess potential strategies such as massing and orientation in addition to basic envelope attributes.	Guardian offers the Building Energy Calculator as part of our comprehensive Glass Analytics suite of online tools. The Building Energy Calculator uses customized make-ups created in the Performance Calculator to compare energy cost, consumption and financial payback information based on hourly simulations of glazing options, building parameters and project location. This design tool can compare annual energy costs for a variety of exterior envelope scenarios.
Whole-building energy simulation - Use energy simulation of efficiency opportunities versus past energy simulation analyses for similar buildings. Focus on load reduction and potential energy savings and holistic project cost implications related to all affected systems. Demonstrate a percentage of improvement compared with the baseline.	SunGuard Advanced Architectural Glass offers 12 coatings providing a wide spectrum of beautiful, energy-saving choices, with varying degrees of light transmission and reflectivity. Most SunGuard products will meet the U.S. Dept. of Energy's "spectrally selective" definition: a light to solar gain (LSG) ratio of 1.25 or higher. SunGuard LSG ratios can approach and exceed 2.0. A range of color and SHGC can be achieved using of an array of tinted substrates such as green, CrystalGray®, gray, CrystalBlue™ and UltraClear™ low-iron. All of these options focus on energy load reduction while not compromising on aesthetics.
Environmental Product Declaration (EPD) (Option 1): Use at least 20 permanently installed products that meet the product-specific Type III declaration.	Guardian led the development of an industry-wide Product Category Rule (PCR) through the Glass Association of North America. The PCR will ensure future EPDs perform to the criteria established in LEED v.4. The next step is development of the Life Cycle Assessment which is the basis for an EPD.
Sourcing of raw materials (Option 2): Use at least 25% by cost products that meet responsible extraction criteria.	Guardian float glass, including SunGuard Advanced Architectural Glass, may contain recycled glass, of which a small amount may be pre-consumer content. Under LEED guidelines, only scrap glass brought in from other manufacturing facilities can qualify as pre-consumer, so the percentage varies depending on the location of the factory and available supply. To find the pre-consumer percentage for the Guardian factory nearest you, use SunGuardGlass.com's Sustainability Calculator to evaluate your project for this credit.
Option 1: Material ingredient reporting - Use at least 20 permanently installed products that demonstrate the chemical inventory of the product to at least 0.1%. **- OR -** Option 2: Material ingredient optimization - Use products that document their material ingredient optimization using at least 25%, by cost, of the total value of permanently installed products in the project.	Guardian has published a Health Product Declaration (HPD) for SunGuard Advanced Architectural Glass with full disclosure of known hazards in compliance with the HPD open standard. The glass is valued as a whole product for purposes of calculation and would count toward Option 2: Material Ingredient Optimization.

v4 - LEED v4: Scoring and Solutions

LEED CATEGORY	LEED CREDIT	LEED POINTS	THE INTENT
INDOOR ENVIRONMENTAL QUALITY	EQc5: Thermal Comfort.	1 point.	To promote occupants' productivity, comfort and well-being by providing quality thermal comfort.
	EQc7: Daylight.	Up to 3 points.	To connect building occupants with the outdoors, reinforce circadian rhythms and reduce the use of electrical lighting by introducing daylight into the space.
	EQc8: Quality Views.	1 point.	To give building occupants a connection to the natural outdoor environment by providing quality views.
	EQc9: Acoustic Performance.	1 point.	To provide workspaces and classrooms that promote occupants' well-being, productivity and communications through effective acoustic design.
INNOVATION	INc1: Innovation.	Up to 5 points.	To encourage projects to achieve exceptional or innovative performance.

THE REQUIREMENTS	GUARDIAN SUNGUARD SOLUTIONS
ASHRAE Standard 55-2010 - Design heating, ventilating, HVAC systems and the building envelope to meet applicable ASHRAE requirements.	There are several Guardian SunGuard Advanced Architectural Glass, products that are designed to optimize the SHGC and reduce glare that have a direct impact on the thermal comfort of the occupants.
Option 1: Provide manual or automatic (with manual override) glare-control devices for all regularly occupied spaces. Demonstrate through computer simulations the percentage of regularly occupied floor area that achieves spatial daylight autonomy (sDA 300/50%) while direct overhead lighting does not exceed 25% of the connected lighting load within a space. Demonstrate that annual sunlight exposure (ASE 1000,250) of no more than 10% is achieved.	Guardian offers a variety of SunGuard coated glass products with light transmission from 8% to more than 78% that allows designers the ability to provide ample visible light to connect the occupants to the outdoors and enhance the experience of the space.
Achieve a direct line of sight to the outdoors via vision glazing for 75% of all regularly occupied floor area. View glazing in the contributing area must provide clear image of the exterior, not obstructed by frits, fibers, patterned glazing or added tints that distort color balance.	SunGuard Advanced Architectural Glass offers a variety of products with high visible light transmission and high color rendering index providing more accurate color transmission through the glazing.
For all occupied spaces, meet requirements, as applicable, for HVAC background noise, sound isolation, reverberation time and sound reinforcement and masking.	SunGuard Advanced Architectural Glass can be used with relatively high STC ratings for indoor applications while also reaching high OITC ratings for exterior applications.
Achieve significant, measureable environmental performance using a strategy not addressed in the LEED green building rating system and/or achieve exemplary performance in an existing LEED v4 credit. Performance point is typically earned for achieving double the credit requirements or the next incremental percentage threshold.	Guardian Advanced Architectural Glass has the ability to meet or exceed local and/or national energy code requirements. Guardian has also tested product makeups for bird collision deterrence, which is pilot credit 55.

While LEED does not certify specific products, using SunGuard Advanced Architectural Glass along with other factors may help your project earn LEED points.


KANSAS STATE UNIVERSITY - OLATHE

TUSTIN CENTER - PHASE II
SANTA ANA, CA USA

Architect: Nadel Architects
Glazier: Hale Glass, Inc.
Fabricator: OCBE Los Angeles
Glass: SunGuard Neutral 40
LEED: Gold

FAR LEFT:
WESTMINSTER CENTER
NEW WESTMINSTER, BC

Architect: Musson Cattell Mackey
Glazier: Lynnmour Glass & Aluminum
Fabricator: Garibaldi Glass
Glass: SunGuard SuperNeutral 54
LEED: Gold

MORGAN STATE UNIVERSITY
BALTIMORE, MD USA

Architect: Hord Coplan Macht
Fabricator: JE Berkowitz
Glass: SunGuard SuperNeutral 54
LEED: Gold

KANSAS STATE UNIVERSITY
OLATHE, KS USA

Architect: 360 Architecture
Glazier: Carter Glass
Fabricator: Insulite Glass Company
Glass: SunGuard SuperNeutral 68
LEED: Silver

We'll help you build with light. And build LEED points, too.

Nobody offers more post-temperable sputter-coated glass options than Guardian. And our specialists are always available to help you find the best products and techniques to raise your LEED score. To find the Guardian Architectural Design Manager nearest you, give Guardian a call at +97172058000 or visit www.guardianglass.com

Just some of the LEED-certified buildings using Guardian glass.

SunGuard Advanced Architectural Glass is improving the indoor and outdoor environments at these buildings and more, which have received or applied for LEED certification.

Azure Tower, Dallas, TX
Arundel Preserve, Hanover, MD
BioSquare D, Boston, MA
Collaboration 3, Greenville, SC
Cyan/PDX, Portland, OR
Ebeid Hospice Residence, Sylvania, OH
Fluor World Headquarters, Irving, TX
GVSU JC Kennedy Hall of Engineering, Grand Rapids, MI
Hearst Corporation, New York, NY
Heifer International, Little Rock, AR
Linden Grove Middle School, Kalamazoo, MI
National Business Park Building, Columbia, MD
Peregrine Financial, Waterloo, IA
Terrazzo, Nashville, TN
The Burnham Institute, Orlando, FL
The Proximity Hotel, Greensboro, NC
USAA Campus, Phoenix, AZ
Westminster Center South, New Westminster, BC
Winrock, Little Rock, AR

GUARDIAN GLASS

See what's possible™