



Contribution of Saflex™ and Vanceva™ PVB interlayers to green building certification

**BREEAM (Building Research
Establishment Environmental
Assessment Method)
International New Construction
Version 6**

New-build domestic and
non-domestic buildings

saflex 
ENHANCE YOUR VISION

vanceva 
A WORLD OF COLOR



What is BREEAM?

Created in 1990 in the U.K. by the Building Research Establishment (BRE), BREEAM (Building Research Establishment Environmental Assessment Method) is a sustainability assessment method for buildings.

The BREEAM International New Construction Version 6 scheme is a performance-based assessment method and certification scheme for new buildings.

The primary aim of Version 6 is to mitigate the life cycle impacts of new buildings on the environment in a robust and cost-effective manner. This is achieved through integration and use of the scheme by clients and their project teams at key stages in the design and construction process.

This enables clients, through BREEAM and BRE Global certification, to measure, evaluate and reflect the performance of their new buildings against best practice in an independent and robust manner.



How does BREEAM work?

BREEAM ratings

A BREEAM-certified rating reflects the performance achieved by a project and its stakeholders as measured against the BREEAM standard and its benchmarks. The rating enables comparability between projects and provides assurance on performance, quality and value of the asset.

BREEAM ratings range from unclassified (in-use scheme only) to pass, good, very good, excellent and outstanding, and they are reflected in a series of stars on the BREEAM certificate.

BREEAM rating		% score
Outstanding	★★★★★★	≥85
Excellent	☆★★★★	≥70
Very good	☆☆★★★	≥55
Good	☆☆☆☆★★	≥45
Pass	☆☆☆☆☆★	≥30
Unclassified	☆☆☆☆☆☆	<30

BREEAM categories

BREEAM measures sustainable value in a series of environmental categories from energy to water. Each category addresses the most influential factors, including low-impact design and carbon emissions reduction; design durability and resilience; adaptation to climate change; and ecological value and biodiversity protection.





How can Saflex™ PVB interlayers contribute to BREEAM certification?

Saflex and Vanceva are plasticized polyvinyl butyral (PVB) interlayers that bond with glass to form laminated safety glass. The interlayer sandwiched between the layers of glass enhances the performance of laminated glass.

Beyond its primary function of enhancing safety and security in glazing, Saflex enables improved structural integrity, acoustic comfort, thermal management (solar control), UV mitigation and bird-collision prevention.

BREEAM is a building-level certification scheme and does not certify specific products. Yet it recognizes processes that evaluate and test the environmental performance or responsible sourcing of specific products. BREEAM provides credits where the process or performance meets a specific standard.

This brochure is intended to demonstrate the potential contribution of Saflex interlayers to the Version 6 criteria. The contribution to each of these categories and assessment issues is indirect, and achievement depends on building design factors, including glass type and configuration, combination of glass, proper design and installation, and interaction with other construction materials.

Saflex can contribute to 5 of the 10 BREEAM credit categories (highlighted in the following table).

Management	Health and wellbeing
Energy	Transport
Water	Materials
Waste	Land use and ecology
Pollution	Innovation

The following table identifies how Saflex and/or Vanceva can contribute to satisfying the following assessment issues from each environmental category of Version 6.0.

Environmental category	Assessment issue	Assessment issue reference	Credits available
Health and wellbeing (Hea)	Visual comfort	Hea 01	Up to 6
	Indoor air quality	Hea 02	5
	Thermal comfort	Hea 04	3
	Acoustic performance	Hea 05	Up to 4
Energy (Ene)	Reduction of energy use and carbon emissions	Ene 01	13
Materials (Mat)	Life cycle impacts	Mat 01	6
	Responsible sourcing of construction products	Mat 03	4
Land use and ecology (LE)	Long-term impact on biodiversity	LE 05	2
Innovation (Inn)	Exemplary level and innovation	Inn 01	10



Health and wellbeing

Hea 01 (visual comfort)

Up to 6 credits

Aim: To ensure daylighting, artificial lighting and occupant controls are considered at the design stage to ensure best practice in visual performance and comfort for building occupants

This issue has five parts:

1. Prerequisite
2. Glare control (1 credit)
3. Daylighting (up to 4 credits — dependent on building type)
4. View out (1 credit)
5. Internal and external lighting (1 credit)

Saflex can assist in meeting daylighting and view-out criteria of this issue.

• Daylighting requirement

Demonstrate that relevant building areas meet minimum levels of daylight factors depending on building or area type and latitude; ensure that 80% of this floor area has a view of the sky or meets the average and minimum point daylight illuminance criteria depending on area type

• View-out requirement

Demonstrate that 95% of the floor area has a minimum share of windows that provide an adequate view out

How can Saflex or Vanceva interlayers contribute to daylighting and view-out credits?

When glass is used in the envelope or interior walls, building occupants can typically view their surroundings and have access to daylight, which is incredibly important for mental health and productivity.

When the safety function of the glass is required and laminated glass is chosen as a solution, Saflex interlayers, through their natural transparency property, minimize negative impact on visible light transmittance (depending on grade and color used).

Some examples of managing light transmittance through Saflex interlayers include:

Saflex Crystal Clear PVB interlayers: Low-iron glass creates greater connectivity between spaces and allows natural light to transmit without green tint found in clear glass. Saflex Crystal Clear is designed to enhance the natural appeal of low-iron glass and remain virtually undetectable at any visible angle and in any light.

Saflex Crystal Clear has a color rendering index (CRI) of 100 and will not affect the color rendering of daylight.

Saflex FlySafe™ 3D PVB interlayers: As a highly effective, low-coverage bird deterrent interlayer solution, FlySafe 3D uses discreet and optimally placed sequins to avert birds without compromising views. Unlike bird-protection glass that uses screen printing, etching, or UV coatings FlySafe 3D allows very minimal obstruction from the interior view.



Saflex Crystal Clear laminated with low-iron glass (left); monolithic low-iron glass (right)

Health and wellbeing



Saflex FlySafe™ 3D PVB interlayers

Hea 02 (indoor air quality) 5 credits

Aim: To recognize and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes

This issue has four parts:

1. Prerequisite — avoidance of asbestos
2. Minimizing sources of air pollution (4 credits)
3. Adaptability — potential for natural ventilation (1 credit)
4. Exemplary level (fulfills all required emission limits)

Emissions from building products

The requirement is to demonstrate that at least four or five building products, which include walls and fenestrations, meet emissions criteria.

How can Saflex contribute?

According to the version 6 standard, glass is recognized as part of an inherently non-VOC-emitting product. When glass is laminated, Saflex interlayers are sandwiched between two glass panes, making exposure to volatile organic compound (VOC) emissions very low.

Further, laminated glass with Saflex PVB interlayers emits less than 20 ppm of total volatile organic compounds (TVOC), making these products eligible to fulfill the credit requirements for this category. Saflex VOC emissions have been assessed according to EN 16516 by an accredited third-party laboratory that is in compliance with EN ISO/IEC 17025 accreditation requirements.

Eastman can provide VOC data on request.

Health and wellbeing

Hea 04 (thermal comfort) 3 credits

Aim: To ensure that appropriate thermal comfort levels are achieved through design, and that controls are selected to maintain a thermally comfortable environment for occupants of the building

This issue has three parts:

1. Thermal modeling (1 credit)
2. Adaptability for a projected climate change scenario (1 credit)
3. Thermal zoning and controls (1 credit)

The requirement is to demonstrate that the building has been assessed against thermal comfort standard ISO 7730:2005 and that both winter and summer comfort are considered.

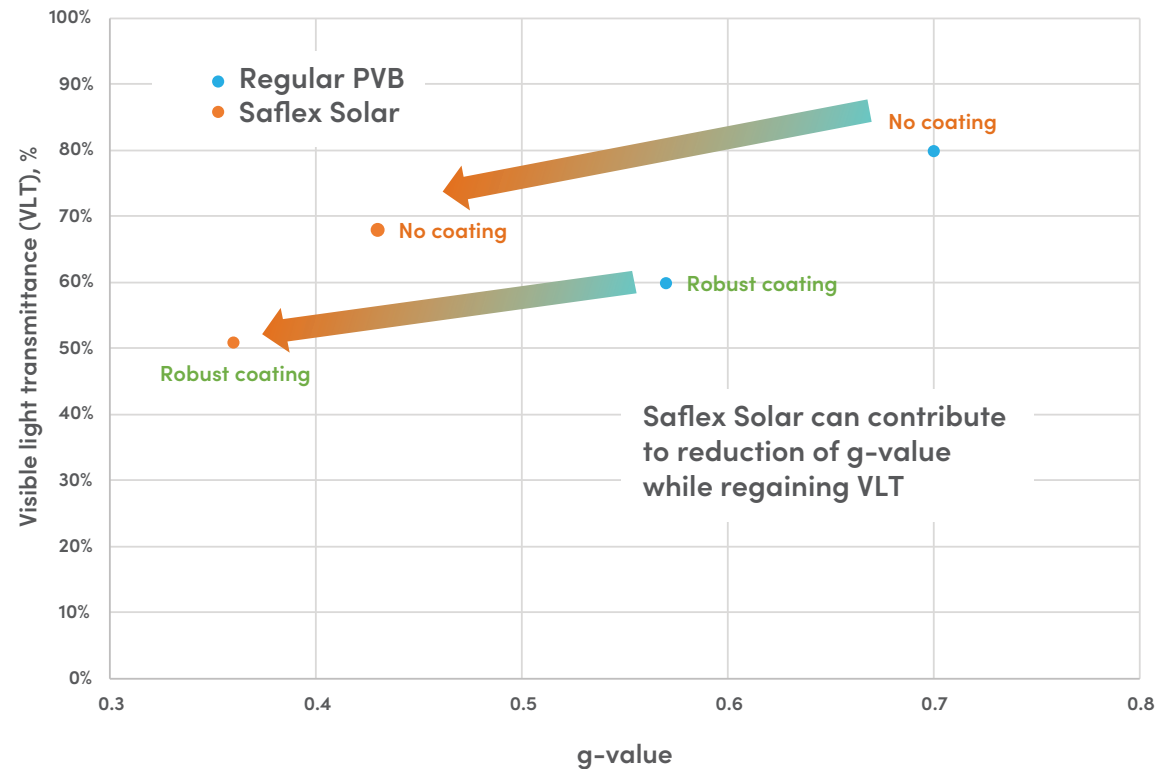
How can Saflex contribute?

Selecting performance glass may contribute to the direct solar radiation control that may impact occupants during summertime.

In certain applications, commercial solar control coatings alone may not be sufficient to reduce the solar heat gain coefficient to the desired level while keeping an acceptable visible light transmission. Saflex Solar PVB interlayers help reduce the solar heat gain coefficient and balance visible light transmittance when used in combination with coatings.

Saflex Solar used in combination with coatings

When combined with reflective and/or colored glass coatings, Saflex Solar PVB can be used to significantly improve the solar heat gain coefficient of facades, even if used in combination with robust solar control coatings. Such a solution reduces the transmittance of UV rays and much of the near-infrared radiation while allowing optimal visible light transmittance. While certain coatings can provide the desired reflected color and overall light transmission, the addition of Saflex Solar interlayers



improves the luminous efficacy (or selectivity: the ratio of light transmittance to solar heat gain/g-value).

Because appropriate thermal management is tied to the solar performance insulation of the envelope, Saflex Solar grades may indirectly support this credit.

Health and wellbeing

Hea 05 (acoustic performance) Up to 4 credits

Aim: To ensure the building's acoustic performance, including sound insulation, meets the appropriate standards for its purpose

This issue has two parts:

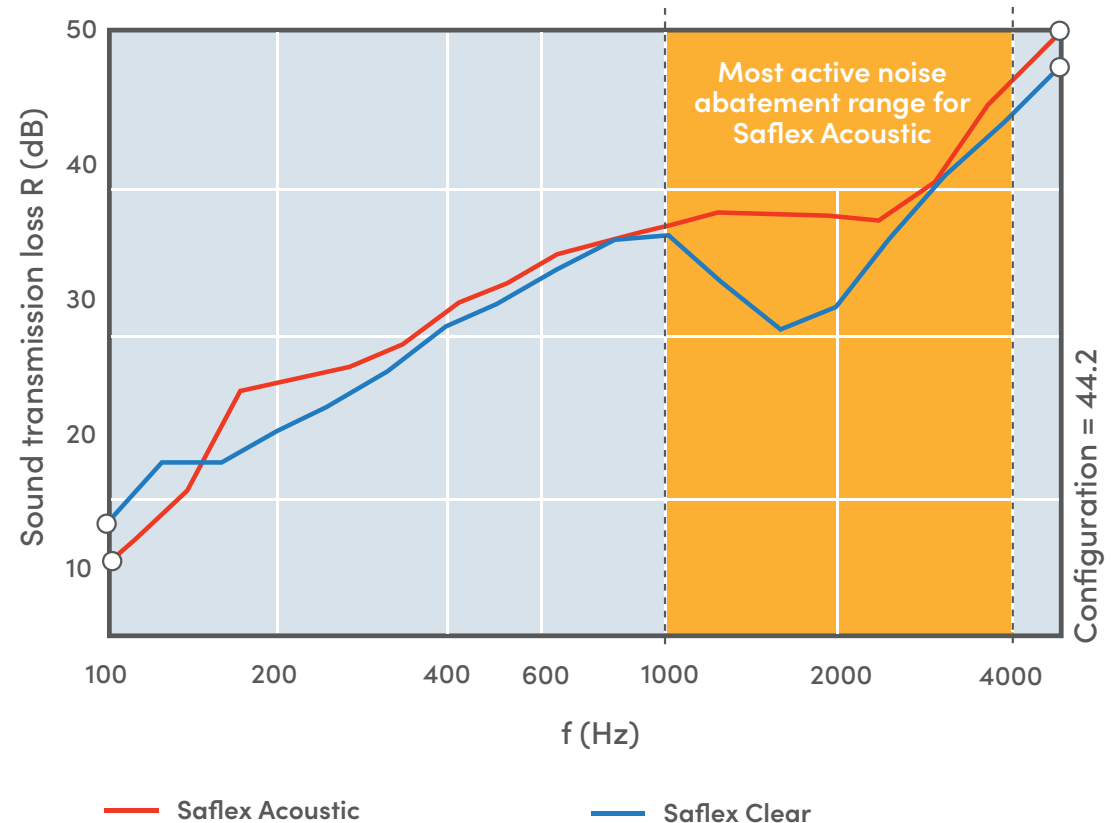
1. Prerequisite
2. Acoustic performance standards

The requirement is to demonstrate that the indoor ambient noise levels and sound insulation between acoustically sensitive rooms meet BREEAM performance standards or good practice or meets or exceeds relevant national legislation for non-residential buildings.

How can Saflex contribute?

Whether for interior glazed applications that enable privacy, security and comfort or for facade applications to isolate interior building spaces from exterior noise environments, Saflex Acoustic PVB interlayers can contribute to sound transmission reduction. Saflex Acoustic is an advanced tri-layer system designed to decouple and disseminate sound waves for superior sound damping performance. This patented system targets sound in the 1,000–3,000 Hz range, which is the most sensitive range of human hearing. These interlayers enhance the acoustic performance of a glazing by 2 dB in R_w or STL when compared to a standard PVB interlayer and up to 4 dB compared to monolithic glass of the same thickness.

Sound transmission loss^{1,2}



¹Sound transmission loss of laminated glass with Saflex Acoustic interlayer and Saflex Clear interlayer; configuration = 44.2

²The ability to reduce noise as perceived by the human ear can be measured. This measurement involves sending specific frequencies of sound through a material, in this case, laminated glass with Saflex Acoustic interlayer, and remeasuring what comes through the glass to determine what gets filtered out. The transmission loss is recorded and can be illustrated in graphical form as shown in the figure.

NOTE: All documents presented in this section are based on samples prepared in Eastman laboratories. Testing certifications from third-party laboratories had a limited number of samples evaluated and are valid for materials tested and not guaranteed for all samples. Samples evaluated at Eastman are tested in accordance with noted standards and procedures. Laboratories are responsible for securing their own performance certificates based on the lamination process.

Ene 01 (reduction of energy use and carbon emissions) 13 credits

Aim: To recognize and encourage buildings designed to minimize operational energy demand, primary energy consumption and CO₂ emissions

This issue has three parts:

1. Energy performance
 - Standard route: Use of approved building energy calculation software (up to 9 credits)
 - Basic route: Energy efficient design features (up to 4 credits)
2. Prediction of operational energy consumption (4 credits)
3. Exemplary level criteria (up to 5 credits)

This assessment determines whether a building's energy performance has improved compared to the minimum energy performance reference building level, calculated according to local building regulations or ASHRAE standard 90.1 or 90.2 or as defined by the U.K. national calculation method. It is also possible to demonstrate energy performance at glazing level.

How can Saflex contribute?

Glass can enable substantial energy efficiency savings through heating, lighting, and cooling management. Modern glazing systems can help minimize solar heat gains (g-value) by controlling infrared wavelengths participating in heat buildup in nearby spaces. In well-designed window and glazing configurations, the use of Saflex Solar or Vanceva Color PVB interlayers can assist with earning credits as part of the energy performance basic route, a term used by BREEAM to describe its minimum requirements. In addition, the use of Saflex Solar has a minimal impact on the daylighting and view-out assessment issue in He 01.

Solar absorbing PVB interlayers reduce solar heat gain.

Saflex Solar PVB interlayers are high-visible-light transmittance, infrared radiation-absorbing interlayers designed to enhance solar heat gain performance. These Saflex grades are the PVB formulations of choice for applications where coated glass may not be available for solar control, uniform angular color is desired, edge deletion may be visible, or glass needs to be bent and laminated while delivering solar heat gain control. Two options are available:

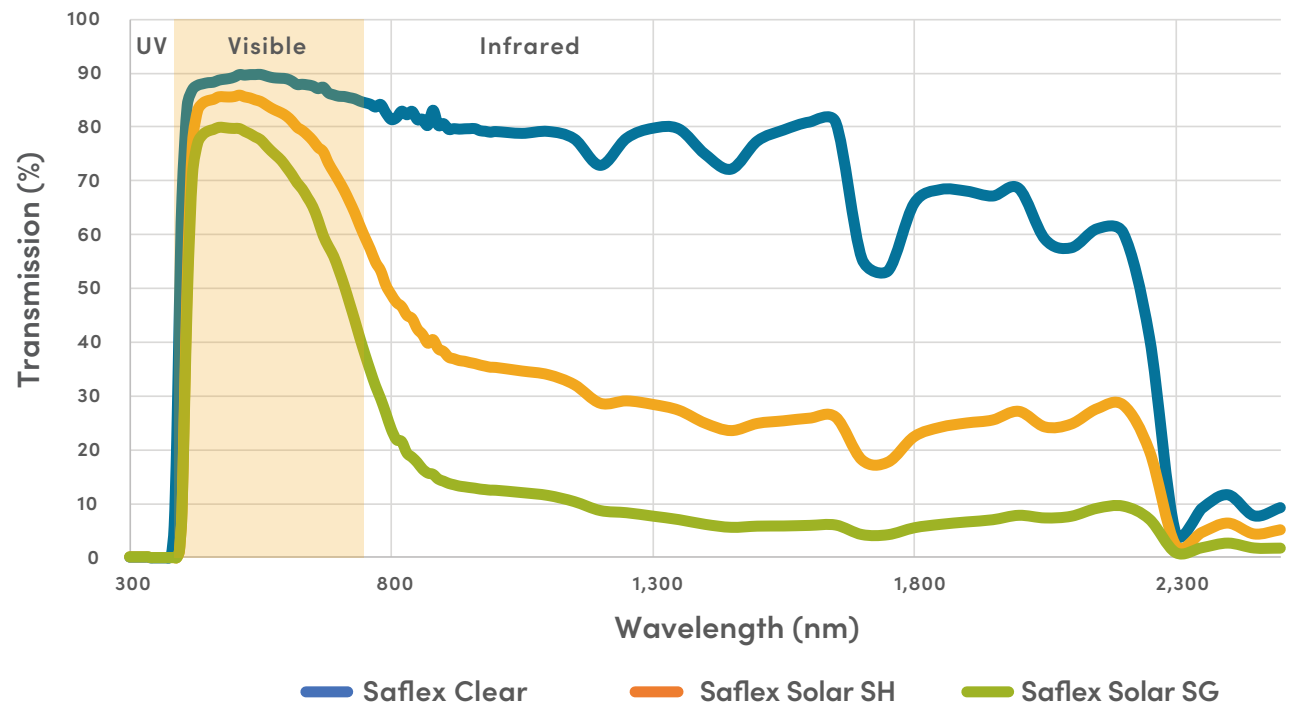
- Saflex Solar SG PVB interlayers, the highest-performing solar-absorbing interlayer, which requires strengthened glass
- Saflex Solar SH PVB interlayers, a more color-neutral solution that may be laminated with annealed glass



Energy



Comparison of Saflex Clear, Saflex Solar SH and Saflex Solar SG



Materials

Mat 01 (life cycle impacts) 6 credits

Aim: To recognize and encourage the use of robust and appropriate life cycle assessment tools and consequently the specification of construction materials with a low environmental impact (including embodied carbon) over the full life cycle of the building

This issue has three parts:

1. Life cycle assessment (LCA) tool to measure the life cycle environmental impact of the building elements (1 to 5 credits)
2. Environmental Product Declaration (EPD) (1 credit)

The requirement is to carry out an LCA against mandatory building elements. To earn additional credits, at least five products specified at the design stage and installed at the post-construction stage should be covered by verified EPDs.

How can Saflex contribute?

Eastman has performed cradle-to-gate LCAs for its main architectural interlayer solutions. These assessments have been reviewed and certified by Quantis, a leading life cycle consulting firm. The LCA data for Saflex can be adopted into models created by laminated glass manufacturers to generate their own LCA or to create an EPD for their laminated glass.

Eastman can provide Saflex LCA data on request.



Materials

Mat 03 (responsible sourcing of construction products) 4 credits

Aim: To recognize and encourage the specification and procurement of responsibly sourced construction products

This issue has three parts:

1. Sustainable procurement plan (1 credit)
2. Responsible sourcing of construction products (ISO 14001:2005 certificate — the manufacture of Saflex PVB interlayers) (up to 3 credits)

To prove the responsible sourcing of construction products, it has to be demonstrated that construction products are responsibly sourced in accordance with BREEAM methodology, including an environmental certification system or a responsible sourcing certification scheme.

How can Saflex contribute?

Saflex PVB Interlayers are manufactured at an ISO 14001-compliant plant. Eastman is committed to improving the footprint of our material offerings.

ISO 14001 certification can be provided on request.



Land use and ecology

LE 05 (long-term impact on biodiversity)

2 credits

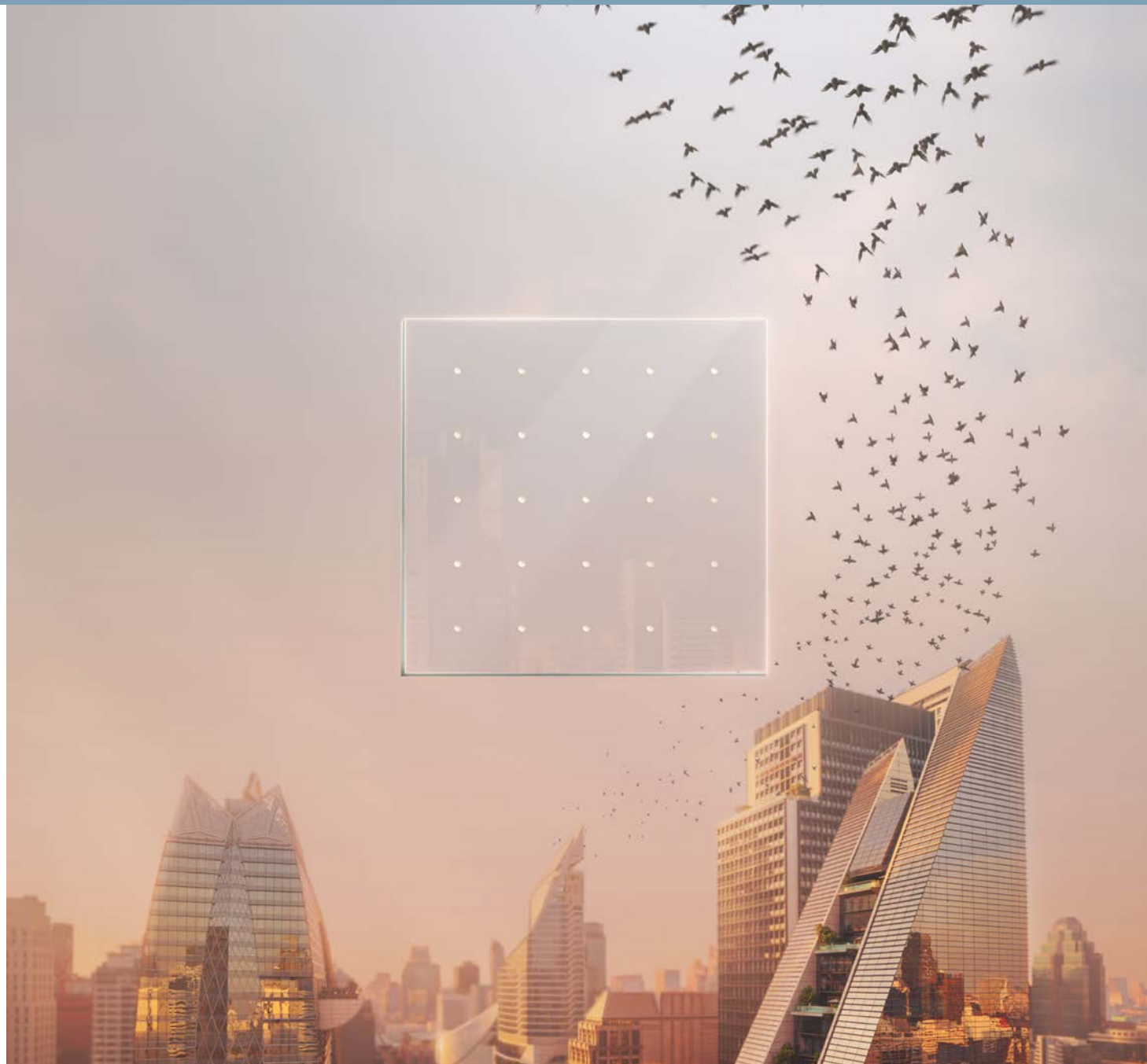
Aim: To minimize the long-term impact of the development on the site and the surrounding area's biodiversity

This credit incentivizes the protection of biodiversity by asking the principal contractor to record actions to protect biodiversity and to ensure the work site does not have a significant impact on local wildlife, including breeding birds, flowering plants, seed germination, amphibians, etc.

How can Saflex contribute?

Saflex™ FlySafe™ 3D PVB interlayers feature reflective technology that acts as bird-collision deterrence. They assist in protecting the ecosystem's valuable birds by making windows visible, thereby avoiding unfortunate collisions.

FlySafe 3D addresses the global challenge of birds colliding with glass in buildings. This unique solution gives architects and facade engineers the freedom to create visually stunning buildings while still protecting birds.



Innovation

Inn 01 (innovation) 10 credits

Aim: To support innovation in the construction industry through the recognition of sustainability-related benefits which are not rewarded by standard BREEAM issues

How can Saflex contribute?

The reflective technology in FlySafe 3D can assist in achieving the BREEAM Inn 01 credit.

Given the prevalence of glass in modern architecture, countless birds are killed as they navigate along migratory pathways and strike windows, link bridges and curtain walls. They fail to see glass, misjudge reflections, or are attracted to internal lights — all leading to avoidable collisions.

Durable FlySafe 3D is a unique solution that provides architects and facade engineers the freedom to create visually stunning buildings while protecting birds and views alike.

FlySafe 3D is recognized in the industry and by ornithologists as one of the best solutions, providing minimal obscuring of views and long-lasting durability. FlySafe 3D won a 2022 Best of Products Award in the Building Materials — Glass category from The Architect's Newspaper. FlySafe 3D was also named the jury winner of the 2022 Architizer's A+Awards in the Positive Impact category.





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