

LEED® WITH
SAINT-GOBAIN GLASS
(LEED V4)
FOR A SUSTAINABLE HABITAT



BUILDING GLASS ROMÂNIA


SAINT-GOBAIN

LEED® with Saint-Gobain glass

What is LEED®?

LEED®, or Leadership in Energy & Environmental Design, is a green building certification program that recognizes best-in-class building strategies and practices. To be LEED® certified, building projects have to meet certain prerequisites and earn points to achieve different levels of certification. The prerequisites and credits differ for each rating system, depending on the type of building (office, school, home ...) and the type of project (new or renovation). All in all, there are five rating systems addressing multiple project types. In July 2014, there were more than 69,000 registered projects and 31,700 certified buildings¹.

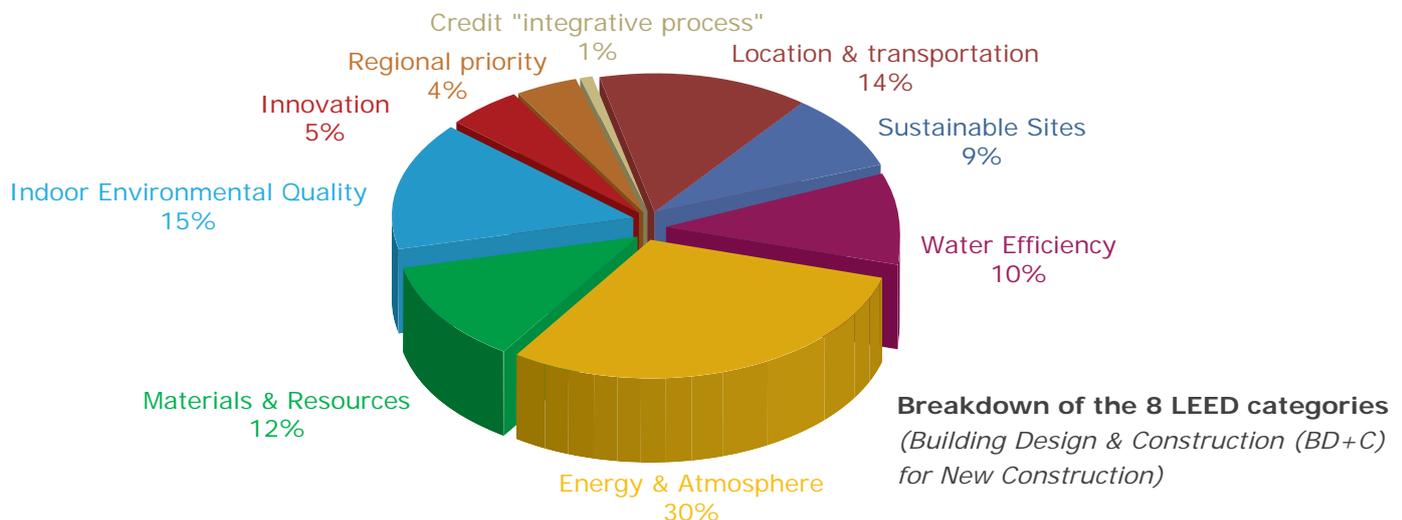
The certification has been developed by the US Green Building Council. As a platinum member of this organization since September 2013, Saint-Gobain has become a key partner of LEED®. The USGBC released a new "v4" version of the LEED® certification at the end of 2013. This will be the only version on the market from July 2015.



The LEED® v4 Building Design and Construction (BD+C) rating system for New Construction features eight major areas, four of which may be boosted by using Saint-Gobain's high performance glazing in the building design. For some, the impact is quite obvious, but for others using Saint-Gobain glass may not necessarily come first to mind! Let's discover together just how great an asset our glass can be for this certification.

Eight Categories for a Sustainable Building

| LEED Categories | Possible points | Weighting | Saint-Gobain glazing impact |
|--------------------------------------|-----------------|-------------|-----------------------------|
| Credit "integrative process" | 1 | 1% | NA |
| Location & transportation | 16 | 14% | NA |
| Sustainable sites | 10 | 9% | NA |
| Water efficiency | 11 | 10% | NA |
| Energy & atmosphere | 33 | 30% | Yes |
| Material & resources | 13 | 12% | Yes |
| Indoor environmental quality | 16 | 15% | Yes |
| Innovation | 6 | 5% | Yes |
| Regional priority | 4 | 4% | NA |
| TOTAL | 110 | 100% | |



¹Source : <http://www.usgbc.org/projects>

LEED® Rating

LEED® projects can achieve a total of 110 points. The minimum number of points to be LEED® certified is 40. Higher levels of compliance are possible leading to different rankings, as shown in the table at the right.

| LEED® ranking | LEED® points |
|------------------|----------------|
| Certified | 40-49 |
| Silver | 50-59 |
| Gold | 60-79 |
| Platinum | > 80 |

Contents of the Brochure

LEED® does not certify a specific product, but a building as a whole. The use of Saint-Gobain high performance glazing can **contribute to your future LEED® project on 12 criteria and be worth up to 45 points.**

This brochure is designed to show how Saint-Gobain glazing can contribute to these LEED® v4 criteria.

| Categories | Criteria | Total points available | Page |
|------------------------------|--|------------------------|------|
| Energy & Atmosphere | <i>Prerequisite: Minimum Energy Performance</i> | | 6 |
| | Optimize energy performance | 18 | 5 |
| Materials & Resources | <i>Prerequisite: Construction and demolition waste management planning</i> | | 8 |
| | Building life cycle impact reduction | 5 | 9 |
| | Building product disclosure and optimization: | | |
| | Environmental product declarations | 2 | 10 |
| | Sourcing of raw materials | 2 | 11 |
| | Material ingredients | 2 | 12 |
| | Construction and demolition waste management | 2 | 15 |
| Indoor Environmental Quality | Low emitting interiors | 3 | 17 |
| | Thermal comfort | 1 | 18 |
| | Daylight | 3 | 19 |
| | Quality views | 1 | 20 |
| | Acoustic performance | 1 | 21 |
| Innovation | Innovation | 5 | 23 |
| TOTAL | | 45 | |

For each criterion, full details on requirements and prerequisites can be found by clicking on the following pictogram that will automatically redirect you to the corresponding LEED® webpage:





Karela Office Park, Athens, Greece
1st Gold LEED certified building in Greece

Architects: Maria Kokkinou - Andreas Kourkoulas

Consultant Architect: John Peponis (Ph.D.)
Professor, College of Architecture,
Georgia Institute of Technology

Project Architects: Tassos Ringas, Artemi Halari

SGG COOL-LITE SKN 174 II and
SGG STADIP silence



Minimum energy performance

Aim

To achieve a minimum level of energy efficiency for the building and its systems in order to reduce the environmental and economic damage caused by excessive energy use.

Requirements

Three options are proposed. One option consists in simulating the energy in a whole building to demonstrate a 5% improvement (for new construction) in the proposed building performance rating compared to the baseline rating (using the ANSI/ASHRAE/IESNA standard 90.1-2010 to make the simulation). A USBGC-approved equivalent standard may be used for projects outside the USA. The two other options ask for compliance with either the "ASHRAE 50% advanced energy design guide", or "advanced building core performance guide" (or the USBGC-approved equivalent standard for projects outside the USA).

Our contribution

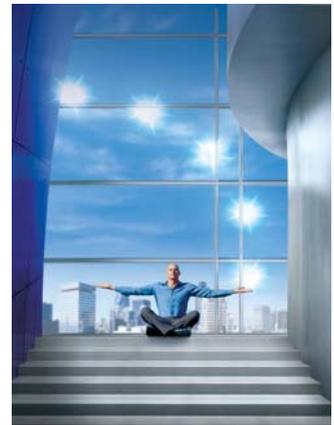
Glass enables you to **make impressive energy reductions** mainly in three areas:

1. **Heating**, by minimizing energy losses in winter (low-e function);
2. **Air-conditioning**, by minimizing cooling loads in summer (solar control function); and
3. **Lighting**, thanks to the transparence of glass and the free contribution of natural light.

With its large range of energy efficient coated glass solutions, such as the SGG PLANITHERM and SGG COOL-LITE ranges, exhibiting a wide variety of U-value:

- Down to 0,8 W/m².°K or 0,14 BTU/h.ft².°F, in double glazed unit (CLIMAPLUS);

- Down to 0,5 W/m².°K or 0,09 BTU/h.ft².°F, in triple glazed unit (CLIMATOP) and its large variety of g factor/SHGC (from 0,10 to 0,70) and visible light transmittance (from less than 10% to more than 80%), **Saint-Gobain can help maximize the building's energy performance, while promoting the entry of natural light into the building.**



Documentation available



Discover all our glazing achievements in actual projects thanks to our Glass Façade website (<http://glassfacade.saint-gobain-glass.com/>)

Products

All CLIMAPLUS or Double Glazed Units and CLIMATOP or Triple Glazed Units, including the following coated glass:

SGG PLANITHERM

SGG PLANISTAR SUN PLUS

SGG COOL-LITE (as SKN, XTREME)

SGG ANTELIO

SageGlass (electrochromic glass)



Optimize energy performance

Aim

To achieve increasing levels of energy performance beyond the prerequisite standard in order to reduce the environmental and economic damage caused by excessive energy use.

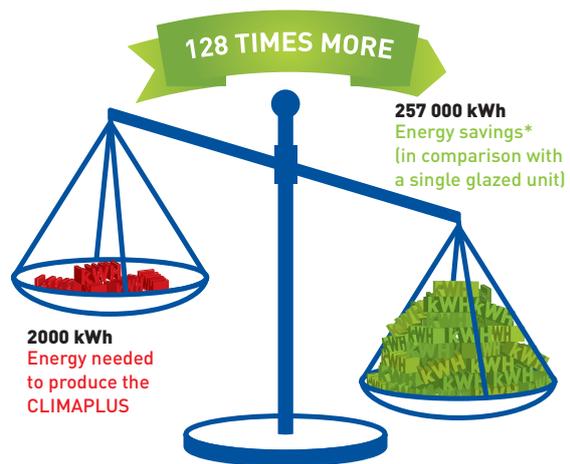
Requirements

Following the same methodology and standards as those used in the prerequisite (cf. previous page), the project's energy performance is assessed and compared to the baseline. Points are awarded according to the percentage of improvement between the two (see table below).

| % improvement in energy performance (for new construction) | Points |
|--|--------|
| 6% | 1 |
| 8% | 2 |
| 10% | 3 |
| 12% | 4 |
| 14% | 5 |
| 16% | 6 |
| 18% | 7 |
| 20% | 8 |
| 22% | 9 |
| 24% | 10 |
| 26% | 11 |
| 29% | 12 |
| 32% | 13 |
| 35% | 14 |
| 38% | 15 |
| 42% | 16 |
| 46% | 17 |
| 50% | 18 |

Energy: glass gives more than it takes

Glass manufacturing requires a lot of energy to produce soda-ash and heat the furnace. However, considering the savings made during the total lifetime of Double Glazed Units (CLIMAPLUS), thanks to its superior thermal performance compared to single-pane windows, the results are amazing. **It saves 128 times more energy than that used to produce the glazing!**



** Calculations are made for a house (100m² with 15m² of CLIMAPLUS 4-16-4 mm), using primary energy, in France over the glazing's 30-year lifetime. The results may differ for other countries.*

Our contribution

Over recent years, Saint-Gobain Glass has launched some of the most advanced energy efficient glass coatings dedicated to façades, skylights and windows of all types. These coated glass products offer a very broad range of performance, in terms of thermal insulation, visible light transmittance and solar factor.

By choosing sgg COOL-LITE (i.e. SKN or XTREME), one can both:

- Decrease cooling loads, thanks to lower solar heat gains (low g value) and
- Reduce heating needs by minimizing heat loss (low Ug value) while allowing visible natural light to come in.

Documentation available



Calumen, our glazing performance calculation software
<http://exprover.saint-gobain-glass.com/trade-customers/calumen>



Tour First, La Défense, France
LEED Gold

Architect:
SRA Architectes and
Kohn Pederson Fox Associates

ANTELIO silver in double skin &
SECURIT for acoustic double skin
partitions.

Tour First allows an energy saving of 26%
(11 points) compared to a conventional
building as defined by ASHRAE (USGBC)
through new lighting, technological
optimization and its specially-
designed thermal double-skin facade.



Construction & demolition waste management planning

Aim

To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements

A construction and demolition waste management plan has to be developed and implemented describing the waste to be targeted for diversion (with a percentage) and the diversion strategy (including how the recycling facility will process the material).

Our contribution

Regarding construction waste, glass has very limited impact. Glazing and glass are made in factories and are delivered ready to be installed and therefore produce no cutting waste on the jobsite. Just one or two elements are used for protection purposes during delivery: these are made of cardboard, plastic or wood and are recyclable on the jobsite. The racks on which the glass is transported are returned to the glass manufacturer or processor.

Saint-Gobain is currently setting up a new recovery channel to give its glazing a second life. This channel aims to collect the cullet coming from products such as windows destined to be destroyed (before the demolition of a building, for instance). The collected cullet is injected once again into the manufacturing process after being processed and sorted by a recycling company. Saint-Gobain is reflecting on how this project could be extended to facades.





Building life-cycle impact reduction

Aim

To encourage adaptive reuse and optimize the environmental performance of products and materials.

Requirements

Four options are proposed for this credit:

1. **Historic building reuse:** maintain the existing building structure, envelope and interior non-structural elements of a historic building or building contributing to a historic district (5 points);
2. **Renovation of abandoned or derelict building:** maintain at least 50%, by surface area, of the existing building structure, enclosure, and interior structural elements for buildings that meet local criteria for abandoned or derelict buildings (5 points);
3. **Building and material reuse:** reuse or salvage building materials off-site or on-site (2 to 4 points);
4. **Whole building life cycle assessment (LCA):** the LCA has to demonstrate a minimum 10% reduction, compared to a baseline building, in at least three of the six impact categories (including global warming potential). At the same time, no impact shifting must be observed (i.e. no increase by more than 5% compared to the baseline building in another impact category) (3 points).

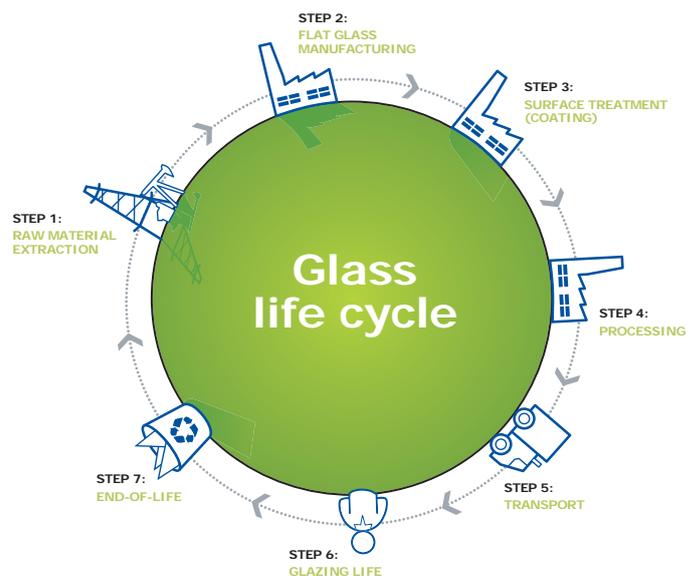
Our contribution

The product's LCA results (contained in the Environmental Product Declaration – EPD) are necessary in evaluating the whole building's environmental footprint.

As a consequence, Saint-Gobain is the best partner to ensure the three points of option n°4. Indeed, **Saint-Gobain is the first glass manufacturer in the world to have carried out a complete Life Cycle Assessment of its products and to deliver an EPD** (Environmental Product Declaration) in compliance with international standards. These EPDs have been verified by an independent third party for full transparency.

In addition, **Saint-Gobain has implemented a stringent environmental program to improve the environmental footprint of its products at every stage in their life cycle.** And this from the very beginning of glass conception, thanks to eco-innovation.

Eco-innovation is Saint-Gobain's policy to bring differentiating value to our customers by developing and distributing innovative products and solutions that help reduce the environmental impact of buildings and infrastructure over their entire life cycle. This is a key aspect towards reaching the 10% reduction required to obtain this credit.





Building product disclosure and optimization: Environmental Product Declarations

Aim

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. To reward project teams for selecting products from manufacturers who have verified improved environmental life-cycle impacts.

Requirements

Two aspects are included in this credit: measuring the environmental impacts of a product and demonstrating a reduction of these impacts.

Measure: the Environmental Product Declaration (1 point)

The project must use at least 20 different permanently installed products sourced from at least five different manufacturers that meet one of the disclosure criteria below:

1. Products with a publicly available, critically reviewed life-cycle assessment (value ¼);
2. Generic Environmental Product Declarations with a third party certification (value ½);
3. Product specific Environmental Product Declarations with a third party certification (value 1).

Reduce: multi-attribute optimization (1 point)

The project has to use a minimum of 50% (based on cost) of third party certified products that demonstrate impact reduction below the industry average in at least three of the six Life Cycle Assessment categories.

Additional option: products sourced (extracted, manufactured, purchased) within 160km of the project site are evaluated at 200% of their base contributing cost.

Our contribution

Saint-Gobain is the first glass manufacturer in the world to have implemented a complete Life Cycle Assessment of its own products in compliance with international standards as required by LEED® and have EPD (Environmental Product Declarations) verified by an independent third party. As a consequence it fulfills the aforementioned option 3.



In addition, our network of floats (38 Saint-Gobain Glass floats) and transformation plants around the world (more than 200 Glassolutions sites in Europe) ensure sourcing proximity.

Documentation available :

Download our verified Environmental Product Declarations online: <http://epd.saint-gobain-glass.com/> and the document that attest that our EPDs comply with LEED® requirements.



Environmental Product Declarations

| |
|--|
| SAINT-GOBAIN GLASS PRODUCTS |
| SGG STADIP (including PROTECT and SILENCE) |
| SGG MIRALITE REVOLUTION |
| SGG DECORGLASS and MASTERGLASS |
| SGG ANTELIO |
| SGG SECURIT DIAMANT |
| SAINT-GOBAIN GLASSOLUTIONS PRODUCTS |
| CLIMAPLUS |
| CLIMAPLUS PROTECT |
| CLIMAPLUS SOLAR CONTROL |
| CLIMAPLUS 4S and SUN |
| CLIMATOP |



Building product disclosure and optimization: Sourcing of raw materials

Aim

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. To reward project teams for selecting products verified to have been extracted or sourced in a responsible manner.

Requirements

Raw material source and extraction reporting (1 point)

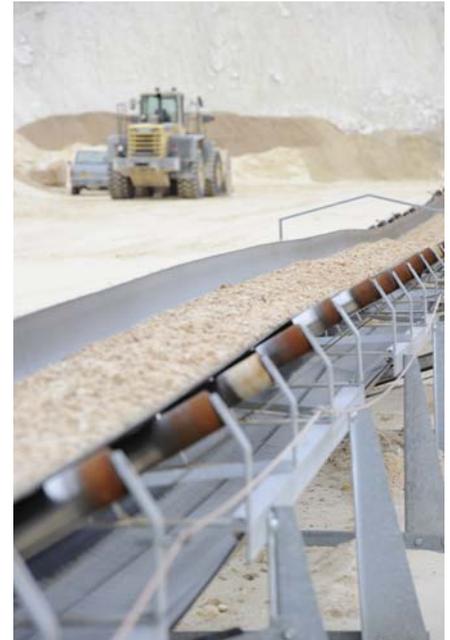
The project has to use at least 20 different permanently installed products from at least five different manufacturers that have publicly released a report from their raw material suppliers which include all details regarding their responsible extraction policy.

Third-party verified corporate sustainability reports (CSR) which include environmental impacts of extraction operations and activities associated with the manufacturer's product and the product's supply chain, are valued as one whole product for credit achievement calculation, if they follow an acceptable framework, such as the GRI (Global Reporting Initiative).

Leadership extraction practices (1 point)

LEED® values products that meet the following extraction criteria: extended producer responsibility, bio-based materials, certified wood products, materials reuse & recycled content.

As in LEED® v3, *Recycled content = postconsumer recycled content + 1/2 * preconsumer recycled content.*



Additional option: products sourced (extracted, manufactured, purchased) within 160km of the project site are evaluated at 200% of their base contributing cost.

Our contribution

Every year, Saint-Gobain publishes its Corporate Social Responsibility report, which is based on the GRI (Global Reporting Initiative) framework. In 2013, this report was rated A+ ("A" means that our level of transparency is very high, thanks to the number of indicators published, and "+" means that some of these indicators have been verified by an independent third party). In this report, Saint-Gobain details its environmental policy, including supply chain subjects.

As for the recycled content, according to the LEED® definition, the Saint-Gobain Glass value would be around 4-5%.

Documentation available

- Saint-Gobain annual Corporate Social Responsibility report (GRI A+), www.saint-gobain.com,
- Recycled content attestation.



Building product disclosure and optimization: Material ingredients

Aim

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. To reward project teams for selecting products for which the chemical ingredients in the product are inventoried using an accepted methodology and for selecting products verified to minimize the use and generation of harmful substances. To reward raw material manufacturers who produce products verified to have improved life-cycle impacts.

Requirements

Option 1: material ingredient reporting (1 point)

The project has to use at least 20 different permanently installed products from at least five different manufacturers that demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).

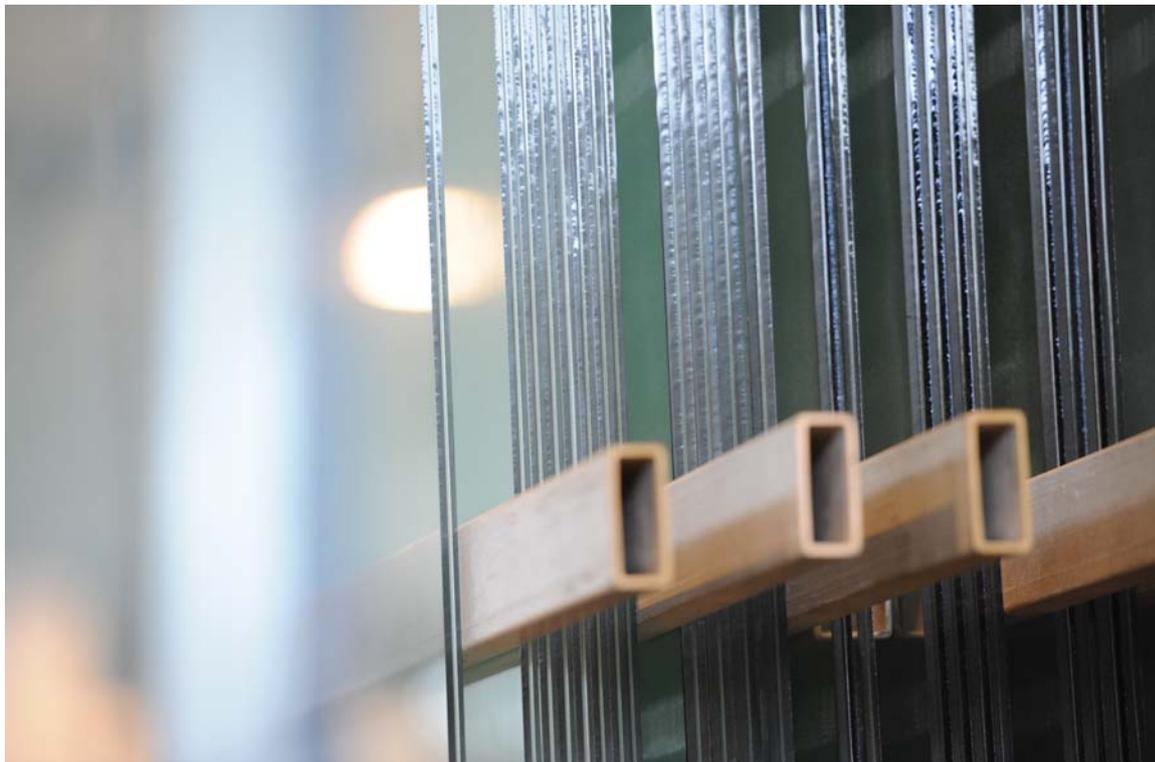
Option 2: material ingredient optimization (1 point)

The products must document their material ingredient optimization for at least 25%, based on cost, of the total value of permanently installed products in the project. One of the methodologies recognized by LEED® is the REACH optimization. When the product contains no ingredients listed on the REACH Authorization or Candidate list, it is valued at 100% of cost for the calculation.

Option 3: product manufacturer supply chain optimization (1 point)

Manufacturers have to be engaged in validated and robust safety, health, hazard, and risk programs with independent third party verification of their supply chain.

Additional option: products sourced (extracted, manufactured, purchased) within 160km of the project site are evaluated at 200% of their base contributing cost.



Our Contribution

Option 2

Glass itself is a substance exempt from registration in REACH, on condition that it complies with the precise conditions concerning the release of certain hazardous substances for the environment. This is the case for all Saint-Gobain Glass products.

Concerning glazing (at the time of publishing this brochure), Saint-Gobain Glass and Glassolutions products contain no Substances of Very High Concern (SVHC) under the terms of REACH appearing on the list of candidate substances or subject to authorization, in concentrations higher than 0.1% in weight, similar to their packaging.

Furthermore, Saint-Gobain Glass and Glassolutions have implemented a monitoring and R&D anticipation program to substitute any substance on the verge of being included in the candidate list for authorization.

Option 3

Saint-Gobain Glass & Glassolutions are engaged in robust safety, health, hazard, and risk programs strongly linked to their supply chain, as outlined in our Chairman and CEO's engagement letter and in our Environmental Health & Safety charter.

Furthermore, all Saint-Gobain Glass floats and quarries have been certified ISO 14001 (an environmental management system) by an independent third party.

In accordance with our purchasing policy, Saint-Gobain suppliers should comply with the Supplier Charter that includes various themes: respect the right to development, employee rights, occupational health and safety, environmental commitment and legal compliance commitment. We have established a three-step process:

1. Charter signed by our suppliers;
2. Evaluation of our suppliers' Corporate Social Responsibility performance in accordance with twenty one environmental, social & ethical criteria, including an assessment of our suppliers' supply chain;
3. Social audits carried out on site.

Documentation Available

- The "REACH declaration" stating that none of Saint-Gobain Glass & Glassolutions products contains Substances of Very High Concern (SVHC) under the terms of REACH appearing on the list of candidate substances or subject to authorization, in concentrations higher than 0.1% in weight;
- Environmental Health & Safety charter and engagement letter signed by Saint-Gobain's Chairman & CEO;
- The ISO 14001 certificate for our floats and quarries.



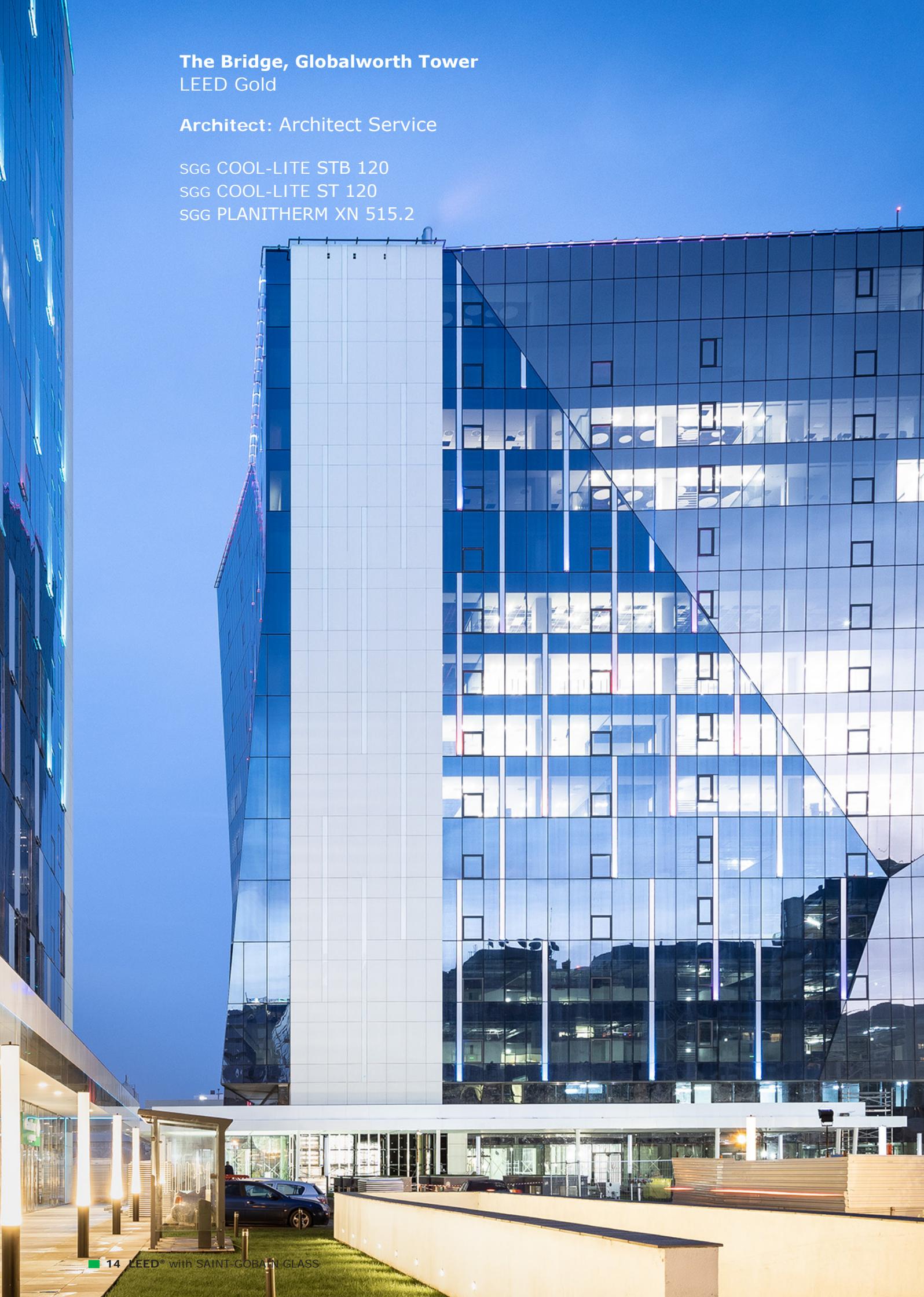
The Bridge, Globalworth Tower
LEED Gold

Architect: Architect Service

SGG COOL-LITE STB 120

SGG COOL-LITE ST 120

SGG PLANITHERM XN 515.2





Construction & demolition waste management

Aim

To reduce construction and demolition waste disposed of in landfills and incineration facilities by recovering, reusing, and recycling materials.

Requirements

The project has to recycle and/or salvage nonhazardous construction and demolition materials, with the following options:

- Option 1: diversion of the construction and demolition material (50 or 75%);
- Or, Option 2: reduction of total waste material (no more than 12.2kg of waste per m²).

Our contribution

Regarding construction waste, glass has very limited impact. As glass and glazing are made in factories and delivered ready to be installed, they do not produce any cutting waste on the jobsite. Just one or two elements are used for protection purposes during delivery: these are made of cardboard, plastic or wood and are recyclable on the jobsite. The racks on which the glass is transported are returned to the glass manufacturer or processor.

Regarding demolition waste, **Saint-Gobain Glass & Glassolutions are working to build partnerships with stakeholders in order to recycle glass at its end of life.** Accordingly, new recycling projects have been launched in France and the UK. There, windows and glazing are recycled and returned to the float as cullet. Other similar projects are being set up in other countries.





Dom Aquaree
Berlin, Germany

Architect: NPS Partner GBR

SGG PLANILUX
SGG STADIP CONTOUR PLANILUX
SGG LITE-FLOOR



Low emitting materials

Aim

To reduce concentrations of chemical contaminants liable to damage air quality, human health, productivity, and the environment.

Requirements

This criteria covers volatile organic compound (VOC) emissions released into the air indoors and the VOC content of materials, as well as the testing methods by which indoor VOC emissions are determined (ISO 16000 for European countries). Six different categories of products are concerned: interior paint and coatings applied on site / interior adhesives and sealants applied on site (including flooring adhesive) / flooring / composite wood / ceilings, walls, thermal and acoustic insulation / furniture.

Products that are inherently non-emitting sources of VOCs (such as glass) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.

Our contribution

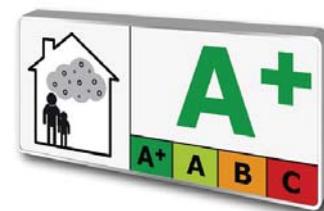
Glazing can be found in two categories out of the six: in "ceilings, walls, thermal and acoustic insulation" and in "furniture", providing good acoustic insulation (especially in partition walls), light as well as a design effect.

Glass itself does not emit any VOCs (coated glass, tempered glass...). The sealant (in double-glazing) and the PVB layer (in laminated glass, SGG STADIP) have been tested and emit very few VOCs.

Walls and furniture can also be decorated with:

- Mirrors (SGG MIRALITE REVOLUTION, SGG MIRALITE PURE, SGG MIRALITE SAFE);
- Lacquered glass (SGG PLANILAQUE EVOLUTION / DECOLAQUE, SGG PLANILAQUE STADIP, MY DECOLAQUE, VITRIO, DECOLIT, MAGNETIC glass marker board);
- Enamels (PICTURE IT, MY DECOPRINT, EMALIT, SERALIT, OPALIT, CREALITE).

These contribute to maintaining a healthy, pollution-free indoor environment and are characterized by a level of formaldehyde and VOC emissions close to 0 (tested under ISO 16000 requirements). For all tempered glass, glazing passes through a furnace and consequently all VOCs are eliminated during the process.



In accordance with the French regulation on VOCs & construction products (introduced in April 2011), our mirrors & lacquered glass rank highest, scoring an A+.

| | Measurement after 28 days (under ISO 16000 by Eurofins) | |
|--------------------------------------|---|------------------------|
| | Total VOC | Formaldehyde |
| SGG MIRALITE REVOLUTION or PURE | ≤ 10 µg/m ³ | < 10 µg/m ³ |
| SGG PLANILAQUE EVOLUTION / DECOLAQUE | ≤ 10 µg/m ³ | < 10 µg/m ³ |
| A+ rating (French regulation, 2011) | < 1000 µg/m ³ | < 10 µg/m ³ |

Documentation available

- Saint-Gobain Glass VOC declaration stating that our mirrors & lacquered glass have been rated A+ under the French regulation;
- VOC test per product;
- Discover our full range of interior design glazing in our Glass Vision & Glass design apps (<http://glassdesign.saint-gobain-glass.com/>).





Thermal comfort

Aim

To promote occupants' productivity, comfort, and well-being by providing quality thermal comfort.

Requirements

The building has to be designed (heating, ventilating, air-conditioning and building envelope) to meet the requirements of specific standards on thermal comfort (ASHRAE standard 55-2010 or ISO and CEN standards).

In addition, individual thermal comfort controls must be provided for at least 50% of individual occupant spaces. For all shared multi-occupant spaces, collective thermal comfort controls can be installed. Thermal comfort controls allow occupants, whether in individual spaces or shared multi-occupant spaces, to adjust at least one of the following in their local environment: air temperature, radiant temperature, air speed, and humidity.

Our contribution

The use of high-performance glazing contributes to thermal comfort in both winter and summer, through efficient insulation solar control, and by eliminating the cold areas around windows.

- **In winter, the heat remains inside, which brings warmth and comfort.** The high-performance insulation properties of Saint-Gobain glazing, such as SGG COOL-LITE XTREME (Ug coefficient down to 0.9 W/m².K for a CLIMAPLUS double-glazed unit and to 0.5 W/m².K for a CLIMATOP triple-glazed unit), minimize heat loss and make the building comfortable.



- An occupant working close to a window may feel a certain discomfort due to direct sunlight or coldness emanating from the facade. **Saint-Gobain's glazing eliminates this so-called "cold wall" effect**, even in winter with an indoor-outdoor temperature difference higher than 20°C. The difference between room temperature and the inner surface of the glass remains low and rarely exceeds 3°C. Such a difference practically goes unnoticed, thus improving the feeling of comfort. The EGLAS, an integrated and invisible heating glass solution can additionally contribute to indoor thermal comfort by controlling radiant heat.

- **In summer, solar gains are reduced thanks to solar control glass, which limits overheating** and the need for air-conditioning. Saint-Gobain provides a range of coated glass, like SGG COOL-LITE XTREME well-suited for the design of building envelopes. Thanks to its electronically tintable glass, SageGlass maximizes both summer & winter comfort.

| Products |
|---|
| All CLIMAPLUS and CLIMATOP with the following coated glass: |
| SGG PLANITHERM |
| SGG PLANISTAR SUN PLUS |
| SGG COOL-LITE (as SKN, XTREME) |
| SGG ANTELIO |
| EGLAS |
| SageGlass |



Daylight

Aim

To connect building occupants with the outdoors, reinforce circadian rhythms, and reduce the use of electrical lighting by introducing daylight into the space.

Requirements

The first requirement consists in providing manual or automatic (with manual override) glare-control devices for all regularly-occupied spaces.

Then, three options are proposed to measure the daylight in the building which has to meet specific thresholds:

1. By simulating, evaluate the spatial daylight autonomy and annual sunlight exposure (2 or 3 points);
2. By simulating, evaluate the illuminance levels (1 or 2 points);
3. Measure the illuminance level when the building is finished (2 or 3 points).

Our contribution

Glass transparency

Glass by nature is the perfect material to connect indoor and outdoor spaces. With its broad range of coated glass products, providing a wide variety of visible light transmittance (from less than 10% to more than 90% for anti-reflective sgg VISION LITE) while limiting energy transfer through the glass (selectivity up to 2.5, for sgg COOL-LITE XTREME), Saint-Gobain glazing can help maximize the natural light entering the building and maximize autonomy without artificial lighting.



Used in doors and partitions, glass is also a very important material inside buildings. It maximizes light input, reaching those offices furthest away from the outer wall, and corridors, too, benefit from the same input, a key aspect for user comfort. Glass can even be used as flooring (LITE FLOOR), and enables light to enter the building from the top through all floors.

If both day lighting and privacy is required, PRIVALITE is the answer. This opalescent glass can become transparent when needed, by simply switching on a current inside the glazing.

Glare control

Saint-Gobain offers a fully-integrated system including a movable blind embedded in the cavity of an insulated glass unit, like CLIMAPLUS/CLIMALIT SCREEN and the DLS ECKLITE systems.

In addition, SageGlass, which is electronically tintable glass that improves building energy performance, enhances the way people experience daylight in buildings by controlling glare and enables more sustainable design and construction by replacing mechanical shades.

Products

- SGG PLANITHERM
- SGG PLANISTAR SUN PLUS
- SGG COOL-LITE (as SKN, XTREME)
- SGG ANTELIO
- SGG DIAMANT
- SGG VISION-LITE
- LITE FLOOR
- PRIVALITE
- SageGlass
- CLIMAPLUS/CLIMALIT SCREEN
- DLS ECKLITE



Quality views

Aim

To connect a building’s occupants with the natural outdoor environment by providing quality views.

Requirements

A direct line of sight to the outdoors via vision glazing must be achieved for 75% of all regularly-occupied floor area. View glazing in the contributing area must provide a clear image of the exterior, unobstructed by frits, fibers, patterned glazing, or added tints that distort color balance.

Additionally, 75% of all regularly-occupied floor area must have at least two of the following four kinds of views:

- Multiple lines of sight to vision glazing in different directions at least 90 degrees apart;
- Views that include at least two of the following: (1) flora, fauna, or sky; (2) movement; and (3) objects at least 25 feet (7.5 meters) from the exterior of the glazing;
- Unobstructed views located within three times’ head height distanc from the vision glazing;
- And views with a view factor of 3 or greater, as defined in “Windows and Offices; A Study of Office Worker Performance & the Indoor Environment.”



Our contribution

A window is by nature made of transparent glass. Glazing solutions exist to suit everybody, varying in terms of light transmission, color, neutrality, degree of reflection, etc... Whatever the preference, glass offers a great way to view the world outside.

However, it is important to **maintain this direct link with the outside under all conditions.** For example, we can avoid dirty glazing thanks to SGG BIOCLEAR (self-cleaning glass) and external water condensation thanks to SGG VIEWCLEAR (anti-condensation glass).

SageGlass lets you embrace natural light and stay connected to the outdoors while preserving the comfort indoors, **even during the summertime or in southerly-exposed spaces.**

Also used internally, for partitions & doors, glass improves the view connection between people and the outside.

| Products |
|--------------------------------|
| SGG PLANITHERM |
| SGG PLANISTAR SUN PLUS |
| SGG COOL-LITE (as SKN, XTREME) |
| SGG ANTELIO |
| SGG DIAMANT |
| SGG VISION-LITE |
| SGG STADIP PROTECT |
| SGG BIOCLEAR |
| SGG VIEWCLEAR |
| SageGlass |



Acoustic performance

Aim

To provide workspaces that promote occupants' well-being, productivity, and communications through effective acoustic design.

Requirements

For all occupied spaces, the project has to meet specific requirements for:

- Heating, ventilating and air-conditioning (HVAC) background noise,
- Sound isolation,
- Reverberation time,
- And sound reinforcement and masking.

Our contribution

Traffic, work, loud music ... all these noises affect the daily quality of life, and even human health. The noise level of a downtown location surrounded by traffic is around 80dB. **High-performance acoustic glazing can bring a lot of comfort by reducing this exterior noise by up to 50dB (Rw).**

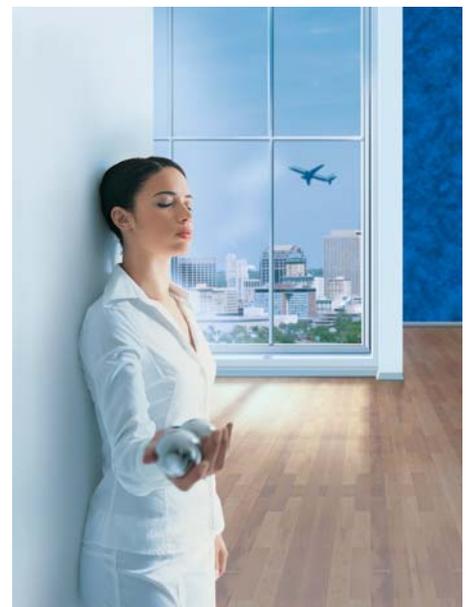
Saint-Gobain's acoustic glazing plays a vital role in protecting a room's soundscape. The choice of glazing naturally depends on the noise level outside the building (airport, small town ...).

The acoustic glazing unit is made either:

- of two panes of glass having a different thickness;
- or, a single pane and a special laminated glass (SGG STADIP SILENCE) made of two sheets of glass bonded together with a plastic sheet (PVB Silence), specially designed to enhance sound insulation.

The glazing solution then has to be integrated into a good quality, airtight frame as noise can spread through any available air passage.

Phone conversations, a noisy colleague, the photocopier... are also disturbing noises. Glass partitions made of SGG STADIP SILENCE can be an interesting solution to reduce noise pollution without blocking natural daylight. Saint-Gobain has also worked on innovative solutions to reduce reverberation time and improve acoustic comfort for the occupant (MICROSLITS). Additionally, we have developed CLIP-IN, a system of modular glazed partitions ensuring an acoustic performance of to 48dB.



| Products |
|--------------------|
| SGG STADIP SILENCE |
| CLIP-IN |
| MICROSLITS |

Documentation available

- Download our acoustic simulator app "glass-dbstation" to find out the best-performing glazing solution to combat the noise pollution of your exterior environment (www.glass-dbstation.com);
- Glazing acoustic certificates.





TNT head office, Hoofddorp, Netherlands
LEED Platinum

Architect: Architectenbureau Paul de Ruiter

SGG COOL-LITE SKN 154 and
SGG COOL-LITE SKN 165



Aim

To encourage projects to achieve outstanding or innovative levels of performance.

Requirements

Project teams can use any combination of:

- Innovation: by achieving significant, measurable environmental performance using a strategy not addressed in the LEED green building rating system;
- Pilot: by achieving one pilot credit from USGBC’s LEED Pilot Credit Library;
- And exemplary performance strategies: an exemplary performance point is typically earned for achieving double the credit requirements or the next incremental percentage threshold.

Our contribution

Saint-Gobain offers a wide range of innovative glazing capable of responding to different kind of needs with impressive and exemplary performances. Thanks to Saint-Gobain’s eco-innovation policy, we are also working on developing and distributing innovative products and solutions that help reduce the environmental impact of buildings and infrastructure over their whole life cycle.

Over the last 2 years, Saint-Gobain has created:

- SGG COOL-LITE XTREME 50/22 II, best selective glazing (2.27) on the market, which allows 2.27 more light than energy to enter the building while having an excellent Ug value;
- SGG VIEWCLEAR, a new anti-condensation glass that keeps the view clear even in cold humid conditions;
- SGG MIRALITE PURE, a mirror that combines an unparalleled level of quality with a unique environmental performance thanks to its water-based protective paint and a composition with no lead added. This technical breakthrough makes for better working conditions and greater user comfort, presenting an almost undetectable VOC rate;
- CLIP-IN SILENCE DOORS, with amazing acoustic properties up to 42dB in partitions.

These are just a few examples of Saint-Gobain’s innovation capabilities...

Saint-Gobain glazing can also be an asset for pilot credits, such as:

- Ergonomics strategy: to promote healthy, comfortable, and productive work by designing the workplace to accommodate its users. Through its transparency, glass, used externally or as a partition, brings comfort, productivity and wellbeing to occupants.
- Bird collision deterrence: to reduce bird injury and mortality from in-flight collisions with buildings. Thanks to special design patterns & colors, our 4BIRD glazing makes façades visible for bird. A discreet but effective, permanent and bird-friendly solution.
- Environmentally preferable interior finishes and furnishings. As mirrors (SGG MIRALITE REVOLUTION and SGG MIRALITE PURE), or lacquered glass (SGG PLANILAQUE EVOLUTION / DECOLAQUE), glass can be used in furniture and contribute to its environmental friendliness thanks to our eco-innovation process, based on the Life Cycle Assessment of our products.





WORLD GREEN BUILDING COUNCIL

For many years now, Saint-Gobain has been involved in local efforts to promote sustainable buildings by joining Green Building Councils (GBCs). Today we are actively involved, both locally and globally:

- Member of the Corporate Advisory Board of the World GBC,
- Partner of the European Regional Network,
- Platinum member of the US GBC,
- Member of more than 30 national GBCs worldwide.

Discover how Saint-Gobain glazing can be an asset for other green building certifications:

- BREEAM with Saint-Gobain Glass
- HOE with Saint-Gobain Glass (in French)
- DGNB with Saint-Gobain Glass (in German)



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DISCLAIMER

This brochure only provides an indication on the possible credits which our glass products could yield in relation to a LEED rating system. It is intended as a guide in the choice of appropriate glazing in relation to the LEED credit rating system and has no binding value. The LEED credit rating of a project is influenced by a variety of factors, such as the type of building, configuration of all the other elements of the building in addition to the glass, final configuration of the glazing itself, etc. The final rating is subject to the performance of a LEED assessment as per the LEED methods and procedures available on their site. It is the user's responsibility to choose the appropriate building environmental assessments methods destined to ensure that the building meets regulatory requirements at national, local or regional level.

SAINT-GOBAIN

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