

Earn **BREEAM® International NC 2016** Credits with AGC glass



What is BREEAM®?

BREEAM® (Building Research Establishment Environmental Assessment Method) is a green building certification developed by **BRE Global** (in the UK) in which the total performance of a building is compared to a set of specific criteria. There are multiple BREEAM® certification schemes for better assessing the environmental performance of a project depending on its location, function (office, retail, etc.) and type of construction (refurbishment, new construction, etc.). This document refers to BREEAM® International New Construction 2016 (BREEAM® International NC 2016), which applies to new constructions.

As of 2016, all new projects must comply with BREEAM® International NC 2016, which places more emphasis on product transparency, information disclosure and a better understanding of the life cycle of the building's materials and components.

How does it work? BREEAM® International NC 2016 is divided into ten environmental sections, in each of which a range of assessment issues provide credits when the project meets the requirements. The assessment is conducted at the building level, meaning that achieving high score involves BREEAM® criteria being considered at each stage of the project (design, conception, construction, use). Building materials are part of this equation and can help you achieve higher scores.





How can AGC Glass Europe help you to gain BREEAM® credits?

In order to support our customers' efforts to improve their building's rating, AGC Glass Europe has joined forces with **third-party BREEAM® assessors** to analyse how AGC glass solutions could contribute within the certification system. Glass itself is an outstanding material for enhancing building performance and, directly or indirectly*, impacts four of the ten environmental sections (highlighted in green in the table below).

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

* Most of the contribution to assessment issues comes from the combination of glass and other building materials; together they can help impact the assessment issue.

| Sections | Assessment issue | Assessment issue reference | Weighting | Credits influenced by glass |
|-----------------------------------|---|----------------------------|----------------|-----------------------------|
| Energy (ENE) | Energy efficiency | ENE 01 | 19% | 15 (11%) |
| Materials (MAT) | Life cycle impacts | MAT 01 | 12.5% | 6 |
| | Responsible sourcing of construction products | MAT 03 | | 3 (9%) |
| Health and Wellbeing (HEA) | Visual comfort* | HEA 01 | 14% | 3 |
| | Indoor air quality | HEA 02 | | 1 |
| | Thermal comfort | HEA 04 | | 1 (5%) |
| | Acoustic performance | HEA 05 | | 1 |
| Innovation (IN) | Exemplary level & innovation | INN | Additional 10% | 9 (9%) |
| | | | | 39 (34%) |



*This credit is only influenced by glass products.



In BREEAM® International NC 2016, calculating building performance is a two-step process:

- Step one: assess for each of the ten sections how much of the available credits your project achieves.
- Step two: apply the weightings between the different sections.

The percentage reached determines the certification level: higher levels of achievement are rewarded with higher levels of certification.

| Pass | Good | Very good | Excellent | Outstanding |
|--------|--------|-----------|-----------|-------------|
| 30-45% | 45-55% | 55-70% | 70-85% | ≥ 85% |

For an office building, AGC Glass Europe products can contribute **up to 34% of the total ranking** out of 110% (100% for the 9 sections and an additional 10% for innovation) to certification. This document offers an overview of how AGC products provide solutions for each green building project. AGC also provides customers dedicated information in order to guarantee that each project enjoys specialised support and achieves higher performance.

If you have any questions, please contact our Sustainability & Product Stewardship department at sustainability@eu.agc.com.

ENERGY (ENE)

— AGC GLASS PRODUCTS CAN INFLUENCE 15 OUT OF 26 CREDITS AVAILABLE —

REDUCTION OF ENERGY USE AND CARBON EMISSIONS (ENE 01)

| Intent | Contribution from AGC products |
|--|---|
| <p data-bbox="526 646 851 885"><i>To recognise and encourage buildings designed to minimise operational energy demand, primary energy consumption and CO₂ emissions.</i></p> <p data-bbox="571 925 851 965">→ UP TO 15 CREDITS</p> | <p data-bbox="907 646 1220 678">ASSESSMENT CRITERIA</p> <p data-bbox="907 702 1758 853">Thermally modelling the building and comparing it against BREEAM best practice specifications is the best way to obtain the highest number of credits available. The number of credits awarded depends on the relative performance of the building.</p> <p data-bbox="907 877 1758 997">It is also possible to demonstrate energy performance at building product level. For glass, the windows must fall within the thermal insulation range (U_g) of 1.2 W/m².K to 1.9 W/m².K depending on project location.</p> <p data-bbox="907 1005 1590 1037">Note, however, that this enables a lower number of credits.</p> |

AGC SOLUTION

With respect to energy performance optimisation, AGC is at the forefront in developing coated glass that contributes to thermal insulation, solar control and glare control.

- **Thermal insulation:** AGC has developed a wide range of super-insulating coated glass products* with a variety of low light reflection and neutral appearance values. One such product is **iplus**, which saves energy while ensuring a comfortable living space.
- **Solar control:** AGC manufactures various solar control solutions including both magnetron-coated (e.g. **Stopray, ipasol**) and pyrolytic-coated (e.g. **Stopsol, Sunergy** and **Planibel G**) ranges. They allow sunlight to pass through a window or facade while radiating and reflecting much of the sun's heat, making indoor spaces much cooler and saving on air conditioning costs.
- **Smart-tinting glass system:** In this highly advanced solution (**Halio**), the window transitions from clear to dark through a reaction involving chemicals and low-voltage electricity. In its clear state, it lets in more light from the outside; a room or building can cut lighting costs by harnessing natural light and can even benefit from free solar gain. Then, by tinting the glass during certain times of day, the building can lower its air conditioning costs by blocking glare and drastically reducing the influx of solar heat.

AGC offers its customers limitless creativity for using coated glass in multiple ways: simply as a single glass pane that can be laminated, bent, toughened, etc., or assembled in insulating glazing that includes advanced double and triple glazed units with highly prized low-emissivity characteristics achieving performance levels of 0.4-0.5 W/(m².K).

*The list of products mentioned in this document is not exhaustive.

MATERIALS (MAT)

— AGC GLASS PRODUCTS CAN INFLUENCE 9 OUT OF 12 CREDITS AVAILABLE —

LIFE CYCLE IMPACTS (MAT 01)

| Intent | Contribution from AGC products |
|--|--|
| <p><i>To recognise and encourage the use of Life Cycle Assessment (LCA) tools to choose low environmental impact building materials.</i></p> <p>→ UP TO 6 CREDITS</p> | <p>ASSESSMENT CRITERIA</p> <p>The main option for gathering credits is to carry out an LCA (Life Cycle Assessment) study at building level over the full life cycle. Note that building performance has no influence on the credits awarded. In BREEAM International NC 2016, the criteria only assess how complete and robust the LCA performed is. This criterion allows for up to five credits.</p> <p>Selecting at least five building products at design stage - which are installed by post-construction stage and covered by verified Environmental Product Declarations (EPDs) - allows for one credit.</p> <p>In case of highly robust LCA and at least 10 products covered by verified EPDs, an extra credit is awarded for achieving an exemplary level in the Innovation section.</p> <p>AGC SOLUTION</p> <p>AGC provides EPDs verified by an external assessor for the following ranges of products:</p> <ul style="list-style-type: none">→ Float (Planibel)→ Magnetron-coated glass (ipasol, Stopray)→ Pyrolytic-coated glass (Stopsol, Sunergy, Planibel G Fast)→ Fire-resistant glass (Pyrobel)→ Mirrors (Mirox)→ Painted glass (Lacobel, Lacobel T) |



- Insulating glazing (**Thermobel, iplus/ipasel Insulating Glazing**)
- Laminated safety glass (**Stratobel and Stratophone**)*

All these EPDs conform to standards ISO 14025, 14040/14044 and EN 15804. They are available upon request.

Key fact: For each tonne of CO₂ emitted by AGC Glass Europe during the glass production process, nearly 10 tonnes of CO₂ are saved by using of our products!

* The EPDs for Stratobel and Stratophone are common to the laminated glass industry. AGC is currently working on an AGC specific version.

RESPONSIBLE SOURCING OF CONSTRUCTION PRODUCTS (MAT 03)

| Intent | Contribution from AGC products |
|--|---|
| <p><i>To recognise and encourage the specification and procurement of responsibly sourced construction products.</i></p> <p>→ UP TO 3 CREDITS</p> | <p>ASSESSMENT CRITERIA</p> <p>Provide evidences that construction products are from responsible sources certified by an Environmental Management System (EMS) or a responsible sourcing certification scheme.</p> <p>For glass products, BREEAM specifies that key processes from the supply chain must be covered by an EMS:</p> <ul style="list-style-type: none"> → Float production → Soda ash and sand suppliers <p>AGC SOLUTION</p> <p>AGC Glass Europe is committed to responsibly sourcing its products. Our key raw materials suppliers and our plants (float and glass processing) are certified ISO 14001*, allowing BREEAM® recognition.</p> <p>ISO 14001 certifications of the supply chain of specific products are available upon request.</p> |

* ISO 14001 is an Environmental Management System attesting to the company's responsible sourcing.

HEALTH AND WELLBEING (HEA)

— AGC GLASS PRODUCTS CAN INFLUENCE 9 OUT OF 18 CREDITS AVAILABLE —

VISUAL COMFORT (HEA 01)

| Intent | Contribution from AGC products |
|--|---|
| <p><i>To ensure daylighting, artificial lighting and occupant controls are considered at the design stage to ensure best practice visual performance and comfort for building occupants.</i></p> <hr/> <p>→ UP TO 3 CREDITS</p> <hr/> | <p>ASSESSMENT CRITERIA</p> <p>This assessment issue covers three different aspects:</p> <ol style="list-style-type: none">1. Glare control Demonstrate that building design has the potential to disable glare and that glare control strategy avoids increasing lighting energy consumption.2. Daylighting The building must meet minimum levels of daylight factor with a defined illuminance value and ensure 80% of the room has a direct view of the sky.3. View out Demonstrate that 95% of the floor area has a minimum share of window or opening in the surrounding walls:<ul style="list-style-type: none">→ 20% of the surrounding walls within 7 meters→ 35% of the surrounding walls within 14 meters <p>AGC SOLUTION</p> <ol style="list-style-type: none">1. Glare control Halio glass is a highly innovative smart tinting glass solution. Depending on weather conditions and orientation, Halio automatically changes its tint to comply with ideal light transmission and solar heat gain characteristics. |

2. Daylighting

Glass is unique amongst all building materials in its ability to let natural light enter the building through glazed facades, doors and partition walls. Products like **Planibel Clearvision**, a highly transparent glass, deliver excellent visible light transmission, thus maximising natural daylight.

3. View out

With AGC products, building occupants can visually connect with the outdoor environment while performing their everyday tasks. Project teams can use glazing products to capitalise on desirable views while factoring in the energy and comfort implications. **All float and coated glass products** can help to meet your needs.

INDOOR AIR QUALITY (HEA 02)

| Intent | Contribution from AGC products |
|---|--|
| <p><i>To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes.</i></p> <p>→ UP TO 1 CREDIT</p> | <p>ASSESSMENT CRITERIA</p> <p>Demonstrate that building products comply with emission limits regarding formaldehyde, volatile organic compounds (VOC) and carcinogenic emissions 1A and 1B.</p> <p>AGC SOLUTION</p> <p>BREEAM® recognises glass as an inherently non-emitting VOC material, which means no testing report is required, provided the products do not include organic-based coatings, binders or sealant.</p> <p>AGC decorative painted glass products contain organic-based coatings. The paints used in AGC's Mirox, Lacobel and Matelac products are applied to the glass in the company's plants.</p> <p>The tests conducted as per the standards on the potential release of VOC emissions showed very low levels of VOC and formaldehyde emissions. All our products are rated A+ or A (the two best performance classes) under the French regulation.</p> |

THERMAL COMFORT (HEA 04)

Intent

Contribution from AGC products

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

→ **UP TO 1 CREDIT**

ASSESSMENT CRITERIA

Demonstrate the building's compliance with thermal comfort standard ISO 7730:2005 by providing a thermal analysis of the project.

AGC SOLUTION

AGC provides a wide range of coated glass products (e.g. **Stopray, Sunergy, Stopsol, iplus, ipasol, Planibel G**) that can be assembled in (double or triple) insulating glazing units featuring a low solar factor and a high thermal insulation value. These products help prevent discomfort for people seated next to windows. Their high level of insulation reduces cold emanating from windows while the solar factor reduces overheating.

ACOUSTIC PERFORMANCE (HEA 05)

Intent

Contribution from AGC products

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

→ **UP TO 1 CREDIT**

ASSESSMENT CRITERIA

Comply with indoor ambient noise level (e.g. ≤ 40 dB L_{AeqT} for single occupancy office) and meet minimum sound insulation levels between acoustically sensitive rooms.

AGC SOLUTION

Well-designed acoustics can enhance the environmental quality of the space by facilitating communication, increasing productivity, improving the well-being of workers or aiding in noise control and speech privacy. Double glazing with **Stratophone** laminated glass reduces noise by up to 52 dB (Rw).

INNOVATION (IN)

— AGC GLASS PRODUCTS CAN INFLUENCE 9 OUT OF 10 CREDITS AVAILABLE —

INNOVATION IN DESIGN (INN)

| Intent | Contribution from AGC products |
|--|---|
| <p data-bbox="398 691 667 1002"><i>To support innovation within the construction industry through the recognition of sustainability-related benefits which are not rewarded by standard BREEAM issues.</i></p> <hr/> <p data-bbox="398 1050 667 1082">→ UP TO 9 CREDITS</p> <hr/> | <p data-bbox="719 691 1032 722">ASSESSMENT CRITERIA</p> <p data-bbox="719 746 1570 818">This assessment issue aims to support exemplary projects and those ones with innovative solutions.</p> <p data-bbox="757 842 1061 874">1. Exemplary buildings</p> <p data-bbox="719 882 1554 954">Demonstrate exemplary level of performance in existing BREEAM issues, such as:</p> <ul data-bbox="757 978 1099 1090" style="list-style-type: none">→ Reduction of energy use→ Indoor air quality→ Life cycle impacts <p data-bbox="719 1114 1263 1145">AGC products contribute to up to eight credits.</p> <p data-bbox="757 1169 1061 1201">2. Innovative solutions</p> <p data-bbox="719 1209 1554 1281">Include an innovation solution in your building project, document it and submit an application for one innovation credit to BRE Global.</p> |

AGC SOLUTION

1. Exemplary buildings

AGC provides advanced products that can contribute towards achieving an exemplary level in several BREEAM® issues:

→ *Reduction of energy use*

AGC's Low-E triple glazing (**Thermobel TG Top, Thermobel TG Advanced**) show very low Ug-values (down to 0.4 W/m².K), drastically reducing heat losses in winter. **Thermobel TG Energy** combines these thermal insulation characteristics with a low solar gain factor, avoiding overheating on south-facing facades during summer.

→ *Indoor air quality*

As an inherently non-emitting material, glass is a powerful ally in enhancing indoor air quality.

→ *Life cycle impacts*

Our product-specific, third-party verified EPDs can contribute towards achieving an exemplary level for the life cycle impact issue.

2. Innovative solutions

AGC is continually developing innovative products so it can meet future demands. **Halio** is typically a breakthrough innovation. This smart-tinting glass system can be programmed to adapt automatically to specific building requirements, taking into account criteria such as the function, location and orientation of the building as well as local weather conditions. Halio comes with a centralised remote management system so the user can monitor the status of all system components in real time, enabling automated, proactive and predictive operation. Building information can be processed to ensure continuous improvement and optimised performance throughout the system's life cycle.



BELGIUM LOUVAIN-LA-NEUVE, AGC GLASS BUILDING - THERMOBEL TOP N+ ON CLEARVISION, THERMOBEL ENERGY N ON CLEARVISION AND ARTLITE ON CLEARVISION - PHILIPPE SAMYN AND PARTNERS SPRL, ARCHITECTS AND ENGINEERS - BEAI SA - **BREEAM EXCELLENT**

POLAND WARSAW, ATLANTIC - STOPRAY VISION 50T - AMC ANDRZEJ M. CHÓLDZYŃSKI - **BREEAM EXCELLENT**

For more information please consult AGC's yearly sustainability report on www.agc-glass.eu/en/sustainability or send your questions and/or suggestions by email to the Sustainability & Product Stewardship department at sustainability@eu.agc.com.

AGC GLASS EUROPE, A LEADER IN FLAT GLASS

AGC Glass Europe is the European branch of AGC, the world's leading flat glass producer. Its baseline, Glass Unlimited, reflects its core assets: innovative strength in advanced glass technologies, a global sales network and an industrial presence stretching from Spain to Russia. AGC Glass Europe has representatives worldwide. See www.agc-yourglass.com for more addresses.

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