EARN BREEAM® INTERNATIONAL NC 2016

Credits with AGC glass

UPDATE 2021

AGC

Your Dreams, Our Challenge

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.

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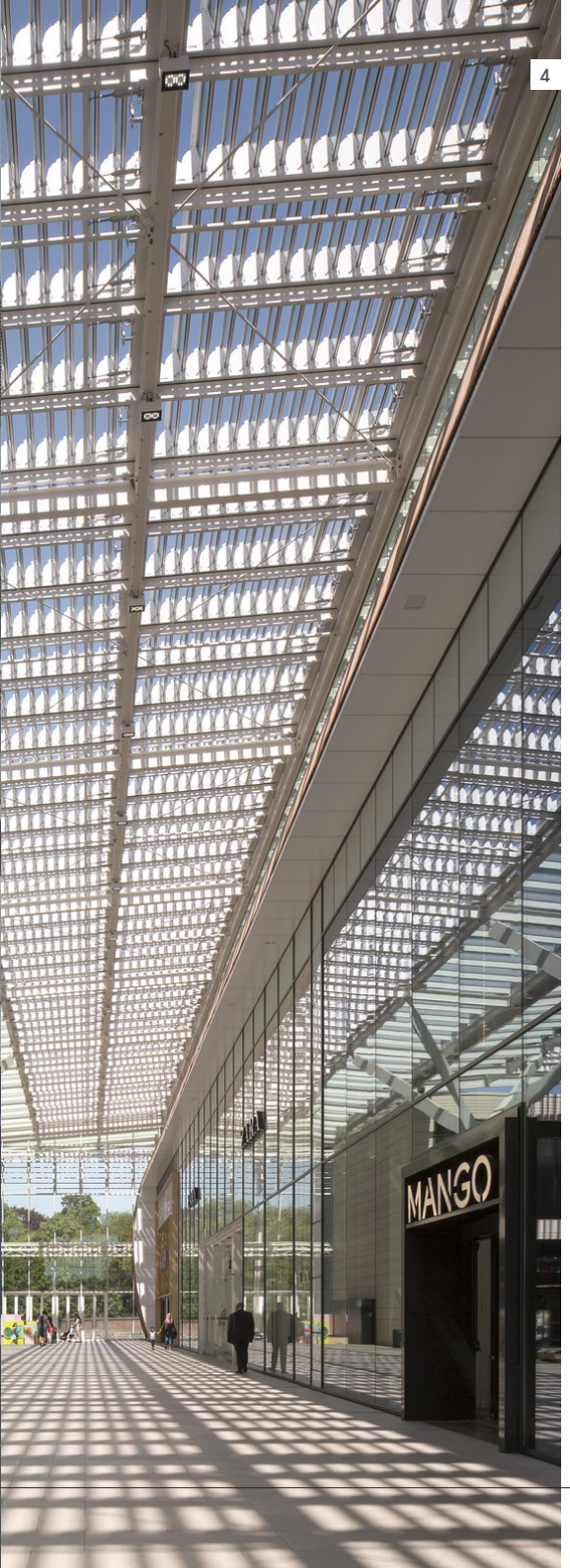
BELGIUM BRUSSELS, DOCKS BRUXSEL - IPASOL NEUTRAL 70/37 AND IPLUS ENERGY N - *ART & BUILD* - **BREEAM EXCELLENT** (COVER)
BELGIUM BRUSSELS, GREENBIZZ BRUSSELS - STOPRAY VISION-50 ON CLEARVISION - *ARCHITECTESASSOC* - **BREEAM EXCELLENT** (PICTURE 1)
UNITED KINGDOM LONDON, 5 BROADGATE - IPASOL LIGHT GREY 60/33 - *MAKE* - **BREEAM EXCELLENT** (PICTURE 2)



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

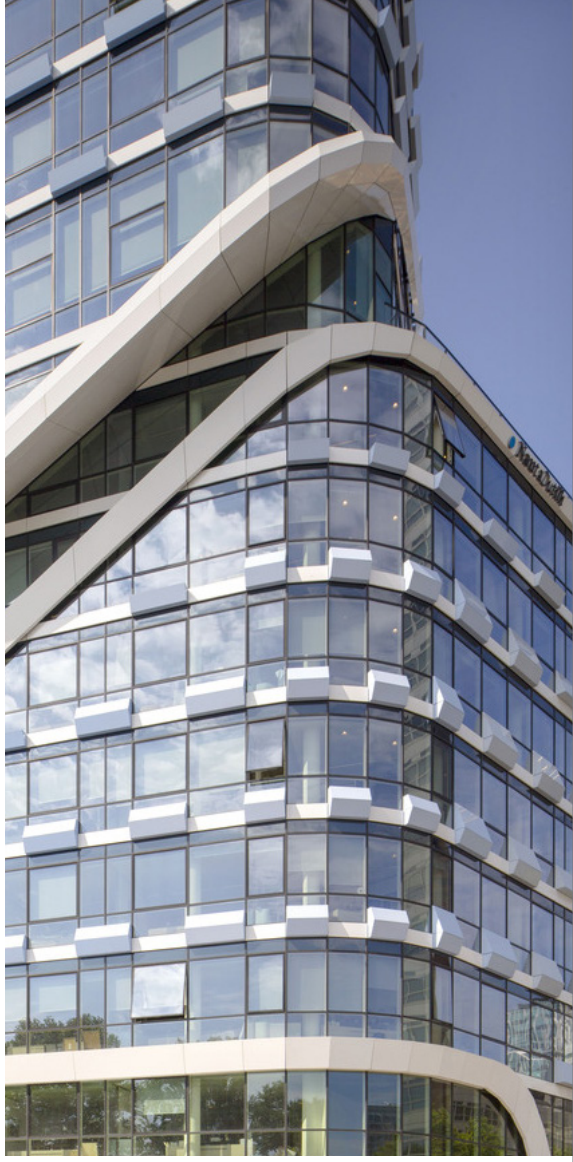
In order to support our customers' efforts to improve their building's rating, AGC Glass Europe has joined forces with **third-party BREEAM® assessors** to analyse how AGC glass solutions could contribute within the certification system. Glass itself is an outstanding material for enhancing building 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

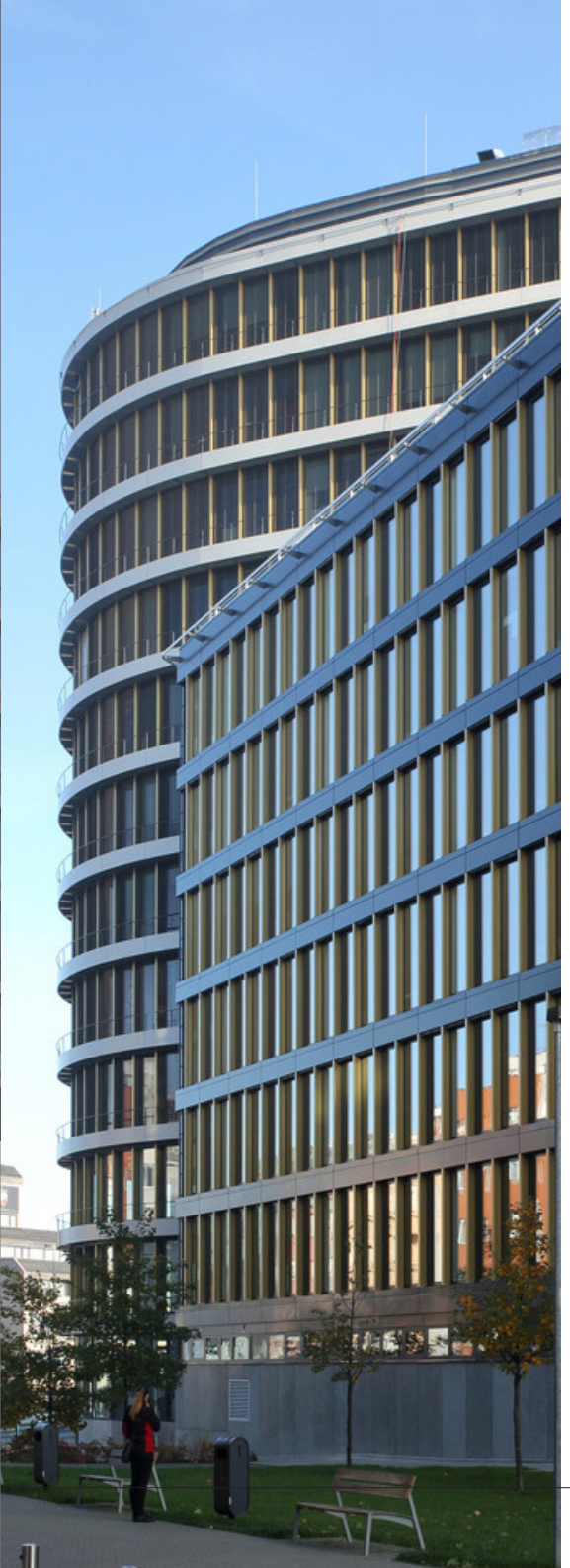
* Most of the contribution to assessment issues comes from the combination of glass and other building materials; together they can help impact the assessment issue.

CZECH REPUBLIC PRAGUE, BUTTERFLY KARLIN - STOPRAY VISION-61 - **BREEAM EXCELLENT** (PICTURE 3)
BELGIUM BRUSSELS, DOCKS BRUXSEL - IPASOL NEUTRAL 70/37 AND IPLUS ENERGY N - *ART & BUILD* - **BREEAM EXCELLENT** (PICTURE 4)

Sections	Assessment issue	Assessment issue reference	Weighting	Credits influenced by glass	
Energy (ENE)	Energy efficiency	ENE 01	19%	15	(8%)
Materials (MAT)	Life cycle impacts	MAT 01	12.5%	6	(8%)
	Responsible sourcing of construction products	MAT 03		3	
Health and Wellbeing (HEA)	Visual comfort*	HEA 01	14%	3	(4%)
	Indoor air quality	HEA 02		1	
	Thermal comfort	HEA 04		1	
	Acoustic performance	HEA 05		1	
Innovation (IN)	Exemplary level & innovation	INN 01	Additional 10%	9	(9%)
				39	**(29%)**



*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 29% 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.

CZECH REPUBLIC PRAGUE, ENTERPRISE OFFICE CENTRE - IPLUS 1.1 T, STRATOPHONE IPLUS 1.1T 66.2 AND ARTLITE - *ING. ARCH.VLADIMÍR KRÁTKÝ* - **BREEAM EXCELLENT**

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
To recognise and encourage buildings designed to minimise operational energy demand, primary energy consumption and CO_2 emissions.	**ASSESSMENT CRITERIA**
→ **UP TO 15 CREDITS**	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. It is also possible to demonstrate energy performance at product level. For glass, the windows must fall within the thermal insulation range (Ug) of 1.2 W/m².K to 1.9 W/m².K depending on project location. Note, however, that this enables a lower number of credits.

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, Energy**) 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.

→ **Self-supply of Renewable energy:** SunEwat is AGC's range of energy-generating glazing. Monocrystalline or polycrystalline photovoltaic cells are embedded between sheets of laminated safety glass. The product is then installed in the shell of the building as an alternative to conventional construction elements. Since the photovoltaic cells are built right into the glazing, it is not necessary to install a separate photovoltaic system. This product enhances a building's ability to produce energy from a renewable energy resource. SunEwat offers various types of energy-generating solutions, either transparent, for window applications, or opaque, for spandrel and cladding applications.

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

To recognise and encourage the use of Life Cycle Assessment (LCA) tools to choose low environmental impact building materials.

→ **UP TO 6 CREDITS**

Contribution from AGC products

ASSESSMENT CRITERIA

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.

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.

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.

AGC SOLUTION

AGC provides EPDs verified by an external assessor for the following ranges of products:

- → Float **(Planibel)**
- → Magnetron-coated glass **(iplus, Planibel AS, Energy, ipasol, Stopray)**
- → Pyrolytic-coated glass **(Stopsol, Sunergy, Planibel G Fast)**
- → Fire-resistant glass **(Pyrobel, Pyrobelite)**
- → Mirrors **(Mirox)**
- → Painted glass **(Lacobel, Lacobel T)**

EPD VERIFIED

→ Insulating glazing **(Thermobel, iplus/ipasol Insulating Glazing)**
→ Laminated safety glass **(Stratobel, Stratophone, ipasafe, ipaphon)**
→ Acid-etched glass **(Matelux)**

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

Key fact: For each tonne of CO_2 emitted by AGC Glass Europe during the glass production process, nearly 8 tonnes of CO_2 are avoided by using of our products!

RESPONSIBLE SOURCING OF CONSTRUCTION PRODUCTS (MAT 03)

Intent

To recognise and encourage the specification and procurement of responsibly sourced construction products.

→ **UP TO 3 CREDITS**

Contribution from AGC products

ASSESSMENT CRITERIA

Provide evidences that construction products are from responsible sources certified by an Environmental Management System (EMS) or a responsible sourcing certification scheme.

For glass products, BREEAM specifies that key processes from the supply chain must be covered by an EMS:

→ Float production
→ Soda ash and sand suppliers

AGC SOLUTION

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.

ISO 14001 certifications of the supply chain of specific products are available upon request.

* 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

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.

→ **UP TO 3 CREDITS**

Contribution from AGC products

ASSESSMENT CRITERIA

This assessment issue covers three different aspects:

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:

- → 20% of the surrounding walls within 7 meters
- → 35% of the surrounding walls within 14 meters

AGC SOLUTION

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
To recognise and encourage a healthy internal environment through the specification and installation of appropriate ventilation, equipment and finishes. → **UP TO 1 CREDIT**	**ASSESSMENT CRITERIA** Demonstrate that building products comply with emission limits regarding formaldehyde, volatile organic compounds (VOC) and carcinogenic emissions 1A and 1B. **AGC SOLUTION** 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. 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. 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.

THERMAL COMFORT (HEA 04)

Intent

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**

Contribution from AGC products

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 $L_{Aeq\,T}$ 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
To support innovation within the construction industry through the recognition of sustainability-related benefits which are not rewarded by standard BREEAM issues.	**ASSESSMENT CRITERIA** This assessment issue aims to support exemplary projects and those ones with innovative solutions. **1. Exemplary buildings** Demonstrate exemplary level of performance in existing BREEAM issues, such as: → Reduction of energy consumption and carbon emissions → Indoor air quality → Life cycle impacts AGC products contribute to up to eight credits. **2. Innovative solutions** Include an innovation solution in your building project, document it and submit an application for one innovation credit to BRE Global.
→ **UP TO 9 CREDITS**	

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.

AGC's **SunEwat** range of energy-generating glazing enhances a building's ability to produce energy from a renewable energy resource. Since the photovoltaic cells are built right into the glazing, it is not necessary to install a separate photovoltaic system. SunEwat offers various types of energy-generating solutions, either transparent (for window applications), or opaque (for spandrel and cladding applications).

→ *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.

Fineo is much more than glass technology. This vacuum insulating glass not only delivers amazing energy performance but also combines exceptionally high thermal insulation with impressive soundproofing and unrivalled durability. The thin vacuum insulating glass also provides an elegant, sleek look. This makes maximum use of sunlight and solar energy. Fineo insulates just as well as triple glass, but is lighter and thinner. So the installation is much less labour-intensive than replacing the complete window frames. This often makes Fineo the most economical solution for renovation and restoration projects.

Fineo is also a sustainable investment, because this insulating glass is 100% recyclable. And the vacuum glass also has a very long life without loss of performance. So the building envelope maintains its optimal comfort for decades.

POLAND WARSAW, MOKOTÓW NOVA - STOPRAY VISION-50 ON CLEARVISION AND STOPRAY VISION-50T - *JASPERS-EYERS* - **BREEAM VERY GOOD**

UNITED KINGDOM LONDON, 70 ST MARY AXE, STOPRAY VISION-60 ON CLEARVISION - *FOGGO* - **BREEAM EXCELLENT**

CZECH REPUBLIC OSTRAVA, NOVÁ KAROLINA PARK OSTRAVA - STRATOBEL STOPRAY 66.2 AND STRATOBEL STOPRAY 66.2 - *CMC ARCHITECTS* - **BREEAM VERY GOOD**

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 EUROPEAN LEADER IN FLAT GLASS

Based in Louvain-la-Neuve (Belgium), AGC Glass Europe produces, processes and markets flat glass for the construction industry (external glazing and interior decoration), car manufacture and other industrial sectors (transport, solar power and high-tech). It is the European branch of AGC, a world leader in flat glass. It has over 100 sites throughout Europe, from Spain to Russia. More information on www.agc-yourglass.com.

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