AGC GLASS EUROPE

ENVIRONMENTAL AND HEALTH PRODUCT DECLARATION

Thermobel TG Top:

① 4 mm iplus 1.1 pos.2 Annealed ② 16 mm Argon 90% ③ 4 mm Planibel Clearlite Annealed ④ 16 mm Argon 90% ⑤ 4 mm iplus 1.1 pos.5 Annealed

Mounting accessories excluded

In accordance with ISO 14025:2010, NF EN 15804+A2:2019 and its French national complement NF EN 15804/CN:2022

Creation date: 26/01/2025
Mother EPD registration number: 20240940466-FC
Configured EPD unique ID: 20240940466-FC_111060_792548

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1. Warning

The information contained in this declaration is provided under the responsibility of AGC Glass Europe in accordance with NF EN 15804+A2 and the national supplement NF EN 15804+A2/CN.

Any total or partial use , in whole or in part, of the information provided in this document must at least be accompanied by the full reference of the original EPD and its producer, who will be able to provide a complete copy.

Standard NF EN 15804+A2 and the NF EN 15804+A2/CN national complement serve as rules for Product Category Rules (RCP).

2. Reading guide

Example reading: -9.0 E -03 = -9.0 x 10^{-3}
The following display rules apply:

- When the inventory calculation result is zero, then the value zero is displayed.
- Abbreviation used:
  LCA: Life Cycle Assessment
  EPD: Environmental Product Declaration
  RLT : Reference Life Time
  FDES: Fiche de Déclaration Environnementale et Sanitaire (Environmental and Health Declaration Sheet)
  PCR: Product Category Rules
  FU: Functional Unit
  NPD : No performance Determined

- The units used are specified in front of each flow: kilogram "kg", gram "g", kilowatt-hour "kWh", megajoule "MJ", square meter "m²", kelvin "K", watt "W", kilometer "km", millimeter "mm".

Results for environmental impacts and indicators of resource use, waste categories and outflows are presented to three significant figures and in scientific format.

All positive values ("greater than zero") correspond to environmental impacts, while negative values ("less than zero") correspond to environmental benefits. This approach applies to all modules, including Module D. When the value of Module D is greater than 0, it is an additional impact to be added to the impacts of the other life cycle modules.

3. Precaution for the use of EPD for product comparison

Construction product EPDs may not be comparable if they do not comply with standard NF EN 15804+A2
The NF EN 15804+A2 standard defines in § 5.3 Comparability of EPDs* for construction products, the conditions under which construction products can be compared, based on the information provided by the EPD:

> "Consequently, a comparison of the environmental performance of construction products using EPD information must be based on the use of the products and their impacts on the building, and must take into account the entire life cycle (all information modules)."

NOTE 1 Outside the framework of a building's environmental assessment, EPDs are not tools for comparing construction products and services.
NOTE 2 When assessing the contribution of buildings to sustainable development, a comparison of environmental aspects and impacts must be undertaken in conjunction with socio-economic aspects and impacts relating to the building.
NOTE 3 For the interpretation of a comparison, reference values are required.

4. General information

Name and address of the manufacturer responsible for the data provided in this EPD	AGC GLASS EUROPE Avenue Jean Monnet 4 1348 Louvain-la-Neuve Belgium LCA Engineer: Gaspard Chantrain, Project Leader: Tanguy Timmermans, Contact: Sustainability@agc.com www.yourglass.com
Production sites	Results from this EPD reflect data collected from all the production sites of the manufacturer and are representative of 100% of the European production, including all the production for the French market.
System boundaries	☐ Cradle to factory gate ☐ Cradle to grave ☑ Cradle to grave + module D
Type of EPD	☐ Collective ☑ Individual, configurable EPD (daughter EPD) ☐ Individual
Program operator	**FDES INIES** Website: www.inies.fr The body in charge of this program is the HQE Association, whose address is: The HQE Association, 4 avenue du Recteur Poincaré – 75016 Paris – France.
Configured EPD unique ID	*20240940466-FC_111060_792548*
Configured EPD date of creation	*26/01/2025*
Configurator	This EPD has been created with the EPD configurator tool of AGC Glass Europe, available at www.agc-yourglass.com/configurator.
Target audience	This EPD is primarily intended for business-to-business communication, although it might be used by final consumers as well (business-to-consumer).
Commercial reference	The product covered here corresponds to the configuration specified by the editor of the present EPD, as described in section 5.2. It is a rectangular-shaped product, assessed using an EPD configuration tool whose full commercial reference is specified on the cover page. For double and triple glazing, all types of spacers are covered by this EPD.
Validity range	Only valid for the stated commercial reference. Other configurations can be assessed individually as configured EPD.
External independent verification	An independent external verification according to the ISO 14025 (2010) environmental declaration program has been carried out for the EPD configurator tool that generated this EPD. NF EN 15804+A2EN 15804+A2 October 2022 and the national complement NF EN 15804/CN: 2019 have been used as PCR. NF 17074:2019 has been also used as information source.

4.1. External verification proof

The EN 15804 of CEN serves as the PCR
Independent verification of the declaration and data in accordance with EN ISO 14025:2010 **☐ Internal ☑ External**
Third-Party Verification **Guillaume Audard, verifiers authorized by AFNOR Normalisation to verify environmental product declarations in the construction sector.**
ISO 14025 compliant program registration number: *20240940466-FC*
Date of 1st publication: *01/10/2024*
Verification date *09/2024*
Validity period: Until *31/12/2029*

5. Functional unit and product description

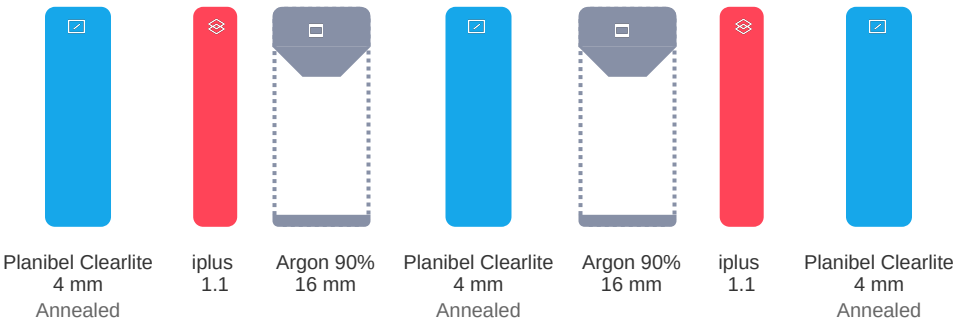
5.1. Description of the functional unit

The declaration refers to a functional unit of 1 m² of glazing, without mounting accessories, used as thermal closing of facades for a reference service life of 30 years. The thermal transmittance (U Value) of the studied product is 0.6 [W/(m².K)].

Note: The reference service life of the product is set to 30 years. This period does not reflect real product lifetime, which is generally defined by building refurbishment. It does not refer to product guarantee either. This period reflects a standard duration of use considered in glazing EPDs.

5.2. Product description

The reference product has the following structure. In the case of double and triple glazing, the study is based on an average spacer and an average gas composition sold by AGC Glass Europe. The variability associated with these components has been studied and complies with the limits set. The results generated by this configurator are therefore independent of cavity thickness (es) and composition.



Associated CE marking as proof of usability:EN 1279-5:2018

5.3. Description of the product usage

The results of the A4-D modules declared in this EPD correspond only to a “Facade glazing” application. Even if the product can have all the following functions:

- ☑ Facade glazing
- ☐ Internal partitioning
- ☐ Surface cladding (aesthetic)
- ☐ Furniture

In the vast majority of cases, glazing products are integrated into a product with an additional degree of processing (windows, glazed doors, etc.). The impacts related to these processing steps are not included and must be added if they occur (material and energy consumption, yield, additional transport, etc.).

5.4 Main performance of the functional unit

Key performance indicators are used to defined glazing product characteristics. Those key performance indicators are displayed in the table 1 below.

Table 1 : Product characteristics

Properties	Symbol	Product
Thermal transmission (according to EN 673)	Ug (W/m².K)	0.6
Light Transmission (EN 410)	Tv (%)	74
Light Reflection (EN 410)	ρv (%)	15
Solar factor (EN 410)	g (%)	52
Direct airborne sound insulation (EN 12578)	Rw (C;Ctr) (dB)	33 (-2;-6)
Resistance to fire (EN13501-2)		NPD
Reaction to fire (EN 13501-1)		NPD
Bullet resistance (EN 1063)		NPD
Burglar resistance (EN 356)		NPD
Pendulum body impact resistance (EN 12600)		NPD / NPD / NPD

5.5. Other technical features not included in the functional unit

Not applicable

5.6. Description of the product main components and/or material

The composition of the product covered by this EPD is specified in the table below. In the case of double or triple glazing, the composition described below is a theoretical average composition used for the calculations presented in the EPD.

Table 2 : Product composition

Product composition	Mass kg
Coating	0.001266
Glass	30.0
Inner sealant (Polyisobutylene)	0.06150324982
Outer sealant (Polysulfide, Silicone, Polyurethane)	0.9629730739
Spacer (Stainless steel, Aluminium, polyamide/steel)	0.53782
Zeolite	0.246889236

5.7. Substances from REACH candidate list

The product covered by this EPD does not contain any substance from REACH candidate list according to REACH regulation (more than 0.1%) at the time the mother EPD was published.

5.8. Distribution circuit

The target audience for this declaration is mainly B2B (business customers), although this document can also be used by final consumers (B2C).

5.9. Reference service life description

The reference service life (RSL) is 30 years.

Table 4 : Reference conditions of product use justifying RSL

Parameter	Value
Reference service life	30 years
Declared product properties (when leaving the production site) and finishing	This product is conformed with the following European standard: EN 1279-5:2018
Theoretical application parameters (if imposed by the producer), including references to the appropriate use practices	These information are detailed in the standard NF DTU 39: 2006 Building works – Glazing and Mirror Glass Works, which defines the specifications for the implementation of glazing and installation of glazing products (new construction, renovation, refurbishment, maintenance) performed on site in all types of buildings.
Alleged quality of the construction work, when the installation is made in accordance with the manufacturer's instructions	
Exterior environment (for exterior applications), e.g. weather resistance, pollutants, UV and wind exposure, building orientation, shade, temperature	
Interior environment (for interior applications), e.g. temperature, humidity, chemicals exposure	
Use conditions, e.g. usage frequency, mechanical exposure	
Maintenance, e.g. required frequency, type and quality and replacement of replaceable components	

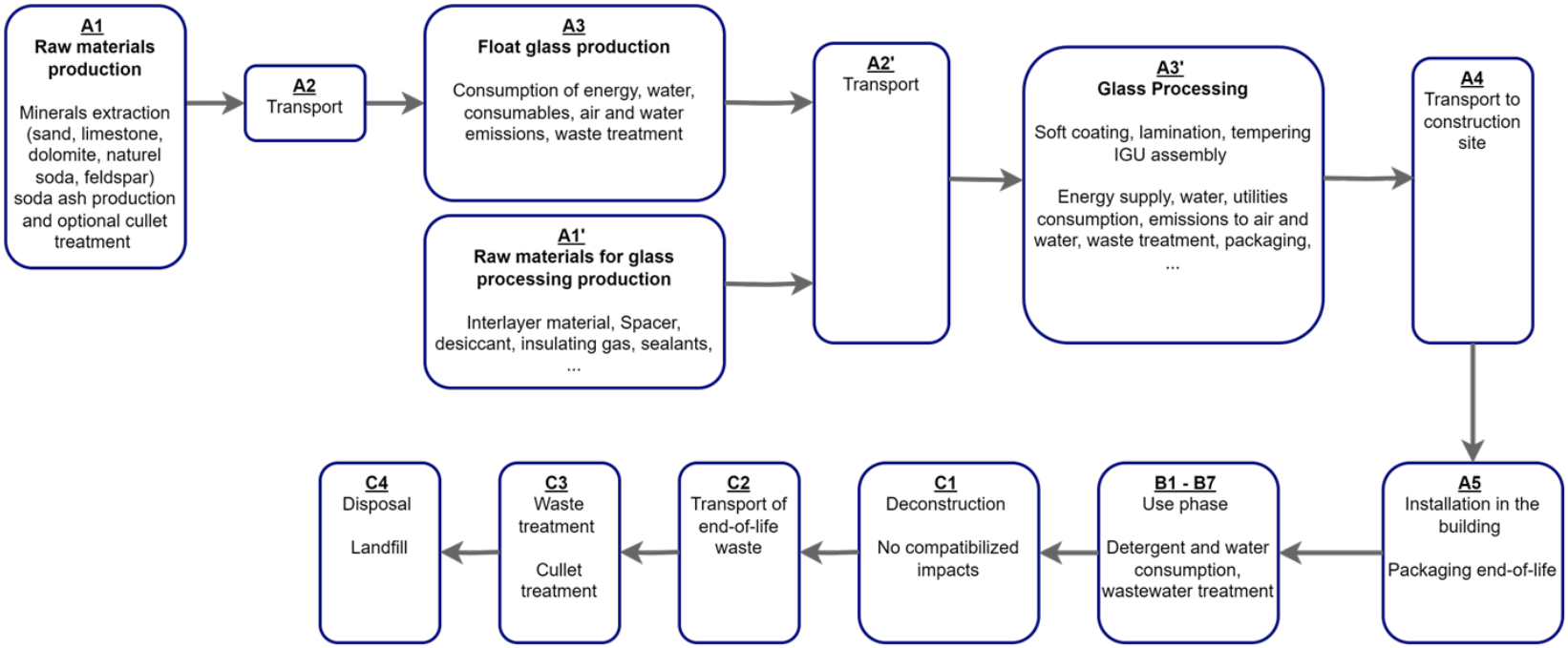
5.10. Biogenic carbon content (C stock)

The glazing product covered by this declaration do not contain biogenic carbon. The biogenic carbon stock (C stock) is therefore 0 kg C/UF. No final packaging is taken into account in this EPD, which implies a declared zero biogenic carbon content for the packaging.

Biogenic carbon content	Value per functional unit
Biogenic carbon content of product (at plant gate)	0.0 kg C
Biogenic carbon content of associated packaging (at plant gate)	0.0 kg C

6. Life cycle stages

This EPD is a cradle to grave study including module D. Life cycle stages regarding product installation (A5) and product use (B1-B7) are modelled based on Glass in building product category rules EN17074: 2019.



	Production steps	Construction steps		Use steps							End of life steps				Benefits and burden beyond system boundaries
	Total A1-A3 production	A4 Transport	A5 Installation	B1 Usage	B2 Maintenance	B3 Repair	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction /demolition	C2 Transport	C3 Wastes treatment	C4 Disposal	D
Declared modules	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

6.1. Production stage, module A1-A3 and module A1'-A3'

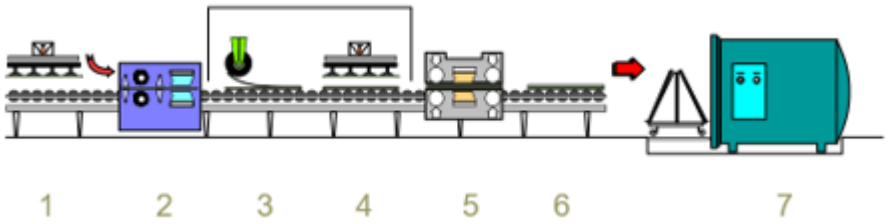
Production stages A1 to A3 cover flat glass production (Planibel). These stages are included in all glass products with 2 possible versions, a Planibel Low-Carbon version and a Planibel Standard version. The difference between Planibel Low-Carbon and Planibel Standard lies in the production process, which uses a high percentage of cullet, electricity for which guarantees of renewable origin have been purchased, and production carried out solely in high-efficiency furnaces using the latest technologies. For standard Planibel product ranges (excluding Low-Carbon), the electricity mix used for flat glass production corresponds to the national residual mixes of the countries of production. The emission factor of this mix is 0.410 kg CO2 eq /kWh. The reference year for Planibel standard data collection is 2021. For Planibel Low-Carbon glass production, the specific mix corresponds to the electricity mix purchased by AGC Glass Europe via cancelled guarantees of origin. The emission factor for this mix has been calculated at 0.0209 kg CO2 eq/kWh. The reference years for Planibel Low-Carbon data collection are 2022-2023.

Stages A1', A2' and A3' cover the transformation of float glass into more complex products. These stages depend on the type of product studied, and can be deduced from the product composition presented in section 5.2 using the information below. For all these processes, the reference year for data collection is 2022.

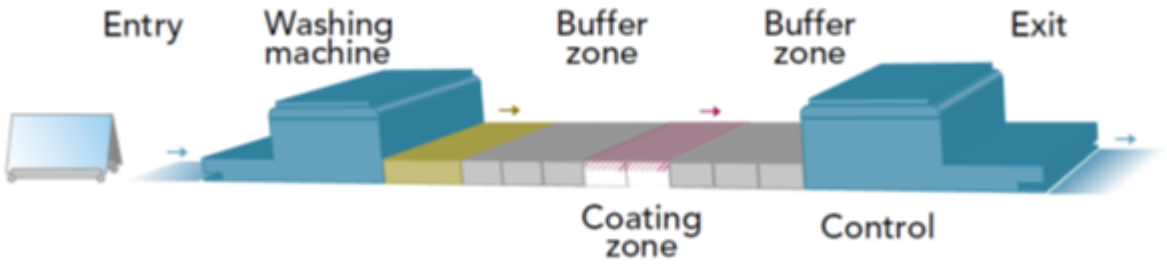
- The presence of a spacer (in white on the diagram in section 5.2) induces an IGU assembly stage in A3', as well as the production of the necessary materials in A1' (spacer, desiccant, insulating gas, sealants, etc.)
- The presence of an interlayer material (shown in orange on the diagram in chapter 5.2) induces a lamination step during A3' processing, as well as the production of the interlayer material in A1'
- The presence of a magnetron layer (in red on the diagram in chapter 5.2) induces a magnetron layer deposition step in A3' as well as a production step for the targets used during magnetron layer deposition in A1'
- The presence of "Thermally toughened", "Heat strengthened" or "Heat soaked thermally toughened" glass in the product induces a thermal tempering step for this glass. The tempering stage involves heating the glass close to its softening point (600 - 650°C) and then cooling it

- **For the standard IGU product ranges (Low-Carbon excluded), the electricity mix used for the production corresponds to the national residual mixes of the production countries. The emission factor of this mix is 0.440 kg CO2 eq/kWh. For the Low-Carbon IGU production, the specific mix corresponds to the electricity mix purchased by AGC Glass Europe via canceled guarantees of origin. The emission factor for this mix has been calculated at 0.013 kg CO2 eq/kWh. The IGU manufacturing process includes:**
  - Float glass loading
  - Glass cutting to specific dimensions
  - Float washing in order to prevent any impurity and to remove interleavant powder used for float transport
  - Assembling (spacer) and inner sealant deposition
  - Placing of the second (and eventually third for a triple glazing) float glass pane
  - Outer sealant deposition

- **For the standard laminated product ranges (Low-Carbon excluded), the electricity mix used for the lamination process corresponds to the national residual mixes of the production countries. The emission factor of this mix is 0.374 kg CO2 eq/kWh. For the Low-Carbon laminated glass production, the specific mix corresponds to the electricity mix purchased by AGC Glass Europe via canceled guarantees of origin. The emission factor for this mix has been calculated at 0.013 kg CO2 eq/kWh. Laminated glass production process involves the following steps:**
    1. Float glass loading
    2. Float washing in order to prevent any impurity and to remove interleavant powder used for float transport
    3. Application of interlayer material
    4. Second glass pane deposition (preliminary washed)
    5. Calendaring, to remove air and ensure a good adhesion of the different components
    6. Loading the two panes of glass and the interlayer material on stillage
    7. Autoclave, (height temperature and low pressure) to remove residual air bubbles and ensure perfect adhesion between float panes and PVB interlayers.



- **For the standard magnetron solar coated glass product ranges (Low-Carbon excluded), the electricity mix used for the production corresponds to the national residual mixes of the production countries. The emission factor of this mix is 0.265 kg CO2 eq/kWh. For the Low-Carbon magnetron solar coated glass production, the specific mix corresponds to the electricity mix purchased by AGC Glass Europe via canceled guarantees of origin. The emission factor for this mix has been calculated at 0.013 kg CO2 eq/kWh. For the standard magnetron low-e coated glass product ranges (Low-Carbon excluded), the electricity mix used for the production corresponds to the national residual mixes of the production countries. The emission factor of this mix is 0.305 kg CO2 eq/kWh. For the Low-Carbon magnetron low-e coated glass production, the specific mix corresponds to the electricity mix purchased by AGC Glass Europe via canceled guarantees of origin. The emission factor for this mix has been calculated at 0.013 kg CO2 eq/kWh. Magnetron coating process involves the following steps:**
    - Float glass loading
    - Float washing in order to prevent any impurity and to remove interleavant powder used for float transport
    - Deposition of metals and metallic oxides under inert gas atmosphere



- **For the standard heat treated glass product ranges (Low-Carbon excluded), the electricity mix used for the production corresponds to the national residual mixes of the production countries. The emission factor of this mix is 0.634 kg CO2 eq/kWh. For the Low-Carbon heat treated glass production, the specific mix corresponds to the electricity mix purchased by AGC Glass Europe via canceled guarantees of origin. The emission factor for this mix has been calculated at 0.013 kg CO2 eq/kWh.**

Allocations

Float glass production impacts are allocated based on mass. Impacts per m² are then derived based on float glass thickness and glass density. This allocation complies with the flat glass product category rule EN 17074:2019.

This allocation complies with the flat glass product category rule EN 17074:2019.

Consumptions from glass processing have been allocated based on area. This allocation complies with the flat glass product category rule EN 17074:2019. A3 sub-module does not generate by-product. Recycled content (attribution) and/or biomass balance (BMB) allocation approaches such as the 'mass balance credits' method and/or the 'Book and Claim' method in accordance with ISO 22095 cannot be used in the context of ECO EPDs.

6.2. Construction stage, module A4-A5

This step takes into account the transport of the flat glasses from the production site to the construction site as well as the installation on site.

The transport considered in this study is the average delivery distance from AGC Glass Europe's Low-Carbon Planibel production sites. This transport therefore corresponds to the transport of glass from AGC Glass Europe's factories to its direct customers.

Regarding the installation on site (module A5), no ancillary materials is considered for the glass to be installed in accordance with EN17074:2019. No breakage during transport and installation has been considered, following EN17074:2019.

1. Transport to the construction site

Transport to construction site scenario considers a delivery over a long distance in truck loaded at nominal capacity. Trucks used could be regular large trucks of more than 32t or smaller trucks between 7.5 and 12t (in the case of insulating glass units transportation). The use share between those two type of trucks can be found in the table below.

Table 5 : Transport to construction site

Parameter	Value	Unit
Diesel truck - EURO 5 – cargo > 32t	50.0	%
Diesel Truck – EURO 5 – cargo 7.5 – 12t	50.0	%
Distance to construction site	700.0	km
Usage capacity	0.5	

2. Installation on site

No ancillary materials is considered for the glass to be installed in accordance with EN17074:2019. Packaging end of life is accounted in module A5 as detailed in EN17074:2019 product category rule.

6.3. Use stage, module B1-B7

1. Description

The only module from the use stage considered is B2 "maintenance". This stage corresponds to glass cleaning with water and detergent.

Repair (B3), replacement (B4) and refurbishment (B5) are not considered. Under normal conditions of use, glazing products do not need any of these operations.

Finally, glass products does not emit any substances neither to the air nor to water during its use (B1).

2. Maintenance parameters

Following EN17074:2019, the average annual water consumption is 0.2 litres per square meter of glass (i.e. 6 litres/m² over the whole life cycle) and an annual consumption of detergents of 10 g/m² (300 g/m² over the whole life cycle). The used water is considered as discharged to sewer grid and further treated in a wastewater treatment plant.

Table 6 : Glass maintenance

Parameter (whole life cycle)	Value	Unit
Water consumption for maintenance	6	liters
Detergent consumption	300	g

This scenario is representative of a construction site located in Europe (including the case of a site in France).

6.4. End of life stage, module C1-C4

No mechanical operation is considered regarding dismantling and deconstruction steps (module C1).

Except C1 which is neglected, end of life stage includes:
- C2: transport to waste treatment site ;
- C3: waste treatment ;
- C4: landfilling of demolition wastes.

End of life scenario is based on worst case scenario, considering that 100% of the glass product is sent to landfill for inert material in the end of life as required by the national supplement NF EN 15804+A2/CN:2022.

Table 7 : End of life scenarios

Parameter	Value	Unit
Waste glass sent to landfill	100	%
Transport to landfill (truck)	50	km
Waste recycled	0	%

All glass wastes are transported by diesel truck EURO 5 with a net payload of 24.7 tonnes.

6.5. Benefits and loads beyond system boundaries, module D

The product studied in this study contains a significant proportion of recycled glass (external cullet), but the end-of-life scenario of the product does not take into account any recycling, therefore module D is declared as zero.

7. Information regarding life cycle assessment calculation

PCR used	ISO14025:2010; NF EN 15804+A2:2019 NF; EN 15804/CN:2022; EN17074:2019 (as an information source)
System boundaries	Cradle to grave, including module D Cullet have been considered as a production waste that has been reached the end of waste status in a previous system and then considered as free of charge in terms of LCA.
Allocations	Float glass production: mass based Glass processing: area based
Primary data representativeness	*Geographical representativeness* 100% of the European production sites of: AGC GLASS EUROPE The production step is therefore representative of the European production, including production for the French market. Transport distances considered are average truck delivery distances from production sites. The transport, installation and end-of-life stages are representative of the French market. *Time representativeness* Primary data collected refer the whole calendar year(s): 2021-2022 *Technological representativeness* Primary data collected from the production sites of: AGC GLASS EUROPE and are representative of the European production including the French market delivery.
Background data representativeness	The following tools have been used to generate this EPD: LCA For Experts software version: 10.8.0.14 (database 2024.1) The EN 15804+A2 indicator set with characterization factors based on EF 3.1 has been used. The main background data has a collection date of less than 10 years.
Cut-off criteria	All product components and packaging known have been considered in the study, except the reusable metal stillages. In case of insufficient input data, proxy have been used to estimate environmental impacts.
Variability	**This configurable EPD is representative of the sole product described. The variability of the results have been studied for reference EPDs during the verification of the EPD configurator tool. I n the case of double and triple glazing, the variability of the mother EPD of this configured EPD was studied for the control indicators of NF EN 15804+A2/CN:2022 as a function of the material composition of the spacers and the type of gas used, in order to verify the variability criterion of the standard. For all products, the variability of the mother EPD of this configured EPD has been studied for the control indicators of NF EN 15804+A2/CN:2022 as a function of the production site and are:** • Global warming: maximum variability between -10% & +20% • Non-renewable primary energy use excluding non-renewable primary energy resources used as feedstocks: maximum variability between -10% & +24%

	• Non-hazardous waste disposed of: maximum variability between -3% & +4%
Assumption related to electricity production	Low-carbon products are processed on the same sites as standard products. Guarantees of origin are not allocated to individual products. All the electricity consumed by the sites is covered by the guarantees of origin when low-carbon products are processed on the site, even if standard products are also processed on the site at the same time. The emission factors considered depend on the type of product and are described in section 6.1. This is a conservative approach. AGC commits to applying this procedure throughout the period of validity of this EPD.

8. Life cycle assessment results

BASELINE ENVIRONMENTAL IMPACT INDICATORS															
Environmental impacts	Production stage	Construction stage		Use stage							End of life stage				D Benefits and charges beyond the boundaries of the system
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Usage	B2 Maintenance	B3 Repair	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ Demolition	C2 Transport	C3 Waste treatment	C4 Elimination	
Climate change - total kg CO_2 equiv/FU or DU	5.22E1	3.86E0	0	0	1.16E-1	0	0	0	0	0	0	1.07E-1	0	5.46E-1	0
Climate change – fossil fuels kg CO_2 equiv/FU or DU [1]	5.16E1	3.63E0	0	0	3.32E-2	0	0	0	0	0	0	1.00E-1	0	4.96E-1	0
Climate change - biogenic kg CO_2 equiv/FU or DU	5.24E-1	2.03E-1	0	0	4.02E-2	0	0	0	0	0	0	5.61E-3	0	4.81E-2	0
Climate change – land cover and land cover transformation kg CO_2 equiv/FU or DU	3.46E-2	3.36E-2	0	0	4.26E-2	0	0	0	0	0	0	9.29E-4	0	1.59E-3	0
Depletion of the ozone layer kg of CFC 11 equiv /FU or DU	7.25E-7	3.18E-13	0	0	3.15E-9	0	0	0	0	0	0	8.79E-15	0	1.32E-12	0
Acidification mole of H+ equiv / FU or DU	2.31E-1	1.37E-2	0	0	4.10E-4	0	0	0	0	0	0	3.38E-4	0	3.51E-3	0
Aquatic eutrophication, freshwater kg P equiv / FU or DU	5.81E-4	1.32E-5	0	0	1.62E-5	0	0	0	0	0	0	3.66E-7	0	2.91E-5	0
Marine aquatic eutrophication kg of N equiv / FU or DU	5.20E-2	6.37E-3	0	0	4.42E-4	0	0	0	0	0	0	1.56E-4	0	8.93E-4	0
Terrestrial eutrophication mole of N equiv/FU or DU	6.08E-1	7.17E-2	0	0	1.50E-3	0	0	0	0	0	0	1.75E-3	0	9.83E-3	0
Photochemical ozone formation kg of NMCOV equiv/FU or DU	1.41E-1	1.23E-2	0	0	2.14E-4	0	0	0	0	0	0	3.05E-4	0	2.71E-3	0
Depletion of abiotic resources (minerals & metals) kg Sb equiv/FU or DU [1]	8.75E-5	2.36E-7	0	0	5.04E-7	0	0	0	0	0	0	6.52E-9	0	2.43E-8	0
Depletion of abiotic resources (fossil fuels) MJ /FU or DU [1]	6.92E2	4.94E1	0	0	4.00E-1	0	0	0	0	0	0	1.36E0	0	6.88E0	0
Water requirement m^3 of deprivation equiv in the world / FU or DU [1]	6.11E0	4.18E-2	0	0	1.66E-1	0	0	0	0	0	0	1.16E-3	0	5.62E-2	0

[1] The results of this environmental impact indicator should be used with caution because the uncertainties of these results are high or because experience with this indicator is limited.

RESOURCE UTILIZATION															
Resource utilization	Production stage	Construction stage		Use stage							End of life stage				D Benefits and charges beyond the boundaries of the system
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Usage	B2 Maintenance	B3 Repair	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ Demolition	C2 Transport	C3 Waste treatment	C4 Elimination	
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials - MJ/FU or DU	7.97E1	3.49E0	0	0	1.80E0	0	0	0	0	0	0	9.66E-2	0	1.11E0	0
Use of renewable primary energy resources as raw materials - MJ/FU or DU	1.32E0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/FU or DU	8.10E1	3.49E0	0	0	1.80E0	0	0	0	0	0	0	9.66E-2	0	1.11E0	0
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - MJ/FU or DU	6.89E2	4.95E1	0	0	4.00E-1	0	0	0	0	0	0	1.37E0	0	6.88E0	0
Use of non-renewable primary energy resources as raw materials - MJ/FU or DU	2.80E0	0	0	0	5.94E-2	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/FU or DU	6.92E2	4.95E1	0	0	4.59E-1	0	0	0	0	0	0	1.37E0	0	6.88E0	0
Use of secondary material - kg/FU or DU	3.16E0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of secondary renewable fuels - MJ/FU or DU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels - MJ/FU or DU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Net freshwater use - m^3/FU or DU	1.84E-1	3.85E-3	0	0	3.87E-3	0	0	0	0	0	0	1.06E-4	0	1.72E-3	0

WASTE CATEGORY															
Category of waste	Production stage	Construction stage		Use stage							End of life stage				D Benefits and charges beyond the boundaries of the system
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Usage	B2 Maintenance	B3 Repair	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ Demolition	C2 Transport	C3 Waste treatment	C4 Elimination	
Hazardous waste disposed of - kg/FU or DU	4.56E-3	1.83E-10	0	0	6.69E-12	0	0	0	0	0	0	5.06E-12	0	3.47E-10	0
Non-hazardous waste disposed of - kg/FU or DU	3.19E0	7.13E-3	0	0	5.96E-3	0	0	0	0	0	0	1.97E-4	0	3.18E1	0
Radioactive waste disposed of - kg/FU or DU	1.82E-2	6.40E-5	0	0	3.25E-6	0	0	0	0	0	0	1.77E-6	0	8.07E-5	0

OUTFLOWS															
Outflows	Production stage	Construction stage		Use stage							End of life stage				D Benefits and charges beyond the boundaries of the system
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Usage	B1 Usage	B3 Repair	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/ Demolition	C2 Transport	C3 Waste treatment	C4 Elimination	
Components for reuse - kg/FU or DU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling - kg/FU or DU	8.53E0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Energy recovery materials - kg/FU or DU	3.22E-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electrical Energy supplied outside - MJ/FU or DU	7.53E-1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Steam energy supplied externally - MJ/FU or DU	1.36E0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas and process energy supplied externally - MJ /FU or DU	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Aggregation of the different modules to achieve a "Total per stage" or "Total Life Cycle"						
Impacts/Flux	**Production stage**	**Construction stage**	**Use stage**	**End of life stage**	**Total Life Cycle**	**D Benefits and charges beyond the boundaries of the system**
Baseline environmental impact indicators						
Climate change - total kg CO_2 equiv/FU or DU	5.22E1	3.86E0	1.16E-1	6.53E-1	5.68E1	0
Climate change – fossil fuels kg CO_2 equiv/FU or DU [1]	5.16E1	3.63E0	3.32E-2	5.96E-1	5.59E1	0
Climate change - biogenic kg CO_2 equiv/FU or DU	5.24E-1	2.03E-1	4.02E-2	5.37E-2	8.21E-1	0
Climate change – land cover and land cover transformation kg CO_2 equiv/FU or DU	3.46E-2	3.36E-2	4.26E-2	2.52E-3	1.13E-1	0
Depletion of the ozone layer kg of CFC 11 equiv /FU or DU	7.25E-7	3.18E-13	3.15E-9	1.33E-12	7.28E-7	0
Acidification mole of H+ equiv / FU or DU	2.31E-1	1.37E-2	4.10E-4	3.85E-3	2.49E-1	0
Aquatic eutrophication, freshwater kg P equiv / FU or DU	5.81E-4	1.32E-5	1.62E-5	2.95E-5	6.40E-4	0
Marine aquatic eutrophication kg of N equiv / FU or DU	5.20E-2	6.37E-3	4.42E-4	1.05E-3	5.99E-2	0
Terrestrial eutrophication mole of N equiv/FU or DU	6.08E-1	7.17E-2	1.50E-3	1.16E-2	6.93E-1	0
Photochemical ozone formation kg of NMCOV equiv/FU or DU	1.41E-1	1.23E-2	2.14E-4	3.02E-3	1.57E-1	0
Depletion of abiotic resources (minerals & metals) kg Sb equiv/FU or DU [1]	8.75E-5	2.36E-7	5.04E-7	3.08E-8	8.83E-5	0
Depletion of abiotic resources (fossil fuels) MJ/FU or DU [1]	6.92E2	4.94E1	4.00E-1	8.24E0	7.50E2	0
Water requirement m^3 of deprivation equiv in the world / FU or DU [1]	6.11E0	4.18E-2	1.66E-1	5.74E-2	6.38E0	0

[1] The results of this environmental impact indicator should be used with caution because the uncertainties of these results are high or because experience with this indicator is limited.

Aggregation of the different modules to achieve a "Total per stage" or "Total Life Cycle"						
Impacts/Flux	**Production stage**	**Construction stage**	**Use stage**	**End of life stage**	**Total Life Cycle**	**D Benefits and charges beyond the boundaries of the system**
Resource utilization						
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials - MJ/FU or DU	7.97E1	3.49E0	1.80E0	1.21E0	8.62E1	0
Use of renewable primary energy resources as raw materials - MJ/FU or DU	1.32E0	0	0	0	1.32E0	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/FU or DU	8.10E1	3.49E0	1.80E0	1.21E0	8.75E1	0
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - MJ/FU or DU	6.89E2	4.95E1	4.00E-1	8.25E0	7.47E2	0
Use of non-renewable primary energy resources as raw materials - MJ/FU or DU	2.80E0	0	5.94E-2	0	2.86E0	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ/FU or DU	6.92E2	4.95E1	4.59E-1	8.25E0	7.50E2	0
Use of secondary material - kg/FU or DU	3.16E0	0	0	0	3.16E0	0
Use of secondary renewable fuels - MJ/FU or DU	0	0	0	0	0	0
Use of non-renewable secondary fuels - MJ/FU or DU	0	0	0	0	0	0
Net freshwater use - m^3/FU or DU	1.84E-1	3.85E-3	3.87E-3	1.83E-3	1.94E-1	0

Aggregation of the different modules to achieve a "Total per stage" or "Total Life Cycle"						
Impacts/Flux	**Production stage**	**Construction stage**	**Use stage**	**End of life stage**	**Total Life Cycle**	**D Benefits and charges beyond the boundaries of the system**
Waste category						
Hazardous waste disposed of - kg/FU or DU	4.56E-3	1.83E-10	6.69E-12	3.52E-10	4.56E-3	0
Non-hazardous waste disposed of - kg/FU or DU	3.19E0	7.13E-3	5.96E-3	3.18E1	3.50E1	0
Radioactive waste disposed of - kg/FU or DU	1.82E-2	6.40E-5	3.25E-6	8.25E-5	1.83E-2	0
Outgoing flows						
Components for reuse - kg/FU or DU	0	0	0	0	0	0
Materials for recycling - kg/FU or DU	8.53E0	0	0	0	8.53E0	0
Energy recovery materials - kg/FU or DU	3.22E-1	0	0	0	3.22E-1	0
Electrical Energy supplied outside - MJ/FU or DU	7.53E-1	0	0	0	7.53E-1	0
Steam energy supplied externally - MJ/FU or DU	1.36E0	0	0	0	1.36E0	0
Gas and process energy supplied externally - MJ/FU or DU	0	0	0	0	0	0

9. Additional information

9.1. Release of hazardous substances into indoor air, soil and water during the use stage

9.1.1. Indoor air

- VOC and formaldehyde emissions

In the scope of this configurator and in accordance with decree no. 2011-321 of 23/03/2021 article R221-23, only the Stratobel, Stratophone and Thermobel product ranges are concerned by labelling relating to VOC and formaldehyde emissions. The emission level of the configuration covered by this EPD is: A+

When applicable, tests for VOC and formaldehyde emissions have been carried out in accordance with EN 7375:2005 and NF EN ISO 16000-9:2009. The VOC emissions declaration is publicly available on the website https://agc-yourglass.com

- Reaction to fungal and bacterial growth

Not tested. Glass is a mineral inert material. It is not by itself a medium for micro-organisms growth.

- Natural radioactive emissions from construction products

Not tested.

- Emission of particulates and fibres emissions.

Not tested.

9.1.2. Water and soil

Not tested. The product is not in contact with water intended for human consumption.

9.2. Product contribution to indoor wellbeing

9.2.1. Product characteristics regarding hygrothermal comfort

The relevant technical hygrothermal comfort characteristics are given in the table below.

Properties	Symbol	Product
Thermal transmission (according to EN 673)	U_g (W/m².K)	0.6
Light Transmission (EN 410)	Tv (%)	74
Light Reflection (EN 410)	ρv (%)	15
Solar factor (EN 410)	g (%)	52

Source: CE marking

9.2.2. Product characteristics regarding acoustics

The product studied has a direct airborne sound insulation Rw (C; Ctr) = 33 (-2;-6)
Source: CE marking

9.2.3. Product characteristics regarding visual comfort

The light transmission value of the product: 74%.
Source: CE marking

9.2.4. Product characteristics regarding odours

Not tested. Glass is a mineral inert material, not able to release any odour during its use.

More information available on www.yourglass.com
And in the « Sustainability » section of our environmental website www.agc-glass.eu/en/sustainability