

AGC GLASS EUROPE

ENVIRONMENTAL AND HEALTH PRODUCT DECLARATION (EPD)

FINEO 8 standard AGC vacuum insulating glazing

In compliance with ISO 14025:2010, NF EN 15804+A2 and its national supplement NF EN15804/CN

August 2025



welcop



Registration number : 20250645354

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Disclaimer

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

Any 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.

CEN standard EN 15804+A2 and the NF EN 15804+A2/CN national supplement serve as the rules for defining product categories (PCR).

NOTE : The French translation of EPD (Environmental Product Declaration) is DEP (Déclaration Environnementale de Produit). In France, however, the term FDES (Fiche de Déclaration Environnementale et Sanitaire) is commonly used, bringing together both the Environmental Declaration and health information for the product covered by the FDES. The FDES is therefore an "EPD" supplemented by health information.

Reading guide

Reading example: $-9,0 \text{ E } -03 = -9,0 \times 10^{-3}$

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

RSL: Reference Service Life

FDES : Fiche de Déclaration Environnementale et Sanitaire

PCR: Product Category Rule

FU: Functional Unit

- 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 with three significant figures and in scientific format.

All positive values (above zero) correspond to environmental impacts, while negative values (below 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 modules in the life cycle.

Comparability of EPD for construction products

Construction product EPDs are not comparable if they do not comply with NF EN 15804+A2.

Standard NF EN 15804+A2 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 FDES:

“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, EPD are not tools for comparing construction products and services.

NOTE 2

To assess 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

To interpret a comparison, reference values are required.

- **General information**

1. Name and address of the manufacturer

The information contained in this declaration is provided under the responsibility of the manufacturer, AGC Glass Europe.

Address : Avenue Jean Monnet, 4 1348 Louvain-la-Neuve | Belgique

Contact : sustainability@eu.agc.com

2. The site(s), manufacturer or group of manufacturers or their representatives for which the EPD is representative

This EPD is representative of the FINEO 8 standard product marketed by AGC Glass Europe in France. At the time of this declaration, only one AGC Glass site, located in Lodelinsart, manufactures FINEO vacuum insulating glazing units for the French market. The results presented in this EPD reflect data collected from this site.

The data correspond to the 2024 calendar year.

3. System boundaries

From cradle-to-grave, including module D.


4. Type of EPD

Individual.

5. Verifier name

This EPD has been verified by Guillaume Audard, auditor authorized by the "Programme INIES" to verify environmental and health declarations in the construction sector.

6. Program operator

<p>This EPD has been produced as part of the environmental and health declaration program for construction products: "Programme INIES".</p> <p>Website: http://www.inies.fr</p>	
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The body in charge of this program is the Association HQE, whose address is:

Association HQE, 4 avenue du Recteur Poincaré – 75016 Paris – France

7. Publication date

This EPD was published in August 2025.

8. Expiration date

This EPD is valid for 5 years from December 31st of the year of publication. It is therefore valid until December 31, 2030.

9. Commercial reference

FINEO 8 standard.

10. Validity range

This EPD covers only the product – FINEO 8 standard (other FINEO families are not included in this FDES).

11. Independent external verification

Independent external verification according to the ISO 14025 (2010) environmental declaration program by:

CEN NF EN 15804+A2 standard from October 2022 du CEN serves as PCR
Independent verification of declaration and data in accordance with EN ISO 14025: 2010
<input type="checkbox"/> Internal <input checked="" type="checkbox"/> External
Third-party verification: Guillaume Audard
SO 14025 program registration number : 20250645354
Date of 1st publication: August 2025
Date of verification : 26/08/2025
Validity period: 31/12/2030

• **Functional unit and product description**

1. Description of the functional unit

To provide thermal insulation over a 1 m² surface with a Ug performance of 0.7 W/m²·K according to ISO 19916-1:2018 and a light transmittance performance of 79% over a period of 50 years.

The reference flow is 1 m² of a FINEO 8 standard product.

Note: The declared service life of the product is 50 years, in line with the reference service life (RSL) of the building. FINEO meets and exceeds the durability tests of ISO 19916-1:2018. This standard specifies the methods for assessing the durability of the thermal insulation performance of vacuum insulating glazing. However, based on extensive laboratory testing, AGC has demonstrated that FINEO can achieve a service life of at least 60 years. Nevertheless, to remain consistent with the building's RSL, a 50-year service life is declared.

2. Description of the product and the packaging

FINEO products are composed of two sheets of float glass, separated by a vacuum gap (~0.1 mm), with pillars, a sealing frit, and a getter (gas absorber), with no evacuation hole.

FINEO delivers thermal performance equal to or better than standard triple glazing, while being 3 to 4 times thinner, lighter, able to harness solar heat, and entirely lead-free.

3. Description of product usage

The product can be used to meet any project requirement in terms of thermal insulation, from restoration needs to high-performance new construction. FINEO is used to improve the thermal and acoustic insulation of windows, glazed doors, façades, roofs, conservatories, skylights, partitions, and specific glazed assemblies.

4. Main performance of the functional unit

Thermal performance Ug of 0.7 W/m²·K.

5. Description of main product components and/or materials

The main components of the FINEO vacuum insulating glazing are float glass, pillars, a sealing frit, and a getter.

Table 1: The main components of the FINEO vacuum insulating glazing

FINEO 8 standard	Quantity (kg/FU)
Float glass	20
Others	0.06
<i>Steel (packaging)</i>	<i>0.54</i>
<i>Wooden pallet (packaging)</i>	<i>1.8</i>
<i>PE film (packaging)</i>	<i>0.01</i>
<i>HDPE (packaging)</i>	<i>0.02</i>
<i>PU (packaging)</i>	<i>0.03</i>
<i>SBR (packaging)</i>	<i>0.02</i>

6. Substances on REACH candidate list (if greater than 0.1% by mass)

At the date of issue of this declaration, the FINEO 8 standard product covered by this declaration do not contain more than 0.1% of substances on the REACH candidate list.

7. Evidence of fitness for use

FINEO products are CE-marked in accordance to EAD 300021-00-0404 and ETA 20/0048. Their fit for purpose is verified by using an AGC software following NF EN 16612. FINEO products are also described in the French Technical Application Document [DTA 6/23-2441 V2](#), issued by CSTB, and it provides construction stakeholders with elements for assessing the suitability of innovative building products like FINEO.

8. Distribution channel

This declaration concerns a vacuum insulating glazing intended for professional clients (B2B). The primary target audience is therefore B2B, although this document may also be used by end consumers (B2C).

9. Description of reference service life

The reference service life (RSL) of glass is 50 years.

Table 2: Parameters describing the reference conditions under which the product is to be used, to justify the RSL.

Parameter	Value
Reference service life	50 years
Declared product properties (at factory gate)	Ug (ISO 19916-1:2018): 0.7 W/m ² ·K Light transmittance (EN 410): 79%
Theoretical application parameters (if imposed by the manufacturer), including references to appropriate requirements and application codes	EN 19916-1: 2018
Assumed quality of installation work	
Outdoor environment	Not applicable
Indoor environment	Not applicable
Use conditions	Not applicable
Maintenance scenario	Water and detergent

10. Biogenic carbon content (Stock C)

FINEO 8 standard does not contain biogenic carbon. Therefore, the biogenic carbon stock is 0 kg C/FU. However, the packaging associated with the product contains 0.792 kg C/FU.

Table 3: Biogenic carbon content.

Biogenic carbon content	Value per functional unit
Biogenic carbon content of product (at gate)	0 kg C
Biogenic carbon content of associated packaging (at gate)	7.92E-01 kg C

- Life cycle stages

The environmental assessment is cradle-to-grave, including module D. The life cycle stages related to installation (A5) and use stages (B1-B7) are modelled based on scenarios defined in the standard EN 17074:2019. The most impactful process is the raw material supply, particularly the production of the glass used to manufacture FINEO 8 standard.

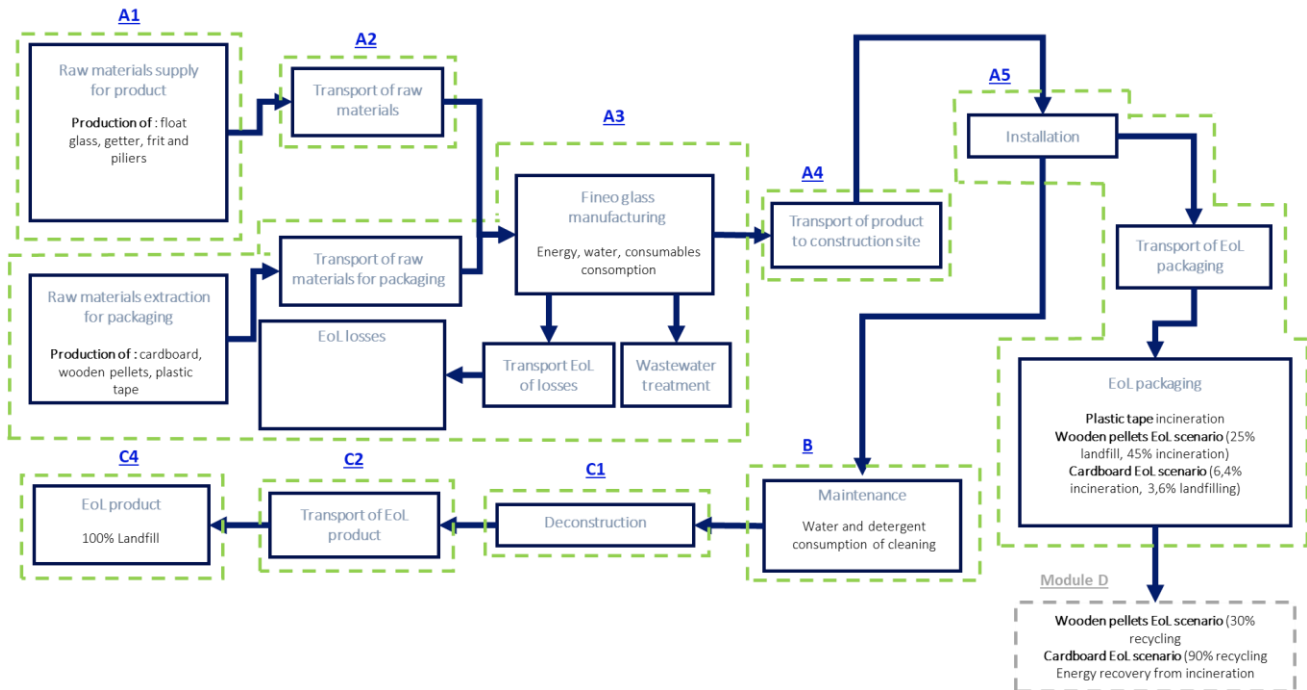


Figure 1: System boundaries overview.

Declared modules	Production			Construction		Use						End Of Life				Benefits & loads beyond system
	Total production A1 à A3	A4 Transports	A5 Installation	B1 Use	B2 Maintenance	B3 Reparation	B4 Replacement	B4 Rehabilitation	B6 Energy consumption	B7 Water consumption	C1 Deconstruction /demolition	C2 Transports	C3 Waste treatments	C4 Disposal	D	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	

Figure 2: Visual description of system boundaries (X = included in LCA).

▪ **Production stage, A1-A3**

Module A1-A3 covers the production and transport of inputs for the manufacturing of the vacuum insulating glazing. It also includes various consumptions and emissions related to the production process such as raw materials (previously mentioned), energy (electricity, natural gas), water, and waste.

The production process consists of the following steps: preparation of the glass pane, placement of micro-spacers, application of the getter, application of the sealing edge, assembly of the glass panes, sealing by heat treatment, and final product finishing.

The approach to modelling the electricity used during production is market-based. The data used for this modelling are RER: Electricity from wind power (Sphera) and BE: Electricity from photovoltaic (Sphera).

The product is packaged.

Allocations

Allocation rules set by the standard have been followed. The impacts of vacuum insulating glazing production are allocated by mass allocation at the production site level.

▪ **Construction stage, A4-A5**

This stage accounts for the transport of glass from the site in Belgium to the French market, with an average distance of 300 km.

1. Parameters relating to raw materials transport

The transport considered in this study corresponds to the transport of glass from the AGC Glass factory in Belgium to its direct customers. Transport is carried out by semi-trailer trucks inloader, dedicated to transporting glass plates.

Table 4: Parameters for transporting glass products.

Parameter	Value
Vehicle	22 Tonne Truck, Euro 5, 28 - 32t gross weight / 22t payload capacity DE: Diesel mix at filling station
Distance to construction site	300 kilometer
Capacity utilization (including empty returns)	45 % (Cf Sphera inventory)
Bulk density of the transported products	NA
Density utilization coefficient	1

2. Building installation parameters

As stated in the standard EN 17074:2019, module A5 is not applicable. Glass products are delivered in their final configuration and "ready to be installed." No waste other than packaging waste is generated. The end-of-life scenario for packaging is conservative and follows INIES documentation as well as specific company information, as shown in the table below.

Tableau 5: End-of-life parameters for packaging waste.

End of Life	Recycling	Incineration	Disposal	Reuse
Plastic packaging	0 %	50 %	50 %	0%
Steel	0 %	0 %	2 %	98%
Wooden pallet	13 %	37 %	0 %	50%

Table 6: Description of Building installation parameters and waste treatment

Parameters	Values
Auxiliary inputs for installation	Not applicable
Water use	0 m ³
Use of other resources	0 kg
Quantitative description of energy type and consumption during installation process	0 kWh
Material waste on construction site before waste treatment generated by product installation (specified by type)	Steel: 0.54 kg/FU Wood pallet: 1.8 kg/FU PE film: 0.01 kg/FU HDPE: 0.02 kg/FU PU: 0.03 kg/FU SBR: 0.02 kg/FU
Output materials (specified by type) produced by waste treatment on the construction site (specified by route) *	7,31E-01 kg recycling/FU 0 kg reuse/FU 1,09E+00 kg incineration/FU 6,05E-01 kg landfill /FU
Direct emissions to ambient air, soil, and water	0 kg

* For more details about the End-of-life parameters for packaging waste check table 5.

▪ **Use stage, B1-B7**

The only module considered in the life cycle stage is that relating to maintenance (B2); the product must be cleaned with detergent and water for maintenance. Repair (B3), replacement (B4) and rehabilitation (B5) are not considered. FINEO does not require these operations during its service life under normal use. Finally, the product generates no consumption or emissions during use (B1).

Table 7: Maintenance parameters.

Parameter	Value
Maintenance process	Washing with detergent and water
Maintenance cycle	Once a year for 50 years
Net consumption of fresh water during maintenance	10 L/FU
Detergent consumption	0,5 dL/FU
Wastewater treatment	10 L/FU
Net use of fresh water during maintenance	0.01 m ³ /FU
Energy input during maintenance	0 kWh/FU

▪ **End of Life stage, C1-C4**

No mechanical steps are involved in the dismantling and demolition FINEO products (C1). End-of-life therefore includes transport from the building site to the landfill and 100% disposal of the product.

Table 8: End-of-life parameters.

Parameter	Value
Individually collected waste	2.01E+01 Kg /FU
Mixed waste collected	0 Kg
Reuse	0 Kg
Recycling	0 Kg
Energy recovery	0 Kg
Disposal	2.01E+01 Kg /FU
End-of-life transport	Disposal 50 km

This transport is carried out by EURO 5 class diesel-powered trucks with a payload of 22 tonnes.

▪ **Benefits and loads beyond system boundaries (module D)**

Reuse, recycling, and incineration of packaging with energy recovery are considered as benefits and loads beyond the system boundaries. Credits from incineration with energy recovery are associated with electricity and heat production, using generic data from the French electricity mix and heat derived from natural gas. Since natural gas is the cleanest fossil fuel, the results are considered conservative. The efficiencies used are presented in the following table.

Table 9: Module D parameters.

Materials	LHV (MJ/kg)	Heat efficiency	Electricity efficiency
Wood	16	25.5%	14.1%
Paper/cardboard	30	27%	15.1%

Table 10 :Benefits beyond system boundaries

Recovered materials leaving system boundaries	Recycling processes beyond system boundaries	Materials/energy saved	Associated quantities
Waste wood pallets	Reuse	Wooden pallets	0.90E+00 kg/FU
Waste wood pallets	Recycling	Wood chips	2.34E-01 kg/FU
Waste wood pallets	Incineration	Electricity	1.50E+00 MJ/FU
Waste wood pallets	Incineration	Heat	2.72E+00 MJ/FU
Steel	Reuse	Steel	5.29E-01 kg/FU
Plastic packaging waste	Incineration	Electricity	3.62E-01 MJ/FU
Plastic packaging waste	Incineration	Heat	6.48E-01 MJ/FU

- Information regarding life cycle assessment calculation

Table 11: Life Cycle Assessment calculation information.

PCR used	ISO14025:2010; NF EN 15804+A2: 2019 EN 15804+A2/CN:2022 EN 17074:2019 (as source of information)
System boundaries	The assessment covers the full life cycle, from cradle to grave, including module D. The system boundary requirements defined by EN 15804+A2 and the national supplement NF EN 15804/CN have been fully met.
Allocations	This Environmental Product Declaration (EPD) complies with the allocation rules set by the applicable standards. Surface-based allocation was implemented at the production site level. Methods involving recycled content allocation (attribution) and/or biomass balance (e.g., mass balance credits or the Book and Claim system, as per ISO 22095) are excluded under the ECO EPD scheme.
Geographical representativeness and temporal representativeness of primary data	Country of production: Belgium Country of installation/use: France Primary data: 2024 Secondary database(s): Ecoinvent 3.9.1, Sphera LCA software: LCA for Experts 10.9.0.3
Geographical representativeness and temporal representativeness of background data	The secondary data are primarily sourced from the 2023.2 database of the LCA software LCA for Experts (version 10.9.0.31), and from Ecoinvent 3.9.1 when no Sphera inventory was available. LCA for Experts was also used for life cycle modelling and indicator calculations. The EN 15804+A2 indicator set with characterization factors based on EF 3.1 was applied. All background data used are primarily less than 10 years old at the time of data collection.
Cut-off criteria	All known constituents of the product and its packaging have been considered. The impacts of capital goods and infrastructure have been excluded. Flows related to human activities, such as employee transportation and administrative operations, are excluded in accordance with EN 15804+A2/CN.
Variability of results	Not applicable

- **Data quality**

Table 12: Quality of the main data used to produce this FDES.

Data	Description of data quality
Specific data	90% of data with an average rating of "very good" 10% of data with an average "good" rating
Generic data	80% of data with an average rating of "very good" 20% of data with an average "good" rating

Table 13: EPDrepresentativeness.

Geographic	This EPD is representative of FINEO 8 standard product produced in Belgium and used in France.
Technological	This EPD is representative of FINEO 8 standard.
Temporal	This EPD is representative of production in 2024.
Variability	Not applicable

• Life Cycle Assessment results

Table 14: Reference Environmental impacts.

REFERENCE ENVIRONMENTAL IMPACT INDICATORS															
Environmental impact	Production	Construction		Use							End of Life				D Benefits and loads beyond system boundaries
	A1 / A2 / A3	A4 Transports	A5 Installation	B1 Use	B2 Maintenance	B3 Reparation	B4 Replacement	B5 Refurbishment	B6 Energy consumption	B7 Water use	C1 Deconstruction / Demolition	C2 Transports	C3 Waste treatment	C4 Disposal	
Climate change - total kg CO ₂ eq/FU	3,50E+01	7,57E-01	3,02E+00	0,00E+00	1,21E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,88E-02	0,00E+00	3,01E-01	-1,22E+00
Climate change – fossils kg CO ₂ eq/FU	3,79E+01	7,45E-01	1,25E-01	0,00E+00	5,01E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,76E-02	0,00E+00	2,99E-01	-1,22E+00
Climate change – biogenic kg CO ₂ eq/FU	-2,90E+00	0,00E+00	2,90E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Climate change – Land use and Land use change kg CO ₂ eq/FU	2,04E-02	1,22E-02	1,04E-04	0,00E+00	7,10E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,11E-03	0,00E+00	1,80E-03	-1,18E-03
Ozone depletion kg of CFC 11 eq/FU	1,75E-08	1,07E-13	1,46E-13	0,00E+00	5,25E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,71E-15	0,00E+00	8,07E-13	-1,75E-10
Acidification mole of H ⁺ eq/FU	1,84E-01	2,97E-03	2,18E-04	0,00E+00	6,70E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,30E-04	0,00E+00	2,13E-03	-3,10E-03
Eutrophication, freshwater kg of P eq/FU	4,77E-04	3,09E-06	7,32E-07	0,00E+00	2,13E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,82E-07	0,00E+00	6,80E-07	-5,67E-06
Eutrophication, marine kg of N eq/ FU	4,04E-02	1,40E-03	6,61E-05	0,00E+00	7,11E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,06E-04	0,00E+00	5,47E-04	-7,76E-04
Eutrophication, terrestrial	4,67E-01	1,56E-02	9,24E-04	0,00E+00	2,46E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,19E-03	0,00E+00	6,03E-03	-8,39E-03

REFERENCE ENVIRONMENTAL IMPACT INDICATORS

Environmental impact	Production	Construction		Use							End of Life				D Benefits and loads beyond system boundaries
	A1 / A2 / A3	A4 Transports	A5 Installation	B1 Use	B2 Maintenance	B3 Repairation	B4 Replacement	B5 Refurbishment	B6 Energy consumption	B7 Water use	C1 Deconstruction / Demolition	C2 Transports	C3 Waste treatment	C4 Disposal	
mole of N eq/FU															
Photochemical ozone formation kg of NMCOV eq/FU	1,06E-01	2,81E-03	1,78E-04	0,00E+00	3,47E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,19E-04	0,00E+00	1,67E-03	-2,86E-03
Depletion of abiotic resources (minerals and metals)¹ kg Sb eq/FU	1,87E-03	6,31E-08	2,02E-09	0,00E+00	8,39E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,74E-09	0,00E+00	1,94E-08	9,99E-07
Depletion of abiotic resources (fossil fuels)¹ MJ/FU	4,59E+02	9,54E+00	3,97E-01	0,00E+00	6,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,69E-01	0,00E+00	3,95E+00	-1,78E+01
Water requirement¹ m ³ depriv eq in the world/FU	3,92E+00	1,12E-02	1,29E-01	0,00E+00	2,75E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,02E-03	0,00E+00	3,43E-02	-2,48E-02

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

15 :Optional indicators

OPTIONAL INDICATORS

Environmental impact	Production	Construction		Use							End of Life				D Benefits and loads beyond system boundaries
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repairation	B4 Replacement	B5 Refurbishment	B6 Energy consumption	B7 Water use	C1 Deconstruction / Demolition	C2 Transport	C3 Waste treatment	C4 Disposal	
Particulate matter - Diseases incidences	2,00E-06	1,94E-08	1,57E-09	0,00E+00	1,02E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,63E-09	0,00E+00	2,67E-08	-1,73E-07
Ionising radiation, human health - kBq U235 eq.	1,16E+00	2,52E-03	2,52E-03	0,00E+00	2,85E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,30E-04	0,00E+00	4,79E-03	-3,45E-01
Ecotoxicity, freshwater - CTUe	1,64E+05	7,08E+00	2,37E-01	0,00E+00	3,10E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,45E-01	0,00E+00	2,27E+00	-5,20E+00
Human toxicity, cancer - CTUh	2,54E-08	1,43E-10	1,45E-11	0,00E+00	2,02E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,30E-11	0,00E+00	5,37E-11	-2,91E-10
Human toxicity, non-cancer - CTUh	1,21E-04	6,42E-09	7,78E-10	0,00E+00	4,11E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,84E-10	0,00E+00	2,08E-09	-7,61E-09
Land use - Pt	5,44E+02	4,69E+00	1,32E-01	0,00E+00	5,32E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,27E-01	0,00E+00	1,09E+00	-2,78E+02

Table 115: Resource use.

RESOURCE USE															
Environmental impact	Production	Construction		Use							End of Life				D Benefits and loads beyond system boundaries
	A1 / A2 / A3	A4 Transports	A5 Installation	B1 Use	B2 Maintenance	B3 Reparation	B4 Replacement	B5 Refurbishment	B6 Energy consumption	B7 Water use	C1 Deconstruction / Demolition	C2 Transports	C3 Waste treatment	C4 Disposal	
Use of renewable primary energy, excluding renewable primary energy resources used as feedstock - MJ/FU	7,35E+02	8,22E-01	1,08E+01	0,00E+00	2,98E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,48E-02	0,00E+00	6,89E-01	-1,57E+01
Use of Renewable Primary Energy Resources as Materials - MJ/FU	2,88E+01	0,00E+00	-1,07E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as feedstock) - MJ/FU	7,64E+02	8,22E-01	9,56E-02	0,00E+00	2,98E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,48E-02	0,00E+00	6,89E-01	-1,57E+01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock - MJ/FU	4,59E+02	9,54E+00	1,60E+00	0,00E+00	6,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,69E-01	0,00E+00	3,95E+00	-1,78E+01
Use of non-renewable primary energy resources as raw materials - MJ/FU	2,40E+00	0,00E+00	-1,20E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as feedstock) - MJ/FU	4,61E+02	9,54E+00	3,97E-01	0,00E+00	6,05E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,69E-01	0,00E+00	3,95E+00	-1,78E+01
Use of secondary material - kg/FU	2,68E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

RESOURCE USE															
Environmental impact	Production	Construction		Use							End of Life				D Benefits and loads beyond system boundaries
	A1 / A2 / A3	A4 Transports	A5 Installation	B1 Use	B2 Maintenance	B3 Repairation	B4 Replacement	B5 Refurbishment	B6 Energy consumption	B7 Water use	C1 Deconstruction / Demolition	C2 Transports	C3 Waste treatment	C4 Disposal	
Use of Renewable Secondary Fuels - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of Non-Renewable Secondary Fuels - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net Freshwater Use - m ³ /FU	1,08E-01	9,16E-04	3,04E-03	0,00E+00	6,40E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,34E-05	0,00E+00	1,05E-03	-2,57E-03

Table 16: Waste Category.

WASTE CATEGORY															
Environmental impact	Production	Construction		Use							End of Life				D Benefits and loads beyond system boundaries
	A1 / A2 / A3	A4 Transports	A5 Installation	B1 Use	B2 Maintenance	B3 Repairation	B4 Replacement	B5 Refurbishment	B6 Energy consumption	B7 Water use	C1 Deconstruction / Demolition	C2 Transports	C3 Waste treatment	C4 Disposal	
Hazardous waste disposed - kg/FU	4,32E-06	3,65E-10	1,89E-10	0,00E+00	4,85E-11	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,33E-11	0,00E+00	9,83E-10	-1,87E-08
Non-hazardous waste disposed - kg/FU	2,58E+00	1,56E-03	9,08E-02	0,00E+00	9,67E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,42E-04	0,00E+00	2,00E+01	-1,41E-01
Radioactive waste disposed - kg/FU	9,67E-03	1,74E-05	1,62E-05	0,00E+00	4,57E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,58E-06	0,00E+00	4,14E-05	-1,26E-03

Table18: Outgoing flows.

OUTGOING FLOWS															
Environmental impact	Production	Construction		Use							End of Life				D Benefits and loads beyond system boundaries
	A1 / A2 / A3	A4 Transports	A5 Installation	B1 Use	B2 Maintenance	B3 Repairation	B4 Replacement	B5 Refurbishment	B6 Energy consumption	B7 Water use	C1 Deconstruction / Demolition	C2 Transports	C3 Waste treatment	C4 Disposal	
Components for reuse - kg/FU	0,00E+00	0,00E+00	9,00E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling - kg/FU	1,41E+01	0,00E+00	2,34E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery - kg/FU	4,80E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Electrical power supplied to the outside - MJ/FU	2,36E-02	0,00E+00	1,68E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Steam energy supplied to the outside - MJ/FU	4,27E-02	0,00E+00	3,04E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Gas and process energy supplied externally - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Table 16: Aggregation of the different modules to create a “Total per stage” or “Total Life Cycle”.

Aggregation of the different modules to achieve a "Total per stage" or "Total Life Cycle"						
Environmental impact	Production	Construction	Use	End-of-life	Total Life Cycle	D Benefits and loads beyond the boundaries of the system
Reference environmental impact indicators						
<i>Climate change - Total</i> <i>kg CO₂ eq./FU</i>	3,50E+01	3,78E+00	1,21E+00	3,70E-01	4,04E+01	-1,22E+00
<i>Climate change – Fossil</i> <i>kg CO₂ eq./FU</i>	3,79E+01	8,69E-01	5,01E-01	3,67E-01	3,96E+01	-1,22E+00
<i>Climate change – Biogenic</i> <i>kg CO₂ eq./FU</i>	-2,90E+00	2,90E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
<i>Climate change - Land cover and land cover change</i> <i>kg CO₂ eq./FU</i>	2,04E-02	1,23E-02	7,10E-01	2,90E-03	7,46E-01	-1,18E-03
<i>Ozone depletion</i> <i>kg of CFC 11 eq./FU</i>	1,75E-08	2,53E-13	5,25E-08	8,17E-13	7,00E-08	-1,75E-10
<i>Acidification</i> <i>mole of H⁺ eq./FU</i>	1,84E-01	3,18E-03	6,70E-03	2,36E-03	1,96E-01	-3,10E-03
<i>Aquatic eutrophication, freshwater</i> <i>kg P eq./FU</i>	4,77E-04	3,83E-06	2,13E-04	9,62E-07	6,95E-04	-5,67E-06
<i>Aquatic eutrophication, marine</i> <i>kg N eq./FU</i>	4,04E-02	1,47E-03	7,11E-03	6,54E-04	4,96E-02	-7,76E-04
<i>Terrestrial eutrophication</i> <i>mole of N eq./FU</i>	4,67E-01	1,66E-02	2,46E-02	7,22E-03	5,15E-01	-8,39E-03
<i>Photochemical ozone formation</i> <i>kg NMCOV eq./FU</i>	1,06E-01	2,99E-03	3,47E-03	1,89E-03	1,14E-01	-2,86E-03
<i>Depletion of abiotic resources (minerals and metals)¹</i> <i>kg Sb eq./FU</i>	1,87E-03	6,51E-08	8,39E-06	2,51E-08	1,88E-03	9,99E-07
<i>Depletion of abiotic resources (fossil fuels)¹</i> <i>MJ/FU</i>	4,59E+02	9,94E+00	6,05E+00	4,82E+00	4,80E+02	-1,78E+01
<i>Water requirement¹</i> <i>m³ of deprivation eq.alent in the world /FU</i>	3,92E+00	1,40E-01	2,75E+00	3,53E-02	6,84E+00	-2,48E-02
Optional indicators						
<i>Particulate matter - Diseases incidences</i>	2,00E-06	2,10E-08	1,02E-07	2,83E-08	2,15E-06	-1,73E-07
<i>Ionising radiation, human health - kBq U235 eq.</i>	1,16E+00	5,05E-03	2,85E-02	5,02E-03	1,19E+00	-3,45E-01
<i>Ecotoxicity, freshwater - CTUe</i>	1,64E+05	7,32E+00	3,10E+01	2,92E+00	1,64E+05	-5,20E+00
<i>Human toxicity, cancer - CTUh</i>	2,54E-08	1,58E-10	2,02E-09	6,67E-11	2,76E-08	-2,91E-10
<i>Human toxicity, non-cancer - CTUh</i>	1,21E-04	7,20E-09	4,11E-08	2,66E-09	1,21E-04	-7,61E-09
<i>Land use - Pt</i>	5,34E+02	4,83E+00	5,32E+01	1,51E+00	5,94E+02	-2,78E+02

¹ The results of this environmental impact indicator should be used with caution because the uncertainties in 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"

Environmental impact	Production	Construction	Use	End-of-life	Total Life Cycle	D Benefits and loads beyond the boundaries of the system
Resource use						
Use of renewable primary energy, excluding renewable primary energy resources used as feedstock - MJ/FU	7,35E+02	1,16E+01	2,98E+01	7,63E-01	7,77E+02	-1,57E+01
Use of Renewable Primary Resources as Materials - MJ/FU	2,88E+01	-1,07E+01	0,00E+00	0,00E+00	1,81E+01	0,00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as feedstock) - MJ/FU	7,64E+02	9,18E-01	2,98E+01	7,63E-01	7,95E+02	-1,57E+01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as feedstock - MJ/FU	4,59E+02	1,11E+01	6,05E+00	4,82E+00	4,81E+02	-1,78E+01
Use of non-renewable primary energy resources as raw materials - MJ/FU	2,40E+00	-1,20E+00	0,00E+00	0,00E+00	1,20E+00	0,00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as feedstock) - MJ/FU	4,61E+02	9,94E+00	6,05E+00	4,82E+00	4,82E+02	-1,78E+01
Use of secondary material - kg/FU	2,68E+00	0,00E+00	0,00E+00	0,00E+00	2,68E+00	0,00E+00
Use of Renewable Secondary Fuels - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of Non-Renewable Secondary Fuels - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net Freshwater Use - m ³ /FU	1,08E-01	3,95E-03	6,40E-02	1,13E-03	1,77E-01	-2,57E-03
Waste Category						
Hazardous Waste Disposed of - kg/FU	4,32E-06	5,54E-10	4,85E-11	1,02E-09	4,32E-06	-1,87E-08
Non-Hazardous Waste Disposed of - kg/FU	2,58E+00	9,24E-02	9,67E-03	2,00E+01	2,27E+01	-1,41E-01
Radioactive waste disposed of - kg/FU	9,67E-03	3,36E-05	4,57E-06	4,30E-05	9,75E-03	-1,26E-03
Outgoing flows						
Components for reuse - kg/FU	0,00E+00	9,00E-01	0,00E+00	0,00E+00	9,00E-01	0,00E+00
Materials for recycling - kg/FU	1,41E+01	2,34E-01	0,00E+00	0,00E+00	1,43E+01	0,00E+00
Materials for energy recovery - kg/FU	4,80E-02	0,00E+00	0,00E+00	0,00E+00	4,80E-02	0,00E+00
Electrical power supplied to the outside - MJ/FU	2,36E-02	1,68E+00	0,00E+00	0,00E+00	1,71E+00	0,00E+00
Steam energy supplied to the outside - MJ/FU	4,27E-02	3,04E+00	0,00E+00	0,00E+00	3,08E+00	0,00E+00
Gas and process energy supplied externally - MJ/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

- **Additional information on the release of hazardous substances into indoor air, soil and water during the use phase**
-

1. Indoor air

No indoor air quality tests were carried out.

2. Soil and water

No soil or water contact tests have been carried out.

- **Product contribution to indoor wellbeing**
-

1. Product features regarding hygrothermal comfort

Thermal insulation coefficient $U_g = 0.7 \text{ W}/(\text{m}^2 \cdot \text{K})$ according to ISO 19916-1:2018.

2. Product features regarding acoustics

Acoustic insulation $R_w (C; C_{tr}) = 36 (-2; -3) \text{ dB}$ according to ISO 19916-1:2018.

11. Product features regarding visual comfort

Light transmission (EN 410): 79%.

12. Product features regarding odours

No olfactory comfort tests were carried out.

In addition, the product is made of glass, a mineral and inert material. It is not likely to emit odors during use.

<p>Owner of the FDES Responsible for data, LCA and information</p>	<p>AGC 4 Avenue Jean Monnet 1348 Louvain-La-Neuve Belgium</p>	
<p>Program operator EPDeditor</p>	<p>HQE-GBC 4 avenue du Recteur Poincaré 75016 PARIS</p>	
<p>EPDprogram database</p>	<p>INIES</p>	
<p>Author of LCA and FDES</p>	<p>WeLOOP 254 Rue du Bourg 59130 Lambersart France</p>	
<p>Verification Name of auditor Date of verification</p>	<p>NF EN 15804+A2 et NF EN 15804/CN Guillaume Audard June 2025</p>	