AGC
Your Dreams, Our Challenge

AGC GLASS EUROPE

ENVIRONMENTAL DECLARATION SHEET AND SANITARY OF THE PRODUCT

ENVIRONMENTAL AND HEALTH PRODUCT DECLARATION

Lacobel 6 mm

Decorative glass

In accordance with ISO 14025:2010, NF EN 15804+A2:2019 and its national complement NF EN15804/CN:2022

July 2023

Registration number: 20230734741
Release Date: August 2023
Version: 1.0 EN

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 use, total or partial, of the information provided in this document must at least be accompanied by the complete reference of the original EPD as well as its producer who may submit a complete copy.

The CEN standard EN 15804+A2, and the national supplement NF EN 15804+A2/CN serve as Product Category Rules (PCR).

NOTE The literal English translation of "EPD (Environmental Product Declaration)" is "DEP" ("Déclaration Environnementale du Produit"). However, in France, the term FDES (Environmental and Health Declaration Sheet) is commonly used, which includes both the Environmental Declaration and health information for the product covered by this FDES. The FDES is therefore a "DEP" supplemented by health information.

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 zero value is displayed.
- Abbreviation used:

  LCA: Life Cycle Assessment

  EPD: Environmental Product Declaration

  RSL: Reference Lifespan

  FDES: Environmental and Health Declaration Sheet

  PCR: Product Category Rules

  UF: Functional Unit

  DU: Declared Unit

- The units used are specified in front of each flow: the kilogram "kg", the gram "g", the kilowatt-hour "kWh", the megajoule "MJ", the square meter "m^2", the kelvin "K", the watt "W", the kilometer "km", the millimeter "mm".

The results of environmental impacts and indicators of resource use, waste categories and outflows are presented with **three significant figures and in scientific format.**

All positive values (greater than zero) correspond to environmental impacts, 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 therefore an additional impact to be added to

the impacts of the other modules in the life cycle.

Precautionary use of the EPD for product comparison

The EPD of construction products may not be comparable if they do not comply with standard NF EN 15804+A2.

The standard NF EN 15804+A2 defined in § 5.3 Comparability of EPD* for construction products, the conditions under which construction products can be compared, based on the information provided by the EPD:

"Therefore, 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 of the environmental assessment of a building, EDFs are not tools for comparing construction products and services.

NOTE 2 For the assessment of the contribution of buildings to sustainable development, a comparison of environmental aspects and impacts shall be undertaken together with socio-economic aspects and impacts relating to the building.

NOTE 3 For the interpretation of a comparison, reference values are required.

General information

1. Name and address of manufacturers

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

Address: Avenue Jean Monnet, 4 1348 Louvain-la-Neuve | Belgium
Contact: sustainability@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 Lacobel range of decorative glass marketed by AGC Glass Europe in Europe, including the French market. In Europe, 2 AGC Glass Europe sites manufacture the Lacobel range for the European market, including the French market. The results of this EPD reflect the data collected from these sites, representing 100% of European production.
The data reflects the calendar year 2021.

3. System boundaries

From cradle to grave, with module D.

4. Type of EPD

Individual.

5. Verifier

This EPD was audited by Cécile Beaudard and Guillaume Audard (Solinnen), auditors authorized by AFNOR Normalisation for the verification of environmental and health declarations in the construction sector.

6. Program

This EPD was carried out within the framework of the environmental and health declaration program for construction products known as the "FDES INIES Programme".

Website: http://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

7. Date of publication

This EPD has been published in August 2023.

8. Expiry date

The validity of this EPD is 5 years after the end of the calendar year of publication, it is therefore valid until December 31, 2028.

9. The commercial reference of the product

The product covered is Lacobel 6 mm as well as Lacomat 6mm, a decorative glass composed of a 6mm soda lime flat glass painted on the side not visible by a matte paint.
Lacobel 6 mm is a real product of AGC Glass Europe's range of decorative glass.

10. Validity framework

In addition to the Lacobel 6 mm, this EPD also features the Lacomat 6mm product, which is technically very close to the Lacobel range. The Lacomat range includes flat glasses painted on the side not visible by a paint of a slightly different nature so that it is not totally opaque but slightly translucent.

The references covered by this EPD are detailed in the table below. This EPD does not cover the optional steps of tempering (corresponding to Lacobel T versions) and applying a security film SAFE + (corresponding to SAFE + versions).

Table 1: Products from the Lacobel range covered by this EPD

	3mm	4mm	5mm	6mm	8 mm	10 mm
Lacobel				X		
Lacomat				X		

Legend

X	Products covered by the EPD
X	Products non-covered by the EPD

11. Independent external audit

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

CEN standard NF EN 15804+A2 of October 2022 serves as a PCR.
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐ Internal ☒ External
Third Party Verification: Cécile Beaudard and Guillaume Audard, auditors at Solinnen
ISO 14025 compliant program registration number:
Date of 1st publication: August 2023
Audit date: July 2023
Validity period: July 2023 – December 2028

• Description of the functional unit and product

1. Description of the functional unit

Ensure the function of 1 m^2 of decorative glass used in construction or furnishing for a lifetime of 30 years.

The reference flux is a Lacobel of 15 kg corresponding to 6mm thickness (see Table 2).

Note: The reference shelf life (RSL) of the product is set at 30 years. This duration does not reflect the actual lifespan which is usually set by the lifespan and renovation of a building. It is simply a question of taking into consideration that beyond 30 years it is legitimate to consider that rearrangements can take place. The RSL does not refer to the warranty either.

2. Product and packaging description

The AGC product covered by this declaration is a 6 mm decorative glass, consisting of a 6 mm soda lime glass and a layer of lacquer (matt or translucent).

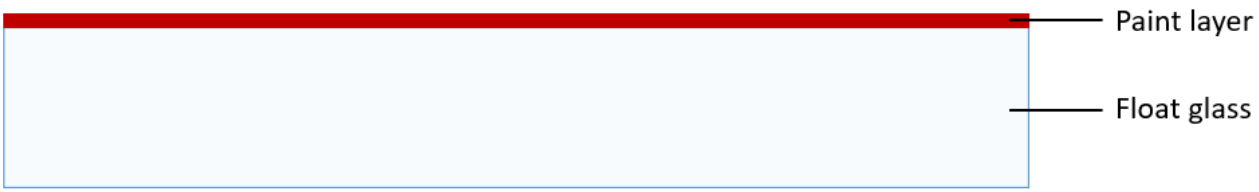


Figure 1: Schematic diagram of the composition of a Lacobel

For more information https://agc-yourglass.com/
The products of the Lacobel and Lacomat ranges are generally delivered without special packaging, on metal stillages intended to be reused. Occasionally, some of these products are delivered in wooden boxes, using small amounts of plastic film and cardboard, in addition to the wooden boxes themselves.

3. Description of the use of the product (field of application)

Lacobel (and Lacomat) glass is intended for use inside buildings: furniture, wall coverings, standard and sliding doors, etc. Lacobel combines perfectly with many other materials such as wood, steel and stone.

Lacobel T tempered lacquered glasses are suitable for both indoor and outdoor use: furniture (tables, shelves, writing boards, displays, showcases), wall covering (splashbacks, restaurant walls, hotels, shops, offices, showers), sills, façade cladding (storefronts).

4. Main performance of the business unit

The products in the Lacobel and Lacomat range are decorative glasses, for which there is no standardized measure of performance.

5. Other technical characteristics not included in the functional unit

Not applicable.

6. Description of the main components and/or materials of the product

Lacobel 6 mm consists of a sheet of soda lime glass on which a paint layer is deposited.

Table 2: Composition of a Lacobel 6 mm

Composition of the product	Lacobel mm
Soda lime flat glass	
Mass	15 kg
Mass (% final product)	> 98%
Paintings	
Mass paint (% final product)	≈ 100 g < 1%
Packaging	
Wood ("end-caps")	101 g
Cardboard	0.0 6 g
Interlayer powder	0.13 g
Metal trestles (damping)	50 g

7. Substances on the candidate list according to the REACH Regulation (if greater than 0.1% by mass)

On the date of issue of this declaration, the products of the Lacobel and Lacomat ranges covered by this declaration do not contain substances from the candidate list according to the REACH regulation incorporated at more than 0.1%.

8. Distribution channel

This statement concerns unprocessed decorative glass for professional customers (B2B). The target audience is therefore mainly B2B, although this document can also be used by end consumers (B2C).

9. Description of the reference service life

The reference service life (RSL) of glass is 30 years.

Table 3: Descriptive parameters of reference conditions for product use and justification of the RSL

Parameter	Value
Reference lifespan	30 years
Theoretical parameters of application (if imposed by the manufacturer), including references to appropriate practices	This information is in standard NF DTU 39:2006 "Building work - Glazing-mirror work." which defines the specifications for the implementation of mirroring and installation work of glass products (new work, renovation, rehabilitation, maintenance) carried out on site in all types of buildings.
Presumed quality of the work, when the installation complies with the manufacturer's instructions	This information is in standard NF DTU 39:2006 "Building work - Glazing-mirror work." which defines the specifications for the implementation of mirroring and installation work of glass products (new work, renovation, rehabilitation, maintenance) carried out on site in all types of buildings.
Outdoor environment (for outdoor applications), e.g. weather, pollutants, UV and wind exposure, building orientation, shading, temperature	
Indoor environment (for indoor applications), e.g. temperature, humidity, chemical exposure	
Conditions of use, e.g. frequency of use, exposure	
Maintenance, e.g. frequency required, type and quality and replacement of replaceable components	

10. Biogenic carbon content (Stock C)

The decorative glasses covered by this declaration do not contain biogenic carbon. The biogenic carbon stock (Stock C) is therefore 0 kg C/UF.

Table 4: Biogenic carbon content

Biogenic carbon content	Value per functional unit
Biogenic carbon content of the product (at the factory gate)	0 kg C
Biogenic carbon content of associated packaging (at factory gate)	45.2 g C

• Life Cycle Stages

Environmental assessment is cradle-to-grave, with module D.
The life cycle stages of the installation (A5) and the working life stages (B1-B7) are modeled using the scenarios defined in EN 17074:2019.
The most impactful process is the supply of raw materials and more particularly the production of flat glass used to produce Lacobel and Lacomat.

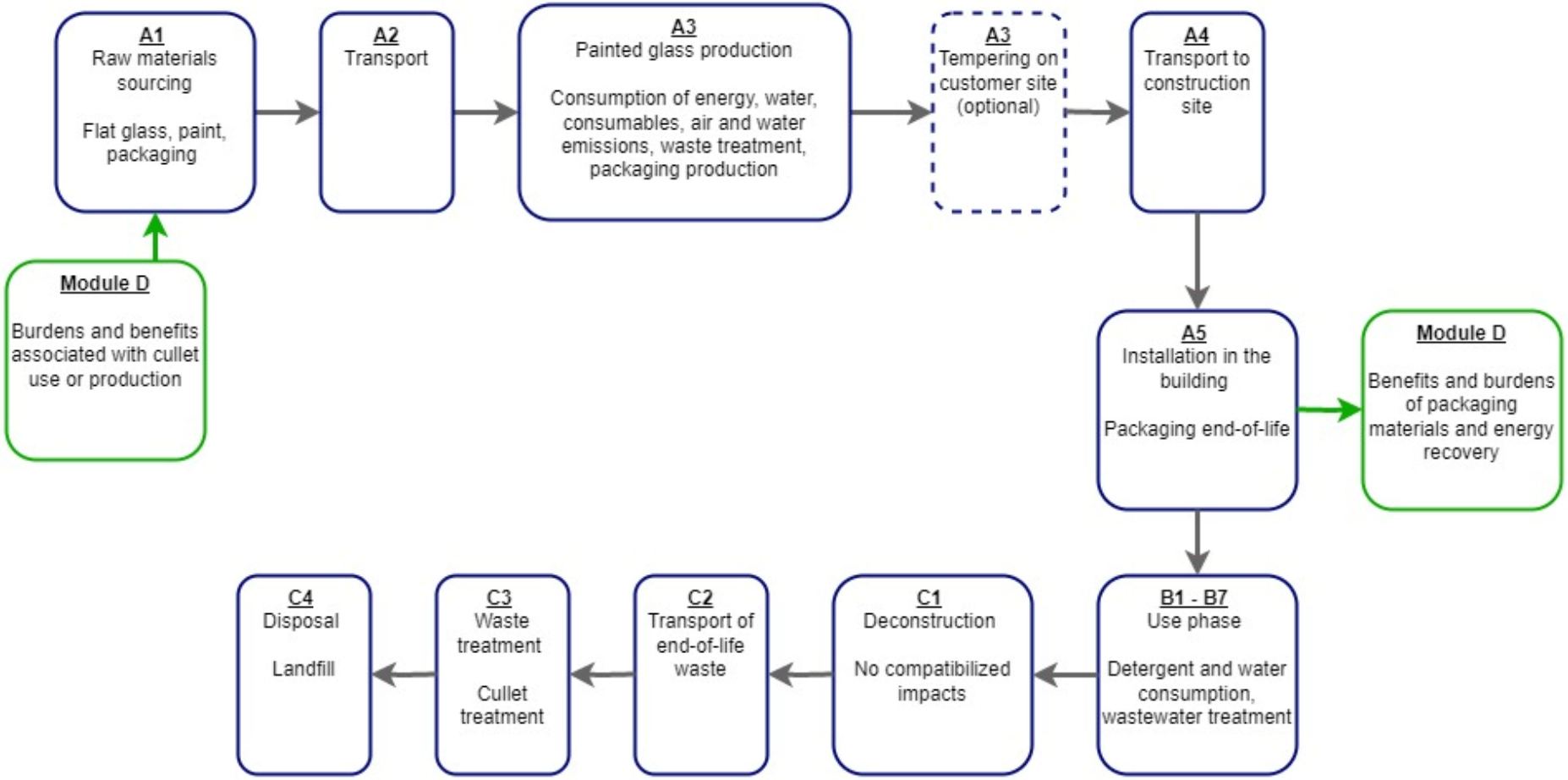


Figure 2: System Overview

	Production stage	Construction stage		Stage of use							End of Life Stage				Benefits and expenses beyond the boundaries of the system
	Total A1-A3 Production	A4 Transport	A5 Installation	B1 Usage	B2 Maintenance	B3 Repair	B4 Replacement	B4 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction/demolition	C2 Transport	C3 waste treatment	C4 Disposal	D
Declared modules	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Figure 3: Visual description of system boundaries (X = included in LCA)

▪ Production stage, A1-A3

Module A1-A3 takes into account the following processes:

1. **Production of raw materials**

The production of raw materials covers the production of flat glass, from the extraction of the constituent raw materials (silica sand, dolomite, sodium carbonate, limestone...) including impacts related to energy supply and direct emissions from flat glass production.

This step also covers the production of paints.

2. **Transport of raw materials to the production site**

All transports are taken into account, both between the extraction of raw materials (sand, dolomite, sodium carbonate, etc.) to the float, as well as transports to the production sites of acid-matted glass and then to the processing site in Lacobel or Lacomat.

3. **Production-related impacts**

The manufacturing process of a Lacobel involves the following steps:

- Polishing and washing flat glass
- Deposition and drying of the paint layer
- Decorative glass washing
- This EPD does not cover the optional steps of tempering (corresponding to Lacobel T versions) and applying a security film SAFE + (corresponding to SAFE + versions)

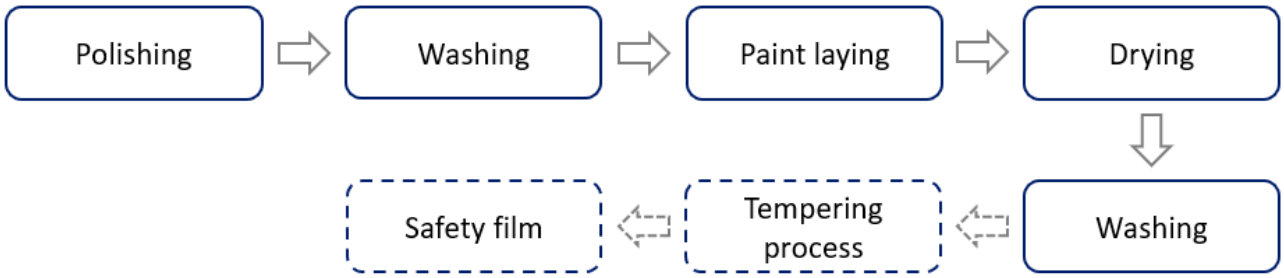


Figure 4: Production steps of a Lacobel

Allocations

A1: The production impacts of flat glass are allocated per tonne of flat glass produced. The impacts per m^2 are then deduced according to the thickness of the flat glass used and the density of the glass. This allocation complies with the industry standard EN 17074:2019.

A3: The consumption of Lacobel production has been allocated on the basis of the surface area of the different types of decorative glass produced. This allocation complies with the rule of EN 17074:2019, which stipulates a surface allocation for glass processing steps.

All inputs and outputs have been taken into account to the extent possible. No known data were voluntarily excluded as part of this assessment.

▪ Construction stage, A4-A5

This step takes into account the transport of decorative glasses from the production site to the construction site, as well as the end of life of the packaging on the construction site.

1. Parameters for transport to the construction site

Transport to the construction site (A4) considers the average delivery distance from AGC Glass Europe's Lacobel production sites. The transport is carried out by "inloader" type truck, dedicated to the transport of glass products.

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

Table 5: Transportation to Site Parameters

Parameter	Value	Unit | Description
Vehicle	24,7	Tonne | Diesel truck - Euro 5 – freighter, 40 t
Distance to the construction site	597	Miles
Capacity utilization (including empty returns)	85	%
Density of products transported	2500	kg/m^3
Density duty cycle	1	

2. Installation parameters in the building

This step concerns the treatment of packaging:

- Transportation to the treatment center
- Recycling process (sorting, grinding, washing) in the case of recycled waste
- Incineration, for waste treated in this sector
- Landfill, for waste treated in this sector

The inputs/outputs not taken into account correspond to any energy consumption or other additional materials used in the assembly of decorative glass, in accordance with EN 17074:2019.

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

▪ Use stage (excluding potential savings), B1-B7

The only module taken into account at the life stage in operation is that relating to maintenance (B2). This corresponds to the cleaning of the glass surface with a solution of water and glass cleaner.

The parameters for washing glazier products are defined in the EN 17074:2019 categorical standard. The average annual water consumption of the network is 0.2 liters per m² of glass (i.e. 6 liters/m² during the reference life), to which is added a quantity of 10 g/m² of detergent (300 g/m² during the reference life). All of this water is considered contaminated and discharged to a treatment plant.

Table 6: Maintenance Parameters

Parameter (for the entire lifetime)	Value	Unit | Description
Maintenance process	Washing with detergent and water	
Net freshwater consumption during maintenance	0.006	m^3/RSL
Detergent consumption	0.3	kg/RSL
Wastewater treatment	0.006	m^3/RSL

Repair (B3), replacement (B4), and rehabilitation (B5) are not considered. Decorative glasses do not require these operations during their lifetime under normal use. Finally, the product is not at the origin of any consumption or emission at the level of its use (B1).

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

▪ End of life stage, C1-C4

The end of life of decorative glass takes into account the following steps:

- C1: deconstruction;
- C2: transport to the treatment site;
- C3: waste treatment;
- C4: Landfilling of demolition waste.

The end-of-life scenario considered in this EPD is inspired by that described and recommended in the national supplement NF EN 15084+A2/CN:2022 for glass products. This scenario is explained in the table below.

Table 7: End-of-life parameters

Parameter	Value	Unit | Description
Share of decorative glass sent to landfill	100	%
Transportation to landfill, truck	50	Miles

This transport is carried out by means of diesel trucks of class EURO 5 with a payload of 24.7 tons.

The inputs/outputs not taken into account in this assessment correspond to any energy consumption related to dismantling and demolition (C1).

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

Benefits and burdens beyond system boundaries (module D)

Benefits and burdens beyond the boundaries of the system correspond to the following items.

1. Additional burdens related to the use of external cullet in A1

With regard to external cullet, module D corresponds to a negative net outflow, related to the consumption of external cullet during the production of flat glass. Module D therefore acts as an additional impact corresponding to the puncture of external cullet which is not compensated by the life cycle of the product.

The impact of the virgin materials replacing the external cullet includes several components:

- Additional production of raw material (sand, sodium carbonate, dolomite, etc.)
- An overconsumption of energy linked to the non-use of cullet, which consumes 25% less energy to melt than virgin raw materials. In addition to higher energy consumption, this also translates into increased CO_2 emissions from the combustion of additional fossil fuels.
- The increase in CO_2 emissions linked to the non-use of cullet, due to a greater quantity of material leading to decarbonisation.

These different components are described in Appendix D of PCR NF EN 17074:2019.

The rule for calculating the impacts of module D is defined in standard NF EN 15804/CN.

$$e_{module\ D1} = \sum_i (M_{MR\ sort.}|_i - M_{MR\ entr.}|_i) \cdot \left(E_{MR\ après\ FsD\ sort.}|_i - E_{VMSub\ sort.}|_i \cdot \frac{Q_{R\ sort.}}{Q_{Sub}}\Big|_i \right)$$

With:

Symbol	Description	Value
M_{MRsort}	Amount of material leaving the system that will be recovered (recycled and reused) in a subsequent system → External cullet leaving the system after treatment	0 kg/m² product
M_{MRentr}	Quantity of material input into the product system that has been recovered (recycled or reused) from a previous system → External cullet entering the system	1.3 kg/m² product
$E_{MR\ après\ FsD\ Sort}$	Specific emissions and resources consumed per unit of analysis from material recovery processes (recycling and reuse) of a subsequent system after end-of-waste status → Impact of cullet treatment after end of waste status	No further treatment is required
$E_{VMsub\ Sort}$	Specific emissions and resources consumed per unit of analysis from the acquisition and pre-treatment of the primary material,	See details below

	or medium material input if the primary material is not used, from cradle to the functional equivalence point where it would replace the secondary material that would be used in a subsequent system → Impact of virgin materials replacing the use of external cullet	
$Q_{R\ sort.}/Q_{sub}$	Quality ratio between recovered (recycled and reused) output material and substituted material → Quality ratio between external cullet and primary materials	In this case, this ratio is considered to be equal to 1

With this logic, the comparison is made at the level of molten glass (since the variations in energy consumption to arrive at this molten glass have been taken into account). The quality ratio between the recovered output material and the substituted material is therefore equal to 1 in view of the fact that the quality of molten glass remains constant whether it was obtained by melting cullet or primary materials.

2. **Benefits and burdens related to the recycling and energy recovery of packaging from module A5**

The recycling of packaging from module A5 sent for recycling is taken into account in module D. This concerns the following materials:

- Steel from wooden packaging (nails)
- Steel corresponding to reusable metal trestles out of order
- The cardboard for separating decorative glass stacks

Steel recycling

The calculation of module D related to steel recycling considers the costs and benefits associated with recycling steel up to the point of substitution, i.e. until steel ingot is obtained. The modeling in Module D considers the impacts of recycling scrap metal into recycled steel ingots (fillers) as well as the avoided production of steel ingots from virgin raw materials (benefits).

Cardboard recycling

Cardboard recycling considers the costs and benefits of recycling used cardboard to the point of substitution, i.e. until recycled Testliner paper is obtained.
The modeling takes into account secondary paper production (testliner type) as well as the avoided impacts associated with virgin fibre paper production.

3. **Benefits and expenses related to energy recovery**

Part of the packaging waste (wood, cardboard and plastic) ends up in energy recovery or landfill with biogas recovery. Benefits associated with avoided energy production are accounted for taking into account:

- The French electricity mix

- Heat production from a gas boiler

The modelling of impacts and benefits beyond the borders of the system is representative of the French situation.

Note 1:
Other materials sent for recycling during the production of Lacobel and Lacomat (module A3) are not taken into account in the calculation of module D. EN 15804+A2 excludes waste from module A1-A3 from the boundaries of module D.

Note2:
The environmental impacts reported in module D with a "+" sign are additional loads to be added to the system studied. Conversely, data with a "-" sign corresponds to an environmental benefit.

• Information for calculating life cycle assessment

Table 8: Information for the calculation of the life cycle assessment

RCP used	ISO 14025:2010 NF EN 15804+A2:2019 NF EN 15804+A2/CN:2022 EN 17074:2019 (As a source of information because outdated)
System boundaries	From cradle to grave with module D
Allowances	A1: Mass A3: Area
Geographical representativeness and temporal representativeness of primary data	**Geographic** 2 European production sites of AGC Glass Europe, representing 100% of Lacobel and Lacomat European production for the European market, specifically including the French market. **Time** Primary data collected for the whole year of 2021. **Technological** Primary input-output and transport data for the LCI calculation were collected from AGC's production site located in Europe representing 100% of Lacobel and Lacomat European production.
Geographical representativeness and temporal representativeness of background data	The secondary data are from the GaBi LCA software 10.6.2.9 as well as its 2023.1 database. GaBi was also used for life cycle modelling and indicator calculation. For this purpose, the indicator set EN 15804+A2 with characterization factors based on EF 3.0 was used. The background data mainly used has a collection date of less than 10 years.
Cut-off criterion	All known constituents of the product and its packaging have been taken into account with the exception of the pigments present in the lacquer used during the production of painted glass. Indeed, an estimate of the mass of these showed that this mass was much lower than the cut-off criterion. In the absence of secondary data that fully matched the needs, these were estimated by approximation.
Energy model	The electricity mix corresponds to the national consumption mixes of the countries in which AGC Glass Europe produces painted glass. Only renewable electricity self-produced and consumed by AGC Glass Europe is considered in this study. All the electricity in the grid is modelled on the basis of national mixes. Natural gas consumption corresponds to the natural gas supply mix of the countries in which AGC Glass Europe produces painted glass.
Other data assumptions	When data is not available for one or more production sites, the value considered is the average of the sites for which the data is

	available.
Variability of results	The variability of the results was studied on production step A1-A3 in order to verify that for all the production sites of Lacobel and Lacomat the variability of the results is less than 35% for the control indicators of standard NF EN 15804+A2/CN:2022: – Global warming: variability of less than 1% – Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials: variability of less than 1% – Non-hazardous waste disposed of: variability of less than 20%

• Results of the life cycle assessment

Table 9: Environmental Impacts

BASELINE ENVIRONMENTAL IMPACT INDICATORS														
Environmental impacts	Production stage	Construction stage		Stage of use							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*	1.88E+01	5.79E-01	1.69E-01	0	2.63E-02	0	0	0	0	0	0	4.69E-02	0	2.19E-01	8.04E-01
Climate change – fossil fuels *kg CO_2 equiv/FU or DU*	1.89E+01	5.82E-01	7.34E-03	0	3.53E-01	0	0	0	0	0	0	4.71E-02	0	2.25E-01	8.03E-01
Climate change - biogenic *kg CO_2 equiv/FU or DU*	-9.88E-02	-8.11E-03	1.62E-01	0	-5.02E-01	0	0	0	0	0	0	-6.57E-04	0	-7.48E-03	4.70E-04
Climate change – land cover and land cover transformation *kg CO2 equiv/FU or DU*	7.39E-03	5.31E-03	5.09E-06	0	1.75E-01	0	0	0	0	0	0	4.30E-04	0	7.00E-04	2.35E-04
Depletion of the ozone layer *kg of CFC 11 equiv /FU or DU*	1.79E-08	5.02E-14	4.42E-10	0	3.11E-08	0	0	0	0	0	0	4.07E-15	0	5.73E-13	1.28E-09
Acidification *mole of H^+ equiv / FU or DU*	9.92E-02	1.96E-03	5.89E-05	0	3.05E-03	0	0	0	0	0	0	1.55E-04	0	1.60E-03	2.01E-03
Aquatic eutrophication, freshwater *kg P equiv / FU or DU*	3.61E-05	2.09E-06	3.17E-08	0	3.16E-05	0	0	0	0	0	0	1.69E-07	0	4.54E-07	1.36E-06
Marine aquatic eutrophication *kg of N equiv / FU or DU*	2.78E-02	9.02E-04	2.12E-05	0	1.61E-03	0	0	0	0	0	0	7.13E-05	0	4.13E-04	4.32E-04
Terrestrial eutrophication mole of N equiv/FU or DU	3.43E-01	1.01E-02	2.60E-04	0	1.08E-02	0	0	0	0	0	0	8.01E-04	0	4.54E-03	7.19E-03
Photochemical ozone formation *kg of NMCOV equiv/FU or DU*	7.41E-02	1.76E-03	6.12E-05	0	2.72E-03	0	0	0	0	0	0	1.40E-04	0	1.25E-03	8.83E-04

BASELINE ENVIRONMENTAL IMPACT INDICATORS															
Environmental impacts	Production stage	Construction stage		Stage of use							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	
Depletion of abiotic resources (minerals & metals)[1] *kg Sb equiv/FU or DU*	1.23E-05	3.70E-08	1.08E-09	0	1.76E-06	0	0	0	0	0	0	3.00E-09	0	1.04E-08	7.27E-08
Depletion of abiotic resources (fossil fuels)[1] *MJ/FU or DU*	2.75E+02	7.80E+00	9.42E-02	0	4.81E+00	0	0	0	0	0	0	6.32E-01	0	3,00E+00	7.87E+00
Water requirement[1] *m^3 of deprivation equiv in the world / FU or DU*	9.58E-01	6.61E-03	1.26E-01	0	5.38E+01	0	0	0	0	0	0	5.36E-04	0	2.47E-02	7.00E-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.

Table 10 : Resource Utilization

RESOURCE UTILIZATION														
Resource utilization	Production stage	Construction stage		Stage of use							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*	1.48E+01	5.52E-01	1.18E-02	0	1.45E+01	0	0	0	0	0	0	4.47E-02	0	4.89E-01	2.10E-01
Use of renewable primary energy resources as raw materials - *MJ/FU or DU*	1.72E+00	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*	1.65E+01	5.52E-01	1.18E-02	0	1.45E+01	0	0	0	0	0	0	4.47E-02	0	4.89E-01	2.10E-01
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - *MJ/FU or DU*	2.74E+02	7.82E+00	9.42E-02	0	6.07E+00	0	0	0	0	0	0	6.34E-01	0	3,00E+00	7.87E+00
Use of non-renewable primary energy resources as raw materials - *MJ/FU or DU*	1.20E+00	0	0	0	0	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*	2.75E+02	7.82E+00	9.42E-02	0	6.07E+00	0	0	0	0	0	0	6.34E-01	0	3,00E+00	7.87E+00
Use of secondary material - *kg/FU or DU*	1.34E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0

RESOURCE UTILIZATION															
Resource utilization	Production stage	Construction stage		Stage of use							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 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*	3.47E-02	6.08E-04	2.94E-03	0	1.26E+00	0	0	0	0	0	0	4.93E-05	0	7.58E-04	1.61E-03

Table 11: Waste Categories

WASTE CATEGORY															
Category of waste	Production stage	Construction stage		Stage of use							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*	5.95E-08	2.89E-11	1.45E-12	0	-8.67E-13	0	0	0	0	0	0	2.34E-12	0	6.54E-11	1.47E-09
Non-hazardous waste disposed of - *kg/FU or DU*	7.03E-01	1.13E-03	1.16E-02	0	5.80E-03	0	0	0	0	0	0	9.13E-05	0	1.50E+01	2.88E-02
Radioactive waste disposed of - *kg/FU or DU*	5.58E-03	1.01E-05	2.43E-06	0	3.15E-06	0	0	0	0	0	0	8.19E-07	0	3.42E-05	-1.16E-04

Table 12: Outflows

OUTFLOWS															
Outflows	Production stage	Construction stage		Stage of use							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	
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*	4.36E-01	0	4.53E-02	0	0	0	0	0	0	0	0	0	0	0	0
Energy recovery materials - *kg/FU or DU*	3.25E-03	0	1.02E-01	0	0	0	0	0	0	0	0	0	0	0	0
Electrical Energy supplied outside - *MJ/FU or DU*	6.89E-03	0	2.31E-01	0	0	0	0	0	0	0	0	0	0	0	0
Steam energy supplied externally - *MJ/FU or DU*	1.25E-02	0	4.16E-01	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

Table 13 : Aggregation of the different modules to achieve a "Total per steps" or "Total Life Cycle"

ENVIRONMENTAL IMPACT INDICATORS: Aggregation of the different modules to achieve a "Total per steps" or "Total Life Cycle"						
Impacts/Flows	Production stage	Construction stage	Stage of use	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*	1.88E+01	7.48E-01	2.63E-02	2.66E-01	1.99E+01	8.04E-01
Climate change – fossil fuels *kg CO_2 equiv/FU or DU*	1.89E+01	5.89E-01	3.53E-01	2.73E-01	2.01E+01	8.03E-01
Climate change - biogenic *kg CO_2 equiv/FU or DU*	-9.88E-02	1.54E-01	-5.02E-01	-8.14E-03	-4.55E-01	4.70E-04
Climate change – land cover and land cover transformation *kg CO2 equiv/FU or DU*	7.39E-03	5.32E-03	1.75E-01	1.13E-03	1.89E-01	2.35E-04
Depletion of the ozone layer *kg of CFC 11 equiv /FU or DU*	1.79E-08	4.42E-10	3.11E-08	5.77E-13	4.95E-08	1.28E-09
Acidification *mole of H^+ equiv / FU or DU*	9.92E-02	2.01E-03	3.05E-03	1.75E-03	1.06E-01	2.01E-03
Aquatic eutrophication, freshwater *kg P equiv / FU or DU*	3.61E-05	2.12E-06	3.16E-05	6.23E-07	7.04E-05	1.36E-06
Marine aquatic eutrophication *kg of N equiv / FU or DU*	2.78E-02	9.23E-04	1.61E-03	4.84E-04	3.09E-02	4.32E-04
Terrestrial eutrophication mole of N equiv/FU or DU	3.43E-01	1.04E-02	1.08E-02	5.34E-03	3.70E-01	7.19E-03
Photochemical ozone formation *kg of NMCOV equiv/FU or DU*	7.41E-02	1.83E-03	2.72E-03	1.39E-03	8.00E-02	8.83E-04
Depletion of abiotic resources (minerals & metals)[2] *kg Sb equiv/FU or DU*	1.23E-05	3.81E-08	1.76E-06	1.34E-08	1.41E-05	7.27E-08

ENVIRONMENTAL IMPACT INDICATORS: Aggregation of the different modules to achieve a "Total per steps" or "Total Life Cycle"						
Impacts/Flows	Production stage	Construction stage	Stage of use	End of life stage	Total life cycle	D Benefits and charges beyond the boundaries of the system
Depletion of abiotic resources (fossil fuels)[2] *MJ/FU or DU*	2.75E+02	7.90E+00	4.81E+00	3.63E+00	2.92E+02	7.87E+00
Water requirement[2] *m^3 of deprivation equiv in the world / FU or DU*	9.58E-01	1.33E-01	5.38E+01	2.53E-02	5.49E+01	7.00E-02
Resource consumption						
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials - *MJ/FU or DU*	1.48E+01	5.64E-01	1.45E+01	5.34E-01	3.04E+01	2.10E-01
Use of renewable primary energy resources as raw materials - *MJ/FU or DU*	1.72E+00	0	0	0	1.72E+00	0
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU or DU*	1.65E+01	5.64E-01	1.45E+01	5.34E-01	3.21E+01	2.10E-01

[2] 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.

ENVIRONMENTAL IMPACT INDICATORS: Aggregation of the different modules to achieve a "Total per steps" or "Total Life Cycle"

Impacts/Flows	Production stage	Construction stage	Stage of use	End of life stage	Total life cycle	D Benefits and charges beyond the boundaries of the system
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials - *MJ/FU or DU*	2.74E+02	7.92E+00	6.07E+00	3.64E+00	2.92E+02	7.87E+00
Use of non-renewable primary energy resources as raw materials - *MJ/FU or DU*	1.20E+00	0	0	0	1.20E+00	0
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU or DU*	2.75E+02	7.92E+00	6.07E+00	3.64E+00	2.93E+02	7.87E+00
Use of secondary material - *kg/FU or DU*	1.34E+00	0	0	0	1.34E+00	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*	3.47E-02	3.55E-03	1.26E+00	8.07E-04	1.30E+00	1.61E-03
Category of waste						
Hazardous waste disposed of - *kg/FU or DU*	5.95E-08	3.04E-11	-8.67E-13	6.77E-11	5.96E-08	1.47E-09
Non-hazardous waste disposed of - *kg/FU or DU*	7.03E-01	1.28E-02	5.80E-03	1.50E+01	1.57E+01	2.88E-02
Radioactive waste disposed of - *kg/FU or DU*	5.58E-03	1.25E-05	3.15E-06	3.50E-05	5.63E-03	-1.16E-04
Outflows						
Components for reuse - *kg/FU or DU*	0	0	0	0	0	0

ENVIRONMENTAL IMPACT INDICATORS: Aggregation of the different modules to achieve a "Total per steps" or "Total Life Cycle"

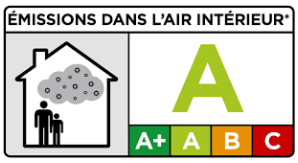
Impacts/Flows	Production stage	Construction stage	Stage of use	End of life stage	Total life cycle	D Benefits and charges beyond the boundaries of the system
Materials for recycling - *kg/FU or DU*	4.36E-01	4.53E-02	0	0	4.81E-01	0
Energy recovery materials - *kg/FU or DU*	3.25E-03	1.02E-01	0	0	1.05E-01	0
Electrical Energy supplied outside - *MJ/FU or DU*	6.89E-03	2.31E-01	0	0	2.38E-01	0
Steam energy supplied externally - *MJ/FU or DU*	1.25E-02	4.16E-01	0	0	4.28E-01	0
Gas and process energy supplied externally - *MJ/FU or DU*	0	0	0	0	0	0

• Additional information on the release of hazardous substances into indoor air, soil and water during the use stage

1. Indoor air

- **VOC and formaldehyde emissions**

VOC and formaldehyde emission tests were carried out in accordance with EN 7375:2005 and NF EN ISO 16000-9:2009. Based on these tests, and under the conditions of the selected exposure scenario, the decorative glasses of the Lacobel range obtained the A emission level in their standard form.



- Lacobel

The VOC emissions report is publicly available on the website https://agc-yourglass.com

- **Behaviour in the face of fungal and bacterial growth**

No tests concerning the behaviour of the product against fungal and bacterial growth have been carried out.

In addition, the product is made of glass, mineral and inert material, It does not constitute, in itself, a growth medium for microorganisms.

- **Natural radioactive emissions from construction products**

No tests on natural radioactive emissions have been conducted.

- **Fibre and particulate emissions**

No fibre and particulate emissions were tested.

2. Soil and water

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

No tests concerning the sanitary quality of the water in contact with the product during its life in use have been carried out.

• Contribution of the product to quality of life inside buildings

1. Product characteristics involved in creating hygrothermal comfort conditions in the building

None, decorative glasses have no impact on the hygrothermal comfort of the building in which they

are installed.

2. Product characteristics involved in creating acoustic comfort conditions in the building

None, decorative glasses have no impact on the acoustic comfort of the building in which they are installed.

3. Product characteristics involved in creating conditions of visual comfort in the building

None, decorative glasses have no impact on the visual comfort of the building in which they are installed, except with regard to interior aesthetics.

4. Product characteristics contributing to the creation of olfactory comfort conditions in the building

No tests on odour comfort have been performed.

• Additional information

1. AGC's Environmental Policy and Objectives

AGC Glass Europe has set itself ambitious environmental objectives to reflect AGC's main sustainability project: maximising the societal added value of our products while minimising environmental impacts. The main objectives are to reduce greenhouse gas emissions by -30% in 2030[3] and achieve carbon neutrality by 2050. In order to reach these objectives, AGC Glass Europe has opted for a holistic approach by focusing on 5 main aspects:

- Sustainable raw material sourcing
- Use of energy-efficient ovens
- Increased use of recycled glass
- Use of electricity with low impact on climate change
- Optimization of the transport of raw materials and finished products

More information is available on our website: https://www.agc-glass.eu/en/sustainability

[3] -30% for Scopes1+2 emissions vs emissions of 2019 and -30% for scope3 emissions vs 2019 emissions.

Additional data available in https://agc-yourglass.com/

And in the "Sustainability" section of our website https://www.agc-glass.eu/en/sustainability