SAINT-GOBAIN

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019 for:

ORAÉ®

4 mm

Low carbon glass

Version 1
Date of publication: 2023-04-14
Validity: 5 years
Valid until: 2028-04-13
Scope of the EPD®: Europe

EPD®
THE INTERNATIONAL EPD® SYSTEM

The International EPD® System
Programme operator: EPD international AB
www.environdec.com
Registration number: S-P-08970

ECO PLATFORM EPD VERIFIED

EPD VERIFIED

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

SAINT-GOBAIN GLASS

General information

Company information

Manufacturer: Saint-Gobain Glass FRANCE, 12 place de l'Iris, 92096 La Défense
Production plant: SAINT-GOBAIN GLASS INDUSTRY - Aviles, Spain/ Torgau, Germany/ Aniche, France.
Management system-related certification: Glass products are manufactured in production plants with an integrated management system certified according to ISO 9001:2015, ISO 14001:2015 and OHSAS 18001:2009 standards.

Programme used: The International EPD® System. More information at www.environdec.com.
PCR identification: PCR 2019:14 Construction products (EN 15804:2012: A2) version 1.1 and its c-PCR-009 Flat glass products used in buildings and other construction works (EN17074:2019)
Prepared by: IVL Swedish Environmental Research Institute, EPD International Secretariat
UN CPC CODE: 3711 - Unworked glass, flat glass and pressed or moulded glass for construction; glass mirrors
Owner of the declaration: Saint-Gobain Glass Industry, Europe
Product name and manufacturer represented: ORAÉ® produced by SAINT-GOBAIN GLASS INDUSTRY
EPD® prepared by: Amelie Briend (Saint-Gobain) and Marie-Charlotte Harquet (Saint-Gobain LCA central team)
Contact : François Guillemot - françois.guillemot@saint-gobain.com
Geographical scope of the EPD®: Europe, cradle to grave and module D
EPD® registration number: S-P-08970
Declaration issued: 2023_04_14, valid until: 2028_04_13
Demonstration of verification: an independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the following third party based on the PCR mentioned above.

Programme information

PROGRAMME:	The International EPD® System
ADDRESS:	EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden
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CEN standard EN 15804:2012 + A2:2019 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction Products, version 1.11
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com for a list of members.
President: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact - Contact via info@environdec.com
Independent third-party verification of the declaration and data, according to ISO 14025:2006:
☐ EPD process certification ☒ EPD verification
Third party verifier: ELYS CONSEIL
Yannick LE GUERN - yannick.leguern@elys-conseil.com
Approved by: The International EPD© System
Procedure for follow-up of data during EPD validity involves third part verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.
EPDs within the same product category but from different programs may not be comparable.
EPDs of construction products may not be comparable if they do not comply with EN 15804.
For further information about comparability, see EN 15804 and ISO 14025.

Product description

Product description and description of use

This Environmental Product Declaration (EPD®) describes the environmental impacts of 1 m² of low carbon glass ORAÉ® to 4 mm with a light transmittance of maximum 91%, for an expected average service life of 30 years.

This EPD is an average of 3 glass production sites in Europe. All the sites producing the flat glass ORAÉ® are considered[1]. The average calculated is a weighted arithmetic mean.

ORAÉ® can be incorporated into a building, furniture or industrial application. The impacts of installation are not taken into account.

ORAÉ® is a float glass with a low embodied carbon thanks to a substantial R&D effort and the excellence of our industrial teams. ORAÉ® is offering exactly the same aesthetics than the regular clear float glass PLANICLEAR®.

ORAÉ® is a basic soda-lime silicate glass produced using the float procedure to be used in building, furniture & industrial applications. This glass is in conformity with the European Standard EN 572-2.

Technical data/physical characteristics :

Thickness (mm)	4 mm
Visible parameters	
Light transmittance (LT) %	**91**
External light reflection (RLE) (%)	**8**
Energetic parameters	
Energy transmittance (ET) %	**87**
Energy absorbance (EA) %	**5**
Solar factor g	**0.88**

Table 1: Performance Data of ORAÉ® 4 mm

The performance data are given according to the EN 410-2011 standard.

Declaration of the main product components and/or materials

The product is 100% glass CAS number 65997-17-3, EINECS number 266-046-0.

Description of the main components for 1 m² of ORAÉ® 4 mm.

[1] Countries considered for the production of ORAÉ®: Germany, Spain, France

PARAMETER	VALUE
Quantity of glass for 1 m^2 of product	10 kg
Thickness	4 mm
Packaging for the transportation and distribution	0 kg
Product used for the Installation	NA

There is no “Substance of Very High Concern” (SVHC) in concentration above 0.1% by weight, and neither do their packaging, following the European REACH regulation (Registration, Evaluation, Authorization and Restriction of Chemicals).

Packaging and product used: None

Description of the main product components and/or materials:

All raw materials contributing more than 5% to any environmental impact are listed in the following table.

Product components	Weight (%)	Post-consumer material weight (%)	Weight biogenic carbon kg C/kg
Sand	20 – 30 %	NA	NA
Cullet	55 – 65 %*	1 - 3 %*	NA
Sodium carbonate	5 – 10 %	NA	NA
Limestone	1 – 5 %	NA	NA
Other	< 1%	NA	NA
Sum	**100%**	**1-3%**	
Packaging materials	**Weight (%)**	**Weight (%)**	**Weight biogenic carbon kg C/kg**
NA	NA	NA	NA

* More information at page 20.

LCA calculation information

TYPE OF EPD	Cradle to grave and module D Mandatory Stages = A1-A3 ; B1-B7 ; C1-C4 and D
FUNCTIONAL UNIT/DECLARED UNIT	1 m² ORAÉ® 4 mm with a light transmittance of maximum 91%, for an expected average service life of 30 years.
SYSTEM BOUNDARIES	Cradle to grave and module D Mandatory Stages = A1-A3 ; B1-B7 ; C1-C4 and D
REFERENCE SERVICE LIFE (RSL)	According to PCR EN 17074:2019, the reference service life is 30 years
CUT-OFF RULES	According to EN 15804+A2, the energy used for the installation of 1m² of glass and the transport glass racks are included in the cut-off-rules.
ALLOCATIONS	There is no co-product therefore no allocation.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	The information was established over the year 2022 The information collected comes from the European sites producing ORAÉ® (SAINT-GOBAIN GLASS INDUSTRY, Spain, France, Germany).
BACKGROUND DATA SOURCE	GaBi data were used to evaluate the environmental impacts. The data are representative of the years 2015-2019.
SOFTWARE	GaBi 10

According to EN 15804+A2, EPD of construction products may not be comparable if they do not comply with this standard. According to ISO 21930:2017, EPD might not be comparable if they are from different programmes.

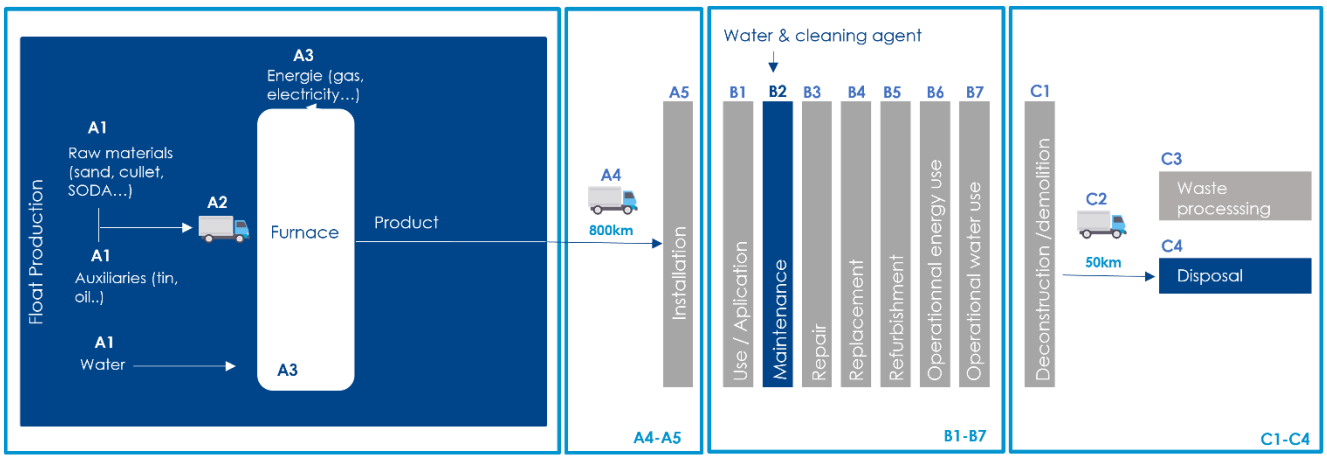
LCA scope

System boundaries (X=included. MND=module not declared)

	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	EU-27																
Specific data used	<90 % GWP-GHG																
Variation products	Not relevant																
Variation sites	-7 to +1%																

According to the PCR, the variation for the GWP indicators (GWP-GHG) has been calculated for the different sites and compared to the product groups formed as averages (similar products from different plants). The variation between the different manufacturing sites and the average is from -7% to 1%. The variation of the sites comes from energy efficiency and the energy mix of the countries. For example, some plants use green electricity and can increase the variability.

Life cycle stages



A1-A3, Product stage

Description of the stage:

For flat glass A1 to A3 represents the production of glass in the float from cradle to gate.

Description of the stage: the product stage of flat glass is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport to manufacturer” and “manufacturing”.

Description of the scenarios and other additional technical information:
A1, Raw materials supply

This includes the extraction and processing of all raw materials and energy which occur upstream from the manufacturing process.

A2, Transport to the manufacturer

The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportations of each raw material.

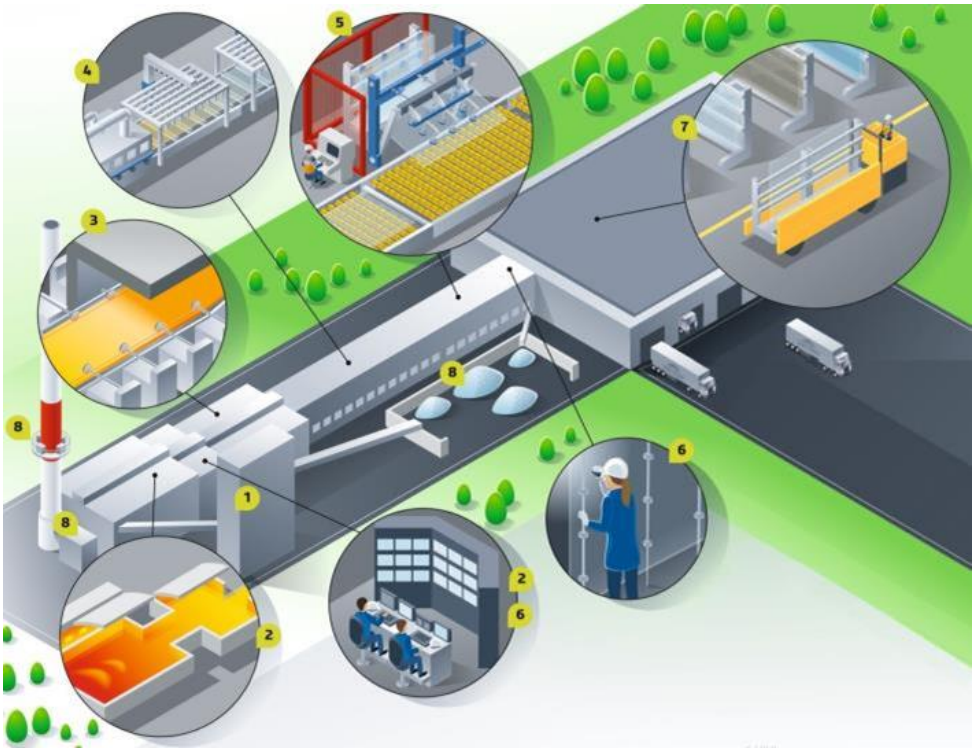
A3, Manufacturing

This module includes the manufacture of products and the manufacture of packaging. The production of packaging material is taken into account at this stage. The processing of any waste arising from this stage is also included.

The product stage includes the extraction and processing of raw materials and energies, transport to the manufacturer, manufacturing and processing of flat glass.

Manufacturing process flow diagram

System diagram:



1. BATCH MIXER: Mix of raw materials (silica, soda ash, lime, feldspar and dolomite) to which is added recycled glass (cullet) and other compounds depending on the desired color and properties.
2. FUSION FURNACE: Raw materials are melted at 1,550°C in a furnace.
3. FLOAT: The molten glass is fed into a bath of molten tin. The glass floats on this flat surface and is drawn off in a ribbon. Serrated wheels, or top rolls, pull and push the glass sideways depending on the desired thickness.
4. ANNEALING LEHR: The glass is lifted onto conveyor rollers and passes through a controlled cooling tunnel measuring more than 100 meters in length. Approximately 600°C at the start of this step, the glass exits the lehr at room temperature.
5. CUTTING AND STACKING: The glass is automatically cut lengthwise and crosswise. The sheets of glass are raised by vacuum frames that then place them on glass stillages.
6. QUALITY: Automatic inspections and regular samples are taken to check the quality of the glass at each step in the glassmaking process.
7. STORAGE AND TRANSPORTATION: The stillages are placed on storage racks in the warehouse.
8. ENVIRONMENT: Use of recycled cullet, installation of pollution abatement systems and closed-circuit management of water: every measure is taken to limit the consumption of energy, extraction of natural resources, production of waste and emissions into the atmosphere.

The flat glass is transported on dedicated racks, used many times. This racks are not included in the life cycle of the product.

A4-A5, Construction process stage

Description of the stage: The construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building.

A4, Transport to the building site:

This module includes transport from the production gate to the building site.
Transport is calculated on the basis of a scenario with the parameters described in the following table

PARAMETER	VALUE
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	Freight truck trailer with a 27t payload, diesel consumption 38 liters for 100 km
Distance	803 km
Capacity utilisation (including empty returns)	100% of the capacity in volume
Bulk density of transported products*	30 % of empty returns in mass
Volume capacity utilisation factor	2500 kg/m3

A5, Installation in the building:

The accompanying table quantifies the parameters for installing the product at the building site. All installation materials and their waste processing are included.

PARAMETER	VALUE/DESCRIPTION
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	According to PCR EN 17074, no waste is considered
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)	None
Ancillary materials for installation (specified by materials)	According to PCR NF EN 17074, none ancillary materials considered
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	According to EN 15804+A1 , the energy needed during the installation is less than 0,1% of the total life cycle energy. It's include in the cut-off-rules.
Direct emissions to ambient air, soil and water	None

B1-B7, Use stage (excluding potential savings)

Description of the stage: the use stage is divided into the following modules:

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational energy use
- B7: Operational water use

B2, Maintenance:

PARAMETER	VALUE
Maintenance process	Water and cleaning agent
Maintenance cycle	Annual average
Ancillary materials for maintenance (e.g. cleaning agent, specify materials)	cleaning agent : 0,001 kg/m² of glass/year
Wastage material during maintenance (specify materials)	0 kg
Net fresh water consumption during maintenance	0,2 kg/m² of glass/year
Energy input during maintenance	None required during product lifetime

Description of the scenarios and additional technical information:
The product has a reference service life of 30 years. This assumes that the product will last in situ with no requirements for repair, replacement or refurbishment throughout this period. Therefore, it has no impact at this stage, except for maintenance.

According to PCR EN 17074, only the maintenance by cleaning glass with water and cleaning agent is included in this study.

C1-C4, End of Life Stage

Description of the stage: this stage includes the next modules:

- C1, Deconstruction, demolition
- C2, Transport to waste processing
- C3, Waste processing for reuse, recovery and/or recycling
- C4, Disposal

End of life scenario used in this study is:
100% of glass is landfilled and the distance to the landfill site considered is 50 km.

Description of the scenarios and additional technical information:

PARAMETER	VALUE/DESCRIPTION
Thickness (mm)	**4**
Collection process specified by type	10 kg
Recovery system specified by type	0 kg
Disposal specified by type	10 kg
Assumptions for scenario development (e.g. transportation)	50 km to landfill

D, Reuse/recovery/recycling potential

Module D quantifies the potential costs and benefits of end-of-life recovery. The end-of-life scenario used is 100% landfill. The declared module D is null.

LCA results

Product Environmental Footprint (PEF) method has been used as the impact model. Specific data has been supplied by the plant, and generic data come from GaBi and ecoinvent databases.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

All emissions to air, water, and soil, and all materials and energy used have been included.

Raw materials and energy consumption, as well as transport distances have been taken directly from the manufacturing plant (Production data according 2022)

All result tables refer to a functional unit/declared unit of 1 m² of flat glass and an expected average service life of 30 years.

Environmental Impacts

Environmental indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY RECYCLING
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Climate Change [kg CO2 eq.]	5,88E+00	3,92E-01	0	0	1,84E-01	0	0	0	0	0	0	2,44E-02	0	1,60E-01	0
Climate Change (fossil) [kg CO2 eq.]	5,86E+00	3,84E-01	0	0	8,08E-02	0	0	0	0	0	0	2,39E-02	0	1,52E-01	0
Climate Change (biogenic) [kg CO2 eq.]	1,08E-02	4,21E-03	0	0	3,05E-02	0	0	0	0	0	0	2,62E-04	0	8,00E-03	0
Climate Change (land use change) [kg CO2 eq.]	3,43E-03	3,19E-03	0	0	7,28E-02	0	0	0	0	0	0	1,99E-04	0	4,37E-04	0
Ozone depletion [kg CFC-11 eq.]	4,70E-09	4,73E-17	0	0	4,39E-09	0	0	0	0	0	0	2,95E-18	0	5,62E-16	0
Acidification terrestrial and freshwater [Mole of H+ eq.]	2,84E-02	1,67E-03	0	0	4,99E-04	0	0	0	0	0	0	1,04E-04	0	1,09E-03	0
Eutrophication freshwater [kg P eq.]	4,71E-05	1,20E-06	0	0	3,23E-05	0	0	0	0	0	0	7,45E-08	0	2,60E-07	0
Eutrophication marine [kg N eq.]	6,27E-03	7,84E-04	0	0	5,33E-04	0	0	0	0	0	0	4,88E-05	0	2,80E-04	0
Eutrophication terrestrial [Mole of N eq.]	6,80E-02	8,72E-03	0	0	1,38E-03	0	0	0	0	0	0	5,43E-04	0	3,08E-03	0
Photochemical ozone formation - human health [kg NMVOC eq.]	1,77E-02	2,11E-03	0	0	3,22E-04	0	0	0	0	0	0	1,31E-04	0	8,48E-04	0
Resource use, mineral and metals [kg Sb eq.][2]	1,09E-06	2,82E-08	0	0	2,55E-06	0	0	0	0	0	0	1,76E-09	0	1,36E-08	0
Resource use, energy carriers [MJ][1]	7,71E+01	5,24E+00	0	0	1,38E+00	0	0	0	0	0	0	3,26E-01	0	1,99E+00	0
Water deprivation potential [m³ world equiv.][1]	1,29E+00	3,52E-03	0	0	3,27E-01	0	0	0	0	0	0	2,19E-04	0	1,59E-02	0

[2] The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator

Resources Use

Resources Use indicators	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				D REUSE, RECOVERY, RECYCLING
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	9,94E+00	2,95E-01	0	0	7,69E-01	0	0	0	0	0	0	1,83E-02	0	2,61E-01	0
Primary energy resources used as raw materials (PERM) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	9,94E+00	2,95E-01	0	0	7,69E-01	0	0	0	0	0	0	1,83E-02	0	2,61E-01	0
Use of non-renewable primary energy (PENRE) [MJ]	7,74E+01	5,25E+00	0	0	1,48E+00	0	0	0	0	0	0	3,27E-01	0	1,99E+00	0
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	7,74E+01	5,25E+00	0	0	1,48E+00	0	0	0	0	0	0	3,27E-01	0	1,99E+00	0
Input of secondary material (SM) [kg]	6,41E+00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m3]	1,78E-02	3,41E-04	0	0	7,61E-03	0	0	0	0	0	0	2,12E-05	0	5,02E-04	0

Waste Category & Output flows

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				D REUSE, RECOVERY, RECYCLING
Waste Category & Output Flows	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	2,14E-07	2,44E-07	0	0	7,69E-11	0	0	0	0	0	0	1,52E-08	0	3,03E-08	0
Non-hazardous waste disposed (NHWD) [kg]	1,28E-02	8,03E-04	0	0	6,47E-03	0	0	0	0	0	0	5,00E-05	0	1,00E+01	0
Radioactive waste disposed (RWD) [kg]	5,16E-04	6,50E-06	0	0	2,84E-06	0	0	0	0	0	0	4,04E-07	0	2,26E-05	0
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Additional voluntary indicators from EN 15804 (according to ISO 21930:2017)

	PRODUCT STAGE	CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				REUSE, RECOVERY RECYCLING
Environmental indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Climate Change [kg CO2 eq.][3]	5,48E+00	3,79E-01	0	0	7,92E-02	0	0	0	0	0	0	2,36E-02	0	1,49E-01	0

[3] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Information on biogenic carbon content

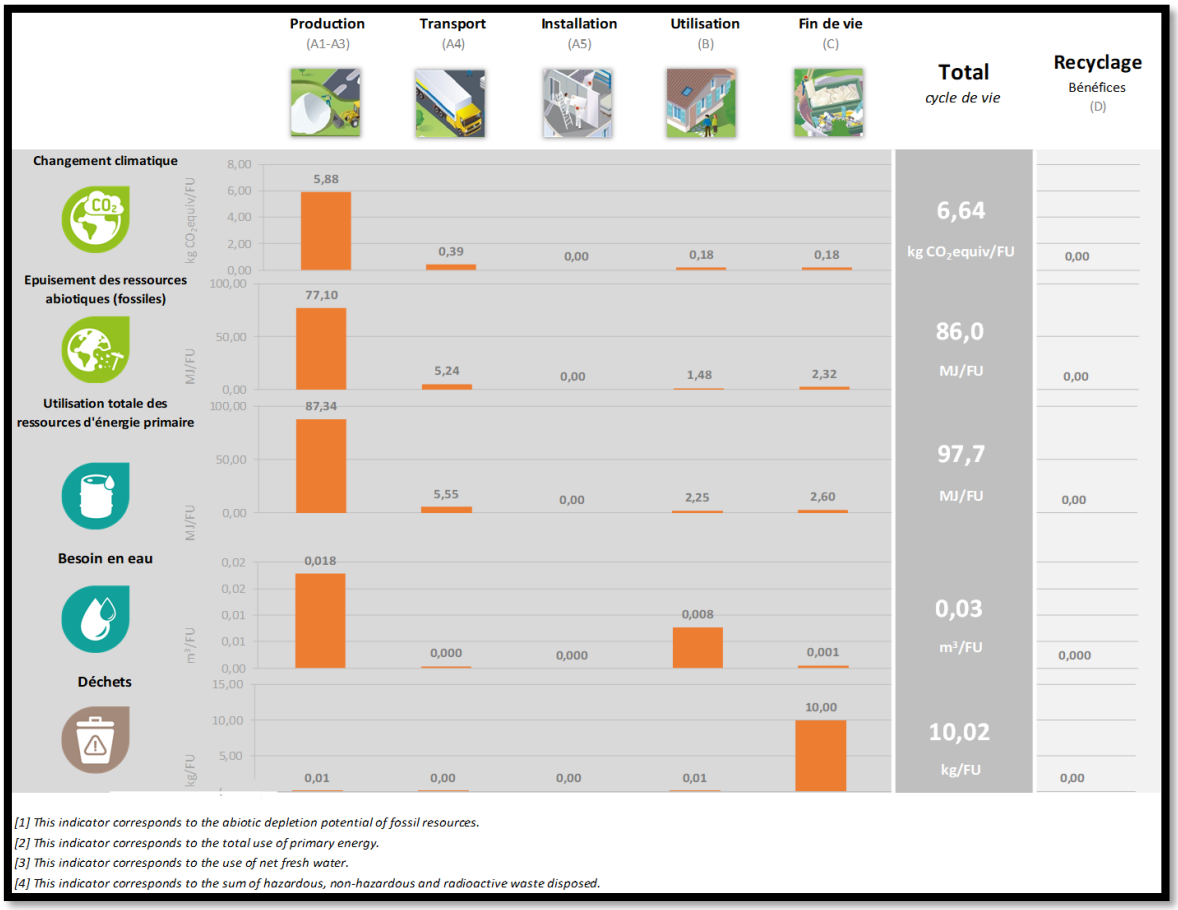
		PRODUCT STAGE
Biogenic Carbon Content		**A1 / A2 / A3**
	Biogenic carbon content in product [kg]	0
	Biogenic carbon content in packaging [kg]	**0**

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO2.

There is no biogenic carbon in glass product. Every thickness considered in this EPD have the same value to biogenic carbon 0 kg C. Moreover, there is no packaging considered for glass products.

LCA interpretation

The following figure refers to a functional/declared unit 1 m² of flat glass product.



Global Warming Potential total (Climate Change) (GWP)

When analyzing the above figure for GWP, it can clearly be seen that the majority of contribution to this environmental impact is from the production modules (A1 – A3). This is primarily because the sources of greenhouse gas emissions are predominant in this part of the life cycle. CO_2 is generated upstream from the production of electricity and is also released on site by the combustion of natural gas. Production of one of raw material will generate the second highest percentage of greenhouse gas emissions. We can see that other sections of the life cycle also contribute to the GWP; however, the production modules contribute to over 90% of the contribution.

Non-renewable resources consumptions

We can see that the consumption of non – renewable resources is once more found to have the highest value in the production modules. This is because a large quantity of natural gas is consumed within the factory. The contribution to this impact from the other modules is very small and primarily due to the non – renewable resources consumed during transportation.

Energy Consumptions

As we can see, modules A1 – A3 have the highest contribution to total energy consumption. Energy in the form of electricity and natural gas is consumed in a vast quantity during the manufacture of glass so we would expect the production modules to contribute the most to this impact category.

Water Consumption

As we don't use water in any of the other modules (A4 – A5, C1 – C4), we can see that there is no contribution to water consumption. For the production phase, water is used within the manufacturing facility and therefore we see the highest contribution here. However, we recycle a lot of the water on site so the contribution is still relatively low. We also use water during the use phase to cleaning the product.

Waste Production

Waste production does not follow the same trend as the above environmental impacts. The largest contributor is the end of life module. This is because 100% of the product is sent to landfill. However, there is still an impact associated with the production module since we do generate waste on site.

Health transparency

Concerning the indoor air quality, clear flat glass is an inert material that doesn't release any inorganic & organic compounds, in particular no VOC (volatile organic compounds).

Additional information:

Data quality

Inventory data quality is judged by geographical, temporal, and technological representativeness. To cover these requirements and to ensure reliable results, first-hand industry data crossed with LCA background datasets were used. The data was collected from internal records and reporting documents. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects good inventory data quality.

Geographic representativity	Technical representativity	Temporal representativity
1,7	3,0	2,0

Saint-Gobain's environmental policy

Saint-Gobain's environmental vision is to ensure the sustainable development of its Activities, while preserving the environment from the impacts of its processes and services throughout their life cycle. The Group thus seeks to ensure the preservation of resources, meet the expectations of its relevant stakeholders, and offer its customers the highest added value with the lowest environmental impact.

The Group has set two long-term objectives: zero environmental accidents and a minimum impact of its activities on the environment. Short and medium-term goals are set to address these two ambitions. They concern five environmental areas identified by the Group: raw materials and waste; energy, atmospheric emissions and climate; water; biodiversity; and environmental accidents and nuisance.

Our products' contribution to Sustainable Buildings

Saint-Gobain encourages sustainable construction and develops innovative solutions for new and renovated buildings that are energy efficient, comfortable, healthy and esthetically superior, while at the same time protecting natural resources.

The following information might be of help for green building certification programs:

RECYCLED CONTENT

(Required for LEED v4.1 Materials and Resources - Sourcing of raw materials)

Recycled content: proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and post-consumer materials shall be considered as recycled content.

Post-consumer material: material generated by households or commercial, industrial and institutional facilities in their role as end-users of the product which can no longer be used for its intended purpose. In practice, in the case of flat glass, all material coming from glass recycling collection schemes falls under this category, i.e. glass waste from end-of-life vehicles, construction and demolition waste, etc.

Pre-consumer material: material diverted from the waste stream during a manufacturing process. Excluded is reutilization of materials such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it.

In the case of flat glass, this waste originates from the processing or re-processing of glass that takes place before the final product reaches the consumer market. Pre-consumer waste flat glass is made of cut-offs, losses during laminating, bending and other processing, including the manufacture of insulating glass units or automotive windscreens.

Cullet generated in the furnace plant and which is reintroduced into the furnace cannot be considered as pre-consumer recycled content, since there was never an intent to discard it and therefore it would never have entered the solid waste stream.

Pre-consumer cullet	~64%
Post-consumer cullet	< 1%

Saint-Gobain Glass intends to continue the increase of recycled material in its products.

RESPONSIBLE SOURCING

(Required for BREEAM International new construction 2016 – MAT 03 Responsible sourcing)

All Saint-Gobain Glass Industry sites with a glassmaking furnace, are ISO 14001 certified.

All internal Saint-Gobain Glass quarries are certified ISO 14001 like, for example, SAINT-GOBAIN SAMIN (sand) in France. Many Saint-Gobain Glass raw material suppliers are certified ISO 14001. Our policy consists in encouraging the sourcing of raw materials extracted or made in sites certified ISO 14001 (or the equivalent).

For any other question / document / certification, please contact our local sales teams.

References

1. ISO 14040:2006: Environmental Management-Life Cycle Assessment-Principles and framework.
2. ISO 14044:2006: Environmental Management-Life Cycle Assessment-Requirements and guidelines.
3. ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services.
4. ISO 14025:2006: Environmental labels and Declarations-Type III Environmental Declarations-Principles and procedures.
5. EN 15804:2012+A1:2013: Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
6. EN 15804:2019+A2 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products
7. European Chemical Agency, Candidate List of substances of very high concern for Authorization. http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp
8. EPD International, General Program Instructions (GPI) for the international EPD® (version 4.0) www.environdec.com
9. ISO 21930: 2017 Sustainability in building construction – Environmental declaration of building products
10. PCR 2019:14 Construction products (EN 15804:2012: A2) version 1.1 and c-PCR-009 Flat glass products (EN 17074)
11. LCA report, Information for the Environmental Product Declaration of insulation products.