



ENVIRONMENTAL PRODUCT DECLARATION

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

Magnetron coated

ORAE 4 mm

Version 2

Date of publication: 2024-01-05

Validity: 5 years

Date of validity: 2028-12-30

Scope of the EPD®: Europe



THE INTERNATIONAL EPD® SYSTEM

The International EPD® System
Programme operator: EPD international AB
www.environdec.com
Registration number: S-P-09991



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General information

Company information

Manufacturer: Saint-Gobain Glass FRANCE, 12 place de l'Iris, 92096 La Défense

Production plant: SAINT-GOBAIN GLASS INDUSTRY

- France: 249 Bd Drion, 59580 Aniche
- Spain: Av. Lugo, 112, 33401 Avilés, Asturias
- Germany: Solarstraße 1, 04860 Torgau

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.

Owner of the declaration: Saint-Gobain Glass Industry, Europe

Product name and manufacturer represented: Magnetron coated ORAÉ® produced by SAINT-GOBAIN GLASS INDUSTRY

EPD® prepared by: Marie-Charlotte Harquet (Saint-Gobain LCA central team)

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Geographical scope of the EPD®: Europe, cradle to grave and module D

EPD® registration number: S-P-09991

Declaration issued: 2023_01_05, **Date of validity:** 2028_12_30

Programme information

PROGRAMME: The International EPD® System

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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 1.2.5 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

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

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.

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 registered in different EPD programmes may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison."

Product information

Product description and description of use

This Environmental Product Declaration (EPD[®]) describes the environmental impacts of 1 m² of magnetron coated ORAÉ[®] 4 mm with a light transmittance of maximum 82%*, for an expected average service life of 30 years.

*Check table 1, below, with all the performance data according to the thickness

This EPD is an average of 3 glass production sites in Europe. All the sites producing the magnetron coated ORAÉ[®] are considered¹.

For the flat glass ORAÉ[®] the average calculated is a weighted arithmetic mean.

For the magnetron process the average calculated is an area arithmetic mean.

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

Manufactured on Saint-Gobain Glass Industry's 'magnetron' coater, a combination of thin multiple metal oxide layers are applied to ORAÉ[®] using a magnetically enhanced cathodic sputtering process under vacuum conditions.

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[®].

Magnetron coated 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.

Depending on the composition of these transparent coating layers, several different products can be produced, distinguishable by the thermal performance, spectrophotometric values and processing characteristics.

Technical data/physical characteristics²:	PLANITHER M [®] XN	PLANISTAR [®] SUN	COOL-LITE [®] XTREME 70/33	ECLAZ [®] ONE
Visible parameters				
Light transmittance (LT) %	82	72	70	80
External light reflection (RLE) %	12	14	11	16
Energetic parameters				
Energy transmittance (ET) %	58	36	31	51
Solar factor g	0,61	0,38	0,33	0,53

Table 1: The performance data are given according to the EN 410-2011 standard in insulating glazing unit 4 Coated-16-4.

¹Countries considered to produce magnetron coated ORAÉ[®]: Germany, Spain, France

² The performance data are given according to the EN 410-2011 standard in insulating glazing unit 4 Coated-16-4.

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 magnetron coated ORAÉ® 4 mm.

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	1m ² of magnetron coated ORAÉ® 4 mm with a light transmittance of maximum 90%, 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 1m ² of glass and the transport glass racks are included in the cut-off-rules.
ALLOCATIONS	Pre-consumer cullet from downstream processing has a contribution to overall income less than 1%. Thus, according to § 6.4.3.2 of the EN 15804+A2 standard, no impact other than pre-treatment before reintroduction into the glass furnace are considered.
GEOGRAPHICAL COVERAGE AND TIME PERIOD	The information was established over the year 2022 for the substrate ORAÉ®. The data for the transformation process are from 2019. 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 programs.

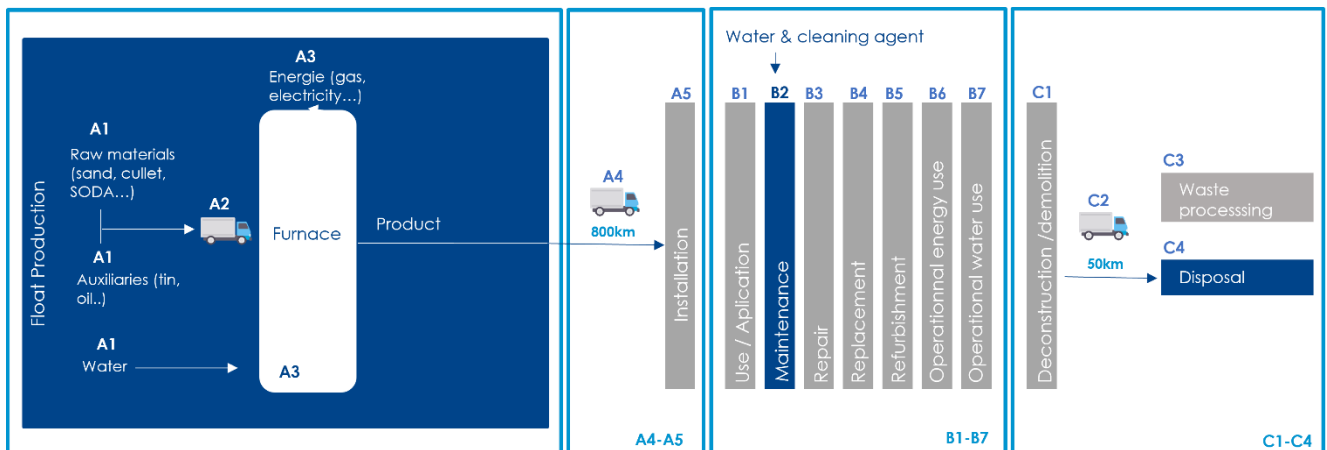
LCA scope

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	-1 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 -1% to 1%. The variation of the sites comes from energy efficiency sites and the energy mix of the countries.

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 and the subsequent coating process on the magnetron line, usually located in the same facility, 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

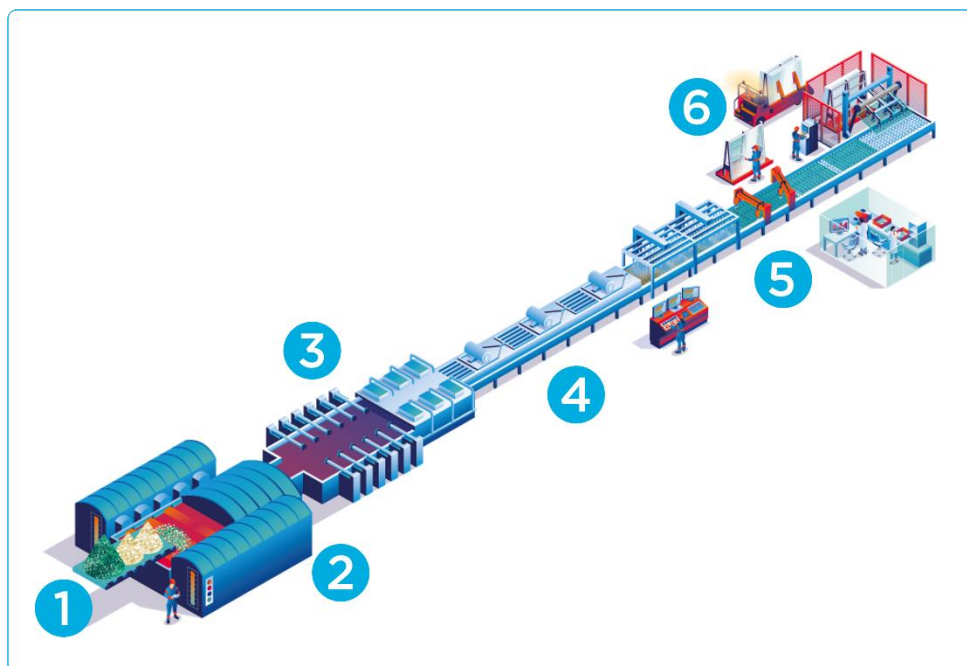
The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportations of each raw material.

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.

Float Glass Process

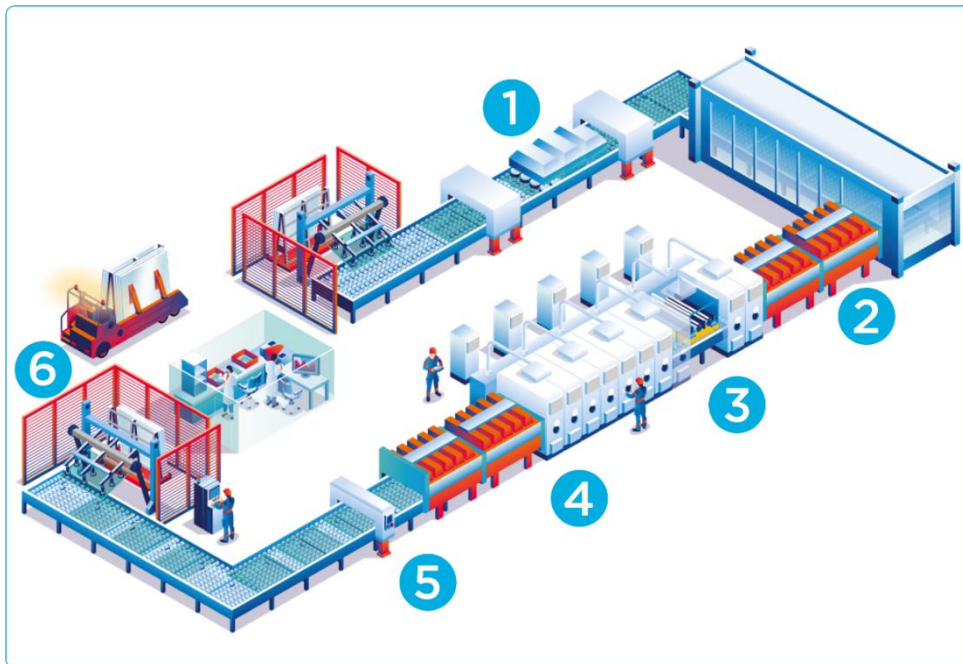


BATCH: Glass is made of silica, soda ash, lime, dolomite, recycled glass (cullet) and additives adjusted according to desired color and properties.

1. **MELTING:** Raw materials are melted in a furnace at more than 1500°C. The thermal energy of the flames is recovered in the regenerators, while that of the fumes can be used to produce electricity or to heat the industrial site.
2. **FORMING:** Molten glass is poured onto a bath of liquid tin. Gear wheels stretch or push the glass to obtain the required thickness (2 to 19 mm) and width (3 to 5m).
3. **COOLING:** The glass passes through a cooling tunnel over 100 meters long, to drop from 600°C to room temperature while controlling the product's thermal and mechanical stresses.
4. **INSPECTION AND CUTTING:** Regular checks are made and samples taken to verify the quality of the glass, which is automatically cut into sheets of 1 to 20 square meters.
5. **STACKING AND STORAGE:** the glass sheets are lifted by suction-cup stackers or by robots and placed on stillages to be stored in the warehouse.

The flat glass is transported on dedicated racks, used many times. These racks are not considered according to the cut-off rules requirements.

Magnetron Coating Process



1. **GLASS PREPARATION:** Flat glass sheets are first scrubbed, washed then conveyed to the coater's entry airlock
2. **AIRLOCK:** Each glass sheet enters the airlock, where pressure is reduced from atmospheric to vacuum. At the coater exit, this operation is reversed.
3. **MAGNETRON PROCESS:** In the coater, the glass is coated with nanometric layers: an ionized gas is projected onto blocks of targeted raw material, tearing off its molecules, which are then deposited on the glass.
4. **LAYER STACKING:** Interchangeable compartments facilitate the ordering of film layers according to the desired functionalities: thermal insulation (silver films), anti-reflective, self-cleaning, anti-corrosion, etc.
5. **QUALITY CONTROL:** The product's optical quality is inspected using cameras. Further tests check the mechanical and chemical properties.
6. **STACKING AND STORAGE:** the glass sheets are lifted by suction-cup stackers or by robots and placed on stillages to be stored in the warehouse.

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/m ³

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/m ² of glass/year
Wastage material during maintenance (specify materials)	0 kg
Net fresh water consumption during maintenance	0.2 kg/m ² 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 and 2019)

All result tables refer to a functional unit/declared unit of 1 m² of magnetron coated ORAÉ® and an expected average service life of 30 years.

Disclaimer 1: 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 following indicators:








- Resource use, mineral and metals [kg Sb eq.]
- Resource use, energy carriers [MJ]
- Water deprivation potential [m³ world equiv.]

Disclaimer 2: The following optional indicators are not declared:

- Ecotoxicity freshwater [CTUe]
- Particulate Matter emissions [Disease incidence]
- Cancer human health effects [CTUh]
- Ionizing radiation - human health [kBq U235 eq.]
- Non-cancer human health effects [CTUh]
- Land Use [Pt]











Disclaimer 3: It is recommended to use the results of modules A1-A3 (A1-A5 for services) without considering the results of module C.

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 - total [kg CO ₂ eq.] ³	6,26E+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 CO ₂ eq.]	6,25E+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 CO ₂ eq.]	1,08E-02	4,21E-03	0	0	3,03E-02	0	0	0	0	0	0	2,62E-04	0	8,00E-03	0
	Climate Change (land use change) [kg CO ₂ eq.]	5,57E-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.]	3,63E-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.]	4,84E-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.]	6,90E-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.]	7,49E-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.]	1,98E-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.]	5,54E-05	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]	8,87E+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 [m ³ world equiv.]	2,12E+00	3,52E-03	0	0	3,27E-01	0	0	0	0	0	0	2,19E-04	0	1,59E-02	0

³ The total global warming potential (GWP-total) is the sum of GWP fossil, GWP biogenic, and GWP land use change.


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]	2,60E+01	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]	2,60E+01	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]	8,90E+01	5,25E+00	0	0	1,38E+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]	8,90E+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) [m ³]	3,37E-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


Waste Category & Output Flows	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 maintenance	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
 Hazardous waste disposed (HWD) [kg]	3,75E-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]	2,46E-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]	3,11E-03	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
	GWP-GHG [kg CO ₂ eq.] ⁴	5,86E+000	3,79E-001	0	0	7,92E-002	0	0	0	0	0	0	2,36E-002	0	1,49E-001	0

⁴ 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 products. Every thickness considered in this EPD has the same value for biogenic carbon 0 kg C. Moreover, there is no packaging considered for glass products.

Electricity information

The table below presents the information for the residual mix and the renewable electricity based on Guarantee of Origin certificates (GOs):

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of Electricity purchased by Saint-Gobain Europe
Definition of the electricity	88 % of the energy consumption is covered by the GOO 12 % of residual grid mix
Energy sources for electricity	Share of energy sources of renewable electricity 55 % Wind 28 % Hydro power 4 % Biomass 1 % Solar Share of energy sources of residual mix 1.01 % Biomass 0.35 % Hard coal 0.98 % HFO 0.82 % Hydro 8.28 % Natural gas 82 % Nuclear 2.10 % Photovoltaic 4.49 % Wind
Type of dataset	Cradle to gate from Gabi and ecoinvent databases
Source	Guarantee of Origin Dataset GaBi EU-28
CO₂ emission kg CO₂ eq. / kW (residual mix)	0.062 kg of CO ₂ eq/kWh – Climate change – total indicator Based on Climate Change - fossil indicator
CO₂ emission kg CO₂ eq. / kWh (Guarantee of Origin)	0.011 kg of CO ₂ eq/kWh – Climate change – total indicator Based on Climate Change - fossil indicator

Health transparency

Concerning the indoor air quality, magnetron coated 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
1.5	3.0	2.0

Saint-Gobain's sustainability roadmap

At Saint-Gobain, we strive to build a more sustainable and inclusive world. Therefore, to establish our sustainability approach, we have set objectives to reach by 2030 in our key focus areas:

- Reducing CO₂ emissions by 33 % for scope 1 and scope 2, and 16 % for scope 3 compared to 2017 levels
- Advancing a circular economy model by decreasing non-valorised production residue by 80 %, increasing the avoidance of virgin raw materials by 30%, and using 100 % recyclable packaging with at least 30 % recycled or bio-sourced content
- Conducting life-cycle assessments for all our product ranges
- Decreasing industrial water withdrawal by 50 % and eliminating water discharge in areas with a high risk of water scarcity

Saint-Gobain approach for Sustainable Construction

For us, over their whole life cycle, buildings should enhance people's health & wellbeing while having reduced footprint on the planet. They should offer better economic value and quality for the developers, owners and occupants.

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.

Differences with previous versions of the EPD

The LCA calculation of the EPD has been updated to better reflect the electricity mix of the magnetron process and editorial modifications have been made.

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. PCR 2019:14 Construction products (EN 15804:2012: A2) version 1.2.5 and c-PCR-009 Flat glass products (EN 17074)
10. LCA report, Information for the Environmental Product Declaration of insulation products.