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ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

LCG Low Carbon Insulating Glass

from
 **Predari Vetri**

Programme: The International EPD® System, www.environdec.com

Programme operator: EPD International AB

EPD registration number: EPD-IES-0015806.002

Publication date: 2024-10-09

Valid until: 2029-10-09

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



THE INTERNATIONAL EPD® SYSTEM



General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR):

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

PCR 2019:14 Construction products (EN 15804+A2) (1.3.4)

PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com for a list of members.

c-PCR009 EN 17074:2019 Glass in building - Environmental product declaration -
Product category rules for flat glass products

Life Cycle Assessment (LCA)

LCA accountability:

Partnership:

Predari Vetri SpA, Via Riccardo Lombardi, 6/8, 46010 - Levata di Curtatone (MN) Italy

Fenzi Group, Via Sant'Andrea 21, 20121 - Milano (MI) Italy

Saint Gobain, Via Giovanni Bensi, 8, 20152 - Milano (MI) Italy

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third-party verifier: Dr.Ugo Pretato – Studio Fieschi & Soci srl

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third party 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, or not compliant with EN 15804, 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. For further information about comparability, see EN 15804 and ISO 14025.

Company profile

EPD owner:

Predari Vetri SpA - Via Riccardo Lombardi, 6/8 - 46010 Levata di Curtatone (MN) - Italia

Contact:

Email: servizioclienti@predarivetri.com

Web: www.predarivetri.com

Description of the organisation:

Italy's leading producer of insulating glass, we are a family-run company that has already transitioned into the third generation, founded in 1960 and with offices in Curtatone di Mantova. Our core business is the production of high-quality insulating glass, using the most efficient technologies on the market with specially dedicated production lines. Internal tempering, layering and digital printing systems complete the range of options for the architecture division, which produces tailor-made products for residential construction and furniture.

Our industrial complex extends over an indoor area of 22,000 square metres, spanning a total area of about 120,000 square metres. The production process is equipped with 8 cutting lines, 5 assembly lines, a vertical work centre, a horizontal work centre, a tempering furnace, a layering plant and a digital printing plant are used, accompanied by a water purification plant.

We are the founders of the Glass Group, the first completely independent Italian group, which since 2009 has united leading glass industries with decades of experience in the transformation of flat glass, with high production numbers and excellent quality standards. We are also active members of a number of industry associations, which provide us with further opportunities for collaboration and development. These affiliations allow us to stay on top of market trends, participate in industry initiatives, and actively contribute to the definition of standards and policies that promote sustainability and innovation in the industry. By actively participating in trade associations, we collaborate in several work tables: review of the Minimum Environmental Criteria, Thermal Account, safety of sports facilities UNI 7697, drafting and revision of UNI 1279 certification regulations for insulating glass and legislative proposals relating to the tax bonuses on glass and windows.

Product-related or management system-related certifications:

All our insulating glass has been certified according to UNI-EN 1279 standards since 1996, the year in which UNI 10593/1/2/3/4 standards became operational and for many years they have been accompanied by European Keymark Certification. In the last three years, the number of product models certified according to UNI-EN 1279, Warm Edge, Tps, Swiss Spacer Ultimate certification, and UNI certification relating to thermally tempered glass, has also been expanded.

The suppliers of raw materials used in the production process are part of the list authorised by the inspection body of the UNI-EN 1279 standard for the construction of insulating glass. This means that they have passed the product tests at the European notified inspection body, Stazione Sperimentale del Vetro. The product certificates are valid for five years and are automatically renewed after passing quality tests. Products that do not conform to the parameters provided for in the UNI-EN 1279 standard cannot be used. In addition, to guarantee the quality of the raw materials, suppliers issue certificates and safety data sheets for the products that are stored in the documentation relating to the certification. The inspection body performs checks on the documentation every six months.

Name and location of production site:

Predari Vetri SpA - Via Riccardo Lombardi, 6/8 - 46010 Levata di Curtatone (MN) – Italia

Product information

Product name:

LCG Low Carbon Insulating Glass

Product identification:

IGU 44.1 INFINITY ORAE' / 16 argon / 44.1 ORAE' (Saint Gobain ORAE'), Butylver TPS + Thiover A+B.

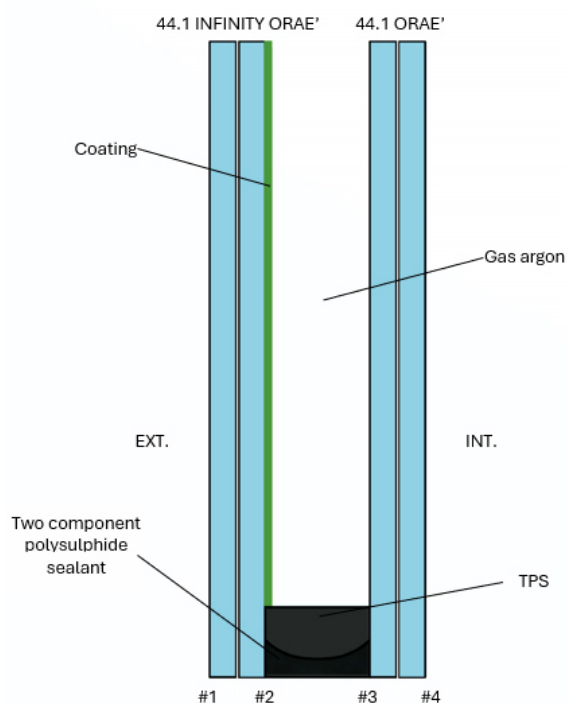
Product description:

The 44.1infinity oraé/ 16 tps + gas/ 44.1 oraé double glazing is the first low carbon impact insulating glass with EPD certification. LCG glass maintains the same characteristics as the standard product, high light transmission 70%, Ug 1.0, solar factor 0.36, but the carbon emission is reduced. The Planitherm Infinity Oraé, as well as the Planitherm Oraé, is made using 64% recycled glass (pre-consumer cullet) and electricity from renewable sources. According to the supplier Saint-Gobain (and certified with EPD), the Oraé substrate has a carbon footprint of 6.64 Kg CO₂ eq./m² (for 4mm glass). The TPS produced by Fenzi, on the other hand, is an organic-based thermoplastic spacer, free of metals or dangerous components, which allows less waste and residues thanks to the reduction of components. The waste material is reusable in the manufacturer's cycle.

The partnership with Fenzi and Saint-Gobain represents an important step forward in addressing the environmental challenges of our time and in offering innovative solutions for a more sustainable world.

UN CPC code:

37116



Luminous Factors **CIE (15-2004)**

Light Transmittance (TL)	70%
Outdoor Reflectance (RLe)	14%
Indoor Reflectance (RLi)	15%

Energy Factors **EN410 (2011-04)**

Transmittance (TE)	33%
Outdoor Reflectance (Ree)	30%
Indoor Reflectance (Rei)	34%
Absorptance A1 (AE1)	35%
Absorptance A2 (AE2)	2%

Solar Factors **EN410 (2011-04)**

Solar Factor (g)	0.36
Shading Coefficient (SC)	0.41

Thermal Transmission **EN673-2011**

Ug	1.0 W/(m ² .K)
Angle relative to the vertical	0°

Acoustics **EN 12758**

Acoustic simulated values	
Rw (C;Ctr)	38 (-2; -6) dB
Ra	36 dB
Ra, tr	32 dB
STC (ASTM E413)	39
OITC (ASTM E1332)	30

Safety Class **EN12600**

Pendulum Body Resistance	2b2/2b2
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Anti-Burglary **EN 356**

Burglar Resistance	NPD
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LCA information

This section records key features of the LCA on which it is based.

The LCA was carried out by Partnership using Database Ecoinvent 3.9.1, with software SimaPro 9.5.0.0 [package version: EF 3.1] and production data from Predari Vetri manufacturing site.

The LCA was carried out using specific data reported in the EPDs of raw materials shown in the following table.

Raw Material		EPD				
Trade name	EDP owner	Publication date	Valid until	Registration number	Geographic area	Stage assessed
MAGNETRON COATED ORAÈ 4 mm	Saint-Gobain Glass Industry	05/01/2024	30/12/2028	S-P-09991	Europe	A1-A5 B1-B7 C1-C4 D
ORAÈ 4 mm		14/04/2023	13/04/2028	S-P-08970	Europe	A1-A5 B1-B7 C1-C4 D
Butylver TPS	FENZI Group	25/07/2024	25/07/2029	EPD-IES-13057	Global	A1-A3 C1-C4 D
THIOVER		25/07/2024	25/07/2029	EPD-IES-13059	Global	A1-A3 C1-C4 D
INDURITORE PER THIOVER		25/07/2024	25/07/2029	EPD-IES-13060	Global	A1-A3 C1-C4 D

Functional unit / declared unit:

The declared unit is one square metre (1 m²) plus packaging, equal to 41,981 kg.

Declared unit	1 m²
Declared unit weight	41,981 kg
Conversion factor to mass	0,02382

Time representativeness:

The primary data refers to the year 2023

Reference service life:

30 years, according to PCR EN 17074:2019

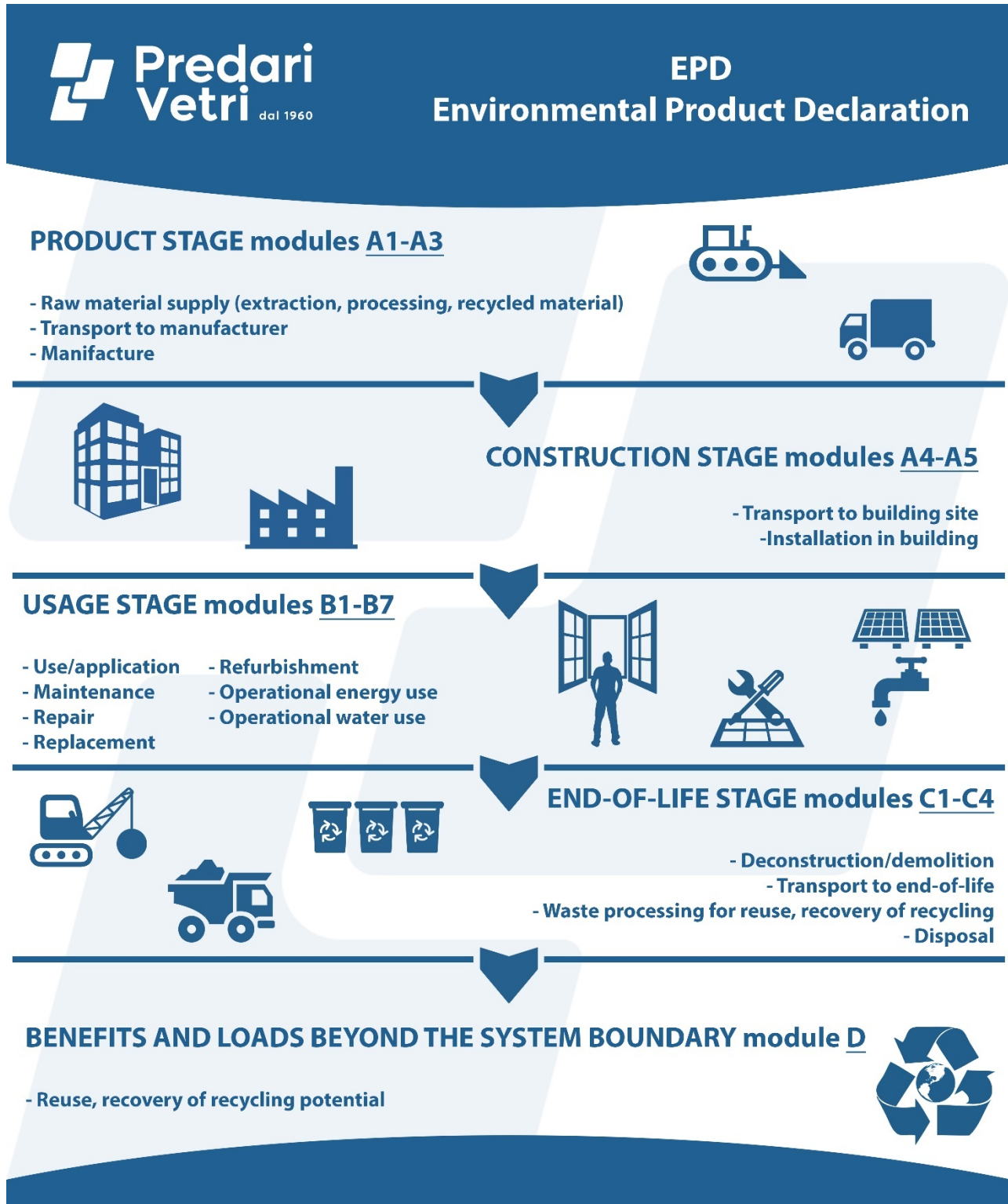
Geographical scope:

The input data are representative of Italy.

Description of system boundaries:

Cradle to grave with module D (A1-A5 + B1-B7 + C1-C4 + D)



System diagram:



A1 - RAW MATERIALS SUPPLY

A1 includes:

- extraction and processing of raw materials, until reaching a raw material, which cannot yet be defined as a finished product;
- generation and supply of energy necessary for the extraction and refining of the raw material;
- generation of energy used for the production of the finished product;
- production of waste resulting from these processes;
- raw materials packaging.

	Energy Source	Ecoinvent process	kg CO ² eq/kWh
	National electricity grid (ITALY)	Electricity, medium voltage {IT} electricity, medium voltage, residual mix Cut-off, U	0,628
	Photovoltaic electricity production	Electricity, low voltage {IT} electricity production, photovoltaic, 3kWp slanted-roof installation, single-Si, panel, mounted Cut-off, U	0,0838

Energy impacts are calculated in the stage A3

At the production site photovoltaic system which meets 38% of energy needs. 30% of the energy produced by the photovoltaic system is transferred to the electricity grid.

A2 - TRANSPORT

A2 includes external and internal transport for the supply of raw materials.

The raw materials are transported to the manufacturing site. The modelling includes road and ship transportation of each raw material from the supplier's site to the manufacturing site.

Transport modality	Ecoinvent process
Road	Transport, freight, lorry 16-32 metric ton, EURO5 {RER} transport, freight, lorry 16-32 metric ton, EURO5 Cut-off, U

A3 - MANUFACTURING

A3 includes:

- production of the product;
- production of packaging accompanying the finished product;
- production of auxiliary materials used for the production of the product;

- management of waste related to the production process;
- production of emissions into the atmosphere.

Manufacturing process

The production process of IGU, with the characteristics under consideration, is carried out as follows:

- 1. Sheet unloading:** vehicles carrying glass sheets, constituting the raw material of the production process, enter the warehouse and position themselves at the unloading areas. The unloaded sheets are placed in the automatic raw material warehouse, to be subsequently sent for cutting.
- 2. Cutting:** the operator with the data preset in the cutting program starts the machining process. Glass sheets are picked up from the warehouse by a gantry crane with suction cups and moved to the cutting area, depositing them on shuttles. These shuttles provide for the horizontal positioning of the sheet and its subsequent placement on the cutting benches, where trimming of excess plastic, in the case of laminated glass, quality control with optical scanners, squaring of the sheet, edging in the case of coated glass, etching and cutting-off take place.
The sheets, thus sized, are stored in special mobile trolleys.
- 3. Insulating glass assembly:**
 - **Grinding at the edges of the panes** with grinding wheels in a water bath to attenuate surface micro-fractures and remove sharp edges of the panes that go to make up the insulating glass unit.
 - **Glass washing** to remove dirt and various processing residues.
 - **First quality check** with scanner for quality verification of the glass surfaces that will be assembled.
 - **Application of the thermoplastic spacer (TPS).** In this case the dehydrated salts and butylene are an integral part of the extruded material.
 - **Assembly of the glazing** in the press, where the glazing is joined together by calibrating the exact thickness and Argon gas is inserted into the insulating glass.
 - **Second quality control** with scanner for quality verification of the surfaces and edges of the assembled glass panes.
 - **Automatic application of spacers** that ensure secure support between one insulating glass unit and another when they are placed on storage trolleys.
 - **Perimeter sealing of IGU** unit with polysulfide to ensure the mechanical seal of the insulating glass unit.
- 4. Storage and shipment:** From the unloading area, finished products, stored on special racks and accompanied by packing lists, are securely fastened to packaging and arranged in the vehicle loading area ready for shipment.

Product packaging

Detailed data of product packaging is reported in the following table.

Material	Ecoinvent process
Plastic	Polyethylene, low density, granulate {GLO} market for polyethylene, low density, granulate Cut-off, U Extrusion, plastic film {GLO} market for extrusion, plastic film Cut-off, U
Cork	Cork slab {RER} cork slab production Cut-off, U

Auxiliary materials

All data relating to materials used for maintenance were excluded from the LCI: clothing and cleaning solvents, spare parts for machinery, air filters.

Waste production

All waste produced during this stage is included.

Emissions

To calculate the contribution relating to emissions generated by gas consumption, calorific value of 1 m³ of gas is assumed equal to 36 MJ.

Emissions	Ecoinvent process
Generated by gas consumption	Heat, district or industrial, natural gas {Europe without Switzerland} heat production, natural gas, at industrial furnace >100kW Cut-off, U (mod_only emissions)

No emission is generated during manufacturing process.

A4 - TRANSPORT

This stage consists of the transport of the product from production plant to the customer's site. An average distance of 500 km is considered as sales are usually local.

Scenario information	Description/Value
Type of vehicle used for transport	Transport, freight, lorry 16-32 metric ton, EURO5

Vehicle lead capacity	Default value from Ecoinvent 3.9.1
Fuel type and consumption	Default value from Ecoinvent 3.9.1
Distance to the site	500 km
Capacity of utilization (including empty returns)	Default value from Ecoinvent 3.9.1
Bulk density of transported products	1.234 kg/m ³
Volume capacity utilization factor	Not applicable

A5 – CONSTRUCTION INSTALLATION

According to EN 17074, it is assumed that no waste other than packaging waste is generated at installation.

In the table below is shown the end of life for packaging waste generated during this stage.

Material	Ecoinvent process
Plastic	Mixed plastics (waste treatment) {GLO} recycling of mixed plastics Cut-off, U
Cork	Core board (waste treatment) {GLO} recycling of core board Cut-off, U

An average distance of 50 km is considered between the customer site and the recycling plant.

Transport modality	Ecoinvent process
Road	Transport, freight, lorry 3.5-7.5 metric ton, EURO5 {RER} transport, freight, lorry 3.5-7.5 metric ton, EURO5 Cut-off, U

Biogenic Carbon Emission of packaging is balanced in this stage.

B1 - USE

According to EN 17074, the use of glass products in buildings does not generate any environmental impact and may therefore be disregarded.

B2 - MAINTENANCE

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

For this module it was used data from EPD of glass:

- INFINITY ORAÈ 4 mm (Saint Gobain)
- ORAÈ 4 mm (Saint Gobain)

Parameter	Value
Maintenance process	Water and cleaning agent
Maintenance cycle	Annual average
Cleaning agent	0,001 kg/m ² of glass/year
Wastage material during maintenance (specify materials)	0 kg
Net freshwater consumption during maintenance	0,2 kg/m ² of glass/year

B3 - REPAIR

According to EN 17074, glass products do not require repair activities during their service life (30 years).

B4 – REPLACEMENT

According to EN 17074, glass products do not require exchange activities during their service life (30 years).

B5 - REFURBISHMENT

According to EN 17074, glass products do not require renewal activities during their service life (30 years).

B6 - OPERATIONAL ENERGY USE

According to EN 17074, there is no energy consumption during normal use.

B7 - OPERATIONAL WATER USE

According to EN 17074, no water consumption occurs during intended operation. Water consumption for cleaning is specified in Module B2.1

C1-C4 - END OF LIFE STAGE

For the end-of-life scenario the following hypotheses were made:

Stage	Description	Scenario
C1	De-assembling	Manual
C2	Transport	50 km
C3	Waste processing	0 % of recycling
C4	Disposal	100 % of landfill

C1 - DE-CONSTRUCTION DEMOLITION

Removal from the building is assumed to involve manual processes, therefore no environmental burdens or benefits are associated with module C1.

C2 - TRANSPORT TO WASTE PROCESSING

Distance to the treatment site considered is 50 km.

Scenario information	Description/Value
Type of vehicle used for transport	Transport, freight, lorry 16-32 metric ton, EURO5
Vehicle load capacity	Default value from Ecoinvent 3.9.1
Fuel type and consumption	Default value from Ecoinvent 3.9.1
Distance to the site	50 km
Capacity of utilization (including empty returns)	Default value from Ecoinvent 3.9.1
Bulk density of transported products	1.234 kg/m ³
Volume capacity utilization factor	Not applicable

C3 - WASTE PROCESSING

Scenario used in this study is:

0% of glass is recycled

0% of plastics (PVB foil, sealants) is recycled

C4 – Disposal

Scenario used in this study is:

100 % of glass is landfilled;

100 % of plastics (PVB foil, sealants) is landfilled.

Scenario information	Ecoinvent process
Landfill	Inert waste {Europe without Switzerland} treatment of inert waste, sanitary landfill Cut-off, U

D - RESOURCE RECOVERY STAGE

There is no reuse nor recovery nor recycling of this product.
Hence, no recycling benefits are reported on stage D.

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	EU	EU	IT	IT	IT	IT	IT	IT	IT	IT	IT	IT	IT	IT	IT	IT	IT
Specific data used	>80%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	/					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	/					-	-	-	-	-	-	-	-	-	-	-	-

Regarding the share of specific data, according to 5.4.3 PCR 2019:14 v.1.3 definition, materials involved in production phase (e.g. raw materials) even when combined with specific activity data can't be qualified as specific data. Therefore, according to this, a computation of the sharing in GWP-GHG impact of other A1-A3 data are quantified in percentage terms over the total A1-A3 module. Generic data are raw materials (only argon), raw materials packaging, product packaging, auxiliary materials. The percentage of specific data is assumed to be larger than 80 %, but it cannot be proved since one or several EPDs that are used as data sources lack information on the percentage of specific data used.

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
#MAGNETRON COATED ORAÈ - 4 mm (Saint Gobain)	20,41	<1%	-
#ORAÈ - 4 mm (Saint Gobain)	20,41	<1%	-
BUTYLVER TPS (Fenzi Group)	0,515	-	-
THIOVER (Fenzi Group)	0,468	-	-
INDURITORE PER THIOVER (Fenzi Group)	0,047	-	-
ARGON	0,028	-	-
TOTAL	41,88	-	-

Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
LDPE	0,068	0,160	-
CORK	0,033	0,079	0,016
TOTAL	0,101	-	-

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
None of the substances included in the “Candidate List” (June 27th, 2024) or in the “Authorization List” (September 22nd, 2023), are contained in Products in concentration $\geq 0,1$ % by weight.			

Extracted from the EPD S-P-08970 and EPD S-P-09991 produced by Saint Gobain.

#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® can be incorporated into a building, furniture or industrial application. 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.

ORAÉ® 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%

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impacts categories, exceeding threshold values, safety margins and/or risks. It is not recommended to use the results of modules A1-A3 without considering the results of module C.

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	3,63E+01	3,95E+00	9,51E-04	0,00E+00	1,62E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,94E-01	0,00E+00	4,90E-01	0,00E+00
GWP-biogenic	kg CO ₂ eq.	-6,07E-02	3,57E-03	6,07E-02	0,00E+00	6,08E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,56E-04	0,00E+00	6,51E-02	0,00E+00
GWP-luluc	kg CO ₂ eq.	2,78E-02	1,92E-03	4,62E-07	0,00E+00	1,46E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,91E-04	0,00E+00	3,57E-04	0,00E+00
GWP-total	kg CO ₂ eq.	3,63E+01	3,96E+00	9,52E-04	0,00E+00	3,68E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,95E-01	0,00E+00	4,94E-01	0,00E+00
ODP	kg CFC 11 eq.	4,06E-07	8,60E-08	2,07E-11	0,00E+00	8,78E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,57E-09	0,00E+00	1,16E-08	0,00E+00
AP	mol H ⁺ eq.	1,79E-01	1,29E-02	3,10E-06	0,00E+00	9,98E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,28E-03	0,00E+00	3,49E-03	0,00E+00
EP-freshwater	kg P eq.	1,85E-03	2,77E-04	6,65E-08	0,00E+00	6,46E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,76E-05	0,00E+00	1,29E-04	0,00E+00
EP-marine	kg N eq.	3,74E-02	4,43E-03	1,07E-06	0,00E+00	1,07E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,42E-04	0,00E+00	1,31E-03	0,00E+00
EP-terrestrial	mol N eq.	4,01E-01	4,68E-02	1,13E-05	0,00E+00	2,76E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,67E-03	0,00E+00	1,40E-02	0,00E+00
POCP	kg NMV OC eq.	1,21E-01	1,93E-02	4,63E-06	0,00E+00	6,44E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,92E-03	0,00E+00	4,72E-03	0,00E+00
ADP-minerals&metals*	kg Sb eq.	1,71E-04	1,27E-05	3,05E-09	0,00E+00	5,10E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,27E-06	0,00E+00	9,95E-07	0,00E+00
ADP-fossil*	MJ	5,24E+02	5,60E+01	1,35E-02	0,00E+00	2,76E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,59E+00	0,00E+00	1,06E+01	0,00E+00

WDP*	m ³ eq.	8,20E+00	2,28E-01	5,49E-05	0,00E+00	6,54E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,28E-02	0,00E+00	4,50E-01	0,00E+00
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Acronyms

GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG³	kg CO ₂ eq.	3,47E+01	1,88E+00	9,46E-04	0,00E+00	1,58E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,92E-01	0,00E+00	4,88E-01	0,00E+00

³Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017

Resource use indicators

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	1,01E+02	8,69E-01	2,09E-04	0,00E+00	1,54E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,67E-02	0,00E+00	1,82E-01	0,00E+00
PERM	MJ	6,00E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,01E+02	8,69E-01	2,09E-04	0,00E+00	1,54E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	8,67E-02	0,00E+00	1,82E-01	0,00E+00
PENRE	MJ	4,78E+02	5,60E+01	1,35E-02	0,00E+00	2,86E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,59E+00	0,00E+00	1,06E+01	0,00E+00
PENRM	MJ	4,73E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	5,26E+02	5,60E+01	1,35E-02	0,00E+00	2,96E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,59E+00	0,00E+00	1,06E+01	0,00E+00
SM	kg	2,72E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,42E-01	7,98E-03	1,92E-06	0,00E+00	1,52E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,96E-04	0,00E+00	1,10E-02	0,00E+00

Acronyms

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

Waste indicators

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	7,62E-04	3,57E-04	8,58E-08	0,00E+00	1,54E-10	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,56E-05	0,00E+00	5,28E-05	0,00E+00
Non-hazardous waste disposed	kg	3,11E+00	2,74E+00	6,58E-04	0,00E+00	1,29E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,73E-01	0,00E+00	4,20E+01	0,00E+00
Radioactive waste disposed	kg	7,84E-03	1,82E-05	4,38E-09	0,00E+00	5,68E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,81E-06	0,00E+00	3,38E-06	0,00E+00

Output flow indicators

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Material for recycling	kg	0,00E+00	0,00E+00	1,01E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Sustainability program 2025 Predari Vetri SpA

We are aware of the contribution we can offer in terms of sustainability, and we firmly believe in the possibility of combining sustainability and economic development for us, for the area and for the people who live there. In 2023, we launched a series of ambitious projects aimed at promoting sustainability in all its facets.

Among these, we list a few examples:

- Implementation of the corporate welfare incentive program;
- Construction of new facilities such as offices, meeting room, canteen, locker rooms and recreational area;
- Academy for technical training in collaboration with universities and technical institutes;
- Extension of the use of Low Carbon glass in the production of insulating glass units through commercial agreements with customers and suppliers;
- Implementation of electricity production from renewable sources;
- Reduction of energy consumption;
- Increased recycling of raw materials, with internal selection of waste materials.

In general, our sustainability choices have an impact on choosing partners sharing the same ESG values, creating a process of interdependence. This approach is also reflected in our customers, who see us as a committed partner in their own sustainability choices. This results in a virtuous chain that respects people, the environment and quality, while encouraging collaboration and business between partners with similar sustainability policies and attracting investment in harmony with company policies. Over the years, we have participated as a guest at fairs and events that promote environmental issues, looking for glass solutions with high energy performance.

References

ISO 14040:2021 Environmental management — Life Cycle Assessment — Principles and Framework

ISO 14044:2021 Environmental Management — Life Cycle Assessment — Requirements and Guidelines

ISO 14025:2010 Environmental labels and declarations — Type III environmental declarations — Principles and procedures

EN 15804:2012+A2:2019 Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction product

General Programme Instructions of the International EPD® System. Version 4.0.

PCR 2019:14 Construction products (EN 15804+A2) (1.3.4) and c-PCR-009 Flat glass products (EN 17074)

S-P-08970 - ORAÉ® (Saint Gobain)

S-P-09991 - MAGNETRON COATED ORAÉ® (Saint Gobain)

EPD-IES-13057.001 - BUTYLVER TPS (FENZI Group)

EPD-IES-13059.001 - THIOVER (FENZI Group)

EPD-IES-13060.001 - INDURITORE PER THIOVER (FENZI Group)

LCA - Predari_Report LCA_rev.1