ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804 and ISO 14025

FLAT GLASS

SAINT-GOBAIN GLASS MEXICO

3 mm – 12 mm
Clear and colored flat glass

Programme : The International EPD® System, www.environdec.com
Programme operator: EPD International AB
Publication date: 2020-09-16
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EPD VERIFIED

EPD®

EPD Registration number
S-P-01743

SAINT-GOBAIN

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Programme information

Programme	The International EPD® System EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden More information at www.environdec.com
EPD® registration number	S-P-01743
Programme category rules (PCR)	EN 15804 as the core PCR and PCR for construction products and construction services issued by the International EPD System (PCR 2012:01 Construction products and construction services, version 2.32 2020-07-01)
CPC Classification	37113 "Float glass and surface ground or polished glass, in sheets"
PCR review was conducted by	The Technical Committee of the International EPD® System. Contact via info@environdec.com
Owner of the declaration	SAINT-GOBAIN GLASS MEXICO Parque Industrial Cuautla, Av. Nicolás Bravo 5, Xaloxtoc, 62741 Cd Ayala, Mor., México Víctor Badiano. Email**:** victor.badiano@saint-gobain.com
Manufacturer	**Saint-Gobain Glass Mexico** Parque Industrial Cuautla, Av. Nicolás Bravo 5, Xaloxtoc, 62741 Cd Ayala, Mor., México
Independent third-party verification of the declaration and data, according to ISO 14025:2006	☐ EPD process certification ☒ EPD verification
EPD® prepared by	Elodie Ducourthial. Email: elodie.ducourthial@saint-gobain.com
Third party verifier	Matthias Schulz, Schulz Sustainability Consulting matthias@schulz-sustainability-consulting.de
Approved by	The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier	☐ Yes ☒ No
Declaration issued	**2020-09-16**
Valid until	**2025-09-16**

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.

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.

Product description

Product description and description of use

FLAT GLASS is a basic soda-lime silicate glass produced using the float procedure to be used in building applications. This glass is in conformity with the European Standard /EN 572-2/.

The declared unit is **1 square meter of flat glass** to be incorporated into a building or furniture.

The reference flow is 1 kg being the density of the product 2,500 kg/m³ with the different thicknesses (see below in Table 1, Table 2 and Table 3) that is to say 1m² of 5 mm of thickness would weight 12.5 kg/m².

Specific make-ups described in this EPD

In this Environmental Product Declaration one square meter of an average flat glass product will be analyzed, taken into account the production of:

- PLANILUX®, clear flat glass. Flat glass is a clear, sheet glass produced from soda-lime silicates, along with metal-oxide materials which are used in the creation of tinted glasses.
- PARSOL®, colored glass. Colored or tinted glasses are primarily the same composition as clear glass with minor adjustments to account for the addition of colorants.

The products are commonly used for building applications such as windows, walls, etc. The declared glass products are available in a range of thicknesses. The thicknesses included in this report are those more common in the commercial and residential markets.
Clear Glass represent 55% of the production, colored glass 45%.

Performance data

The range of FLAT GLASS is very large and can be personalized according to its thickness mainly.

Here are a few examples of configurations for each of the products described in this EPD.

Discover more information about the FLAT GLASS range on https://mx.saint-gobain-glass.com/es-MX

Thickness (mm)	3	4	5	6	8	10	12
Visible parameters							
Light transmittance (TL) %	91	90	90	89	89	88	87
Energetic parameters							
Energy transmission (TE) %	87	85	83	82	79	76	73
Energy absorption (AE) %	6	8	9	11	14	17	20
Solar factor g	0.88	0.87	0.86	0.85	0.85	0.81	0.79
Weight per m² (kg)	7,5	10	12,5	15	20	25	30

Table 1 : Different thicknesses of PLANILUX® (NFRC)

Thickness (mm)	3	4	5	6	8	10	12
Visible parameters							
Light transmittance (TL) %	63	56	49	43	34	26	21
Energetic parameters							
Energy transmission (TE) %	65	58	52	47	37	30	24
Energy absorption (AE) %	29.8	36	43	48	58	65	71
Solar factor g	0.71	0.68	0.64	0.61	0.55	0.50	0.47
Weight per m² (kg)	7,5	10	12,5	15	20	25	30

Table 2 : Different thicknesses of PARSOL® GREY (NFRC)

Thickness (mm)	3	4	5	6	8	10	12
Visible parameters							
Light transmittance (TL) %	82	79	77	74	69	64	60
Energetic parameters							
Energy transmission (TE) %	64	58	52	48	40	34	29
Energy absorption (AE) %	30	36	42	47	55	61	66
Solar factor g	0.73	0.68	0.64	0.61	0.56	0.52	0.50
Weight per m² (kg)	7,5	10	12,5	15	20	25	30

Table 3: Different thicknesses of PARSOL® GREEN (NFRC)

The performance data are given according to the NFRC and CIE (15-2004) standards for thermal and visible parameters.

Declaration of the main product components and/or materials

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

At the date of issue of this declaration, 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).

LCA calculation information

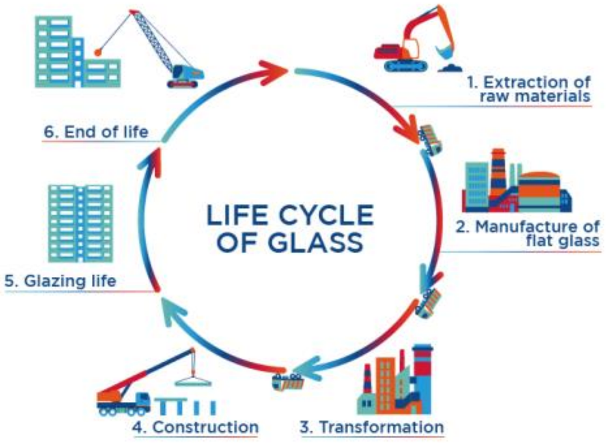
FUNCTIONAL UNIT / DECLARED UNIT	1 m2 of FLAT GLASS to be incorporated into a building. The impacts of installation are not taken into account.
SYSTEM BOUNDARIES	Cradle to gate. Mandatory Stages = A1-A3
EXCLUDED LIFE CYCLE STAGES	Excluded stages = A4-A5; B1-B7; C1-C4 and D
REFERENCE SERVICE LIFE (RSL)	n/a. Boundaries are cradle to gate
CUT-OFF RULES	All significant parameters shall be included. According to EN 15804, mass flows under 1% of the total mass input and/or energy flows representing less than 1% of the total primary energy usage of the associated unit process may be omitted. However, the total amount of energy and mass omitted must not exceed 5% per module. Substances of Very High Concern (SVHC), as defined in the REACH Regulation (article 57), in a concentration above 0.1% by weight, in glass final products, shall be included in the Life Cycle Inventory and the cut-off rules shall not apply. All inputs and outputs to the processes for which data is available were included in the calculation. No core processes were excluded. Particular care was taken to include materials and energy flows known to have the potential to cause significant emissions into air, water and soil related to the environmental indicators of the governing PCR.
ALLOCATIONS	No allocation. Attribution of total inputs and outputs are based on kg of production for FLAT GLASS. Allocation of background data (energy and materials) taken from the GaBi 2016 databases is documented online at http://gabi-software.com/support/gabi/gabi-database-2014-lci-documentation/
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Primary production data is from the year 2018 SAINT-GOBAIN GLASS Mexico.
BACKGROUND DATA SOURCE	GaBi data not older than 10 years were used to evaluate the environmental impacts.
SOFTWARE	Gabi 8 - GaBi envision Initial tool updated with most recent version data base (GaBi 8, Service pack 37) 13100_Saint_Gobain_Glass_Dec_12_2019_FDES+Update_SP37_Mexico

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

Reading note: In this document, the thousand separator and the decimal mark follow the International System; English version, *i.e* 1 234.56

Life cycle stages

Diagram of the Life Cycle



Relevant stages: as this is a cradle to gate the only relevant stages are A1-A3.
In conformity with EN 15804+A1, production steps include:

- Extraction and processing of raw materials;
- Generation of electricity, steam and heat from primary energy resources, also including their extraction, refining and transport;
- Transportation up to the factory gate and internal transport;
- Manufacturing of ancillary materials or pre-products;
- Manufacturing of product;
- Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product.

All glasses are transported in specific trucks (inloaders), with returnable racks.

Production			Installation		Use phase							End-of-Life				Next product system
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C3	C3	C4	D
Raw materials (extraction, processing, recycled material)premières	Transport to manufacturer	Manufacturing	Transport to building site	Installation into building	Use / application	Maintenance	Repair	Replacement	Refurbishement	Operational; energy use	Operational water use	Deconstruction / demolition	Transport to EoL	Waste processing for reuse, recovery or recycling	Disposal	Reuse, recovery or recycling potential
X	X	X	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

Table 4: Modules of the production life cycle included in the EPD (X = declared modules ; MNA = modules not assessed)

Product stage, A1-A3

Description of the stage: For flat glass A1 to A3 represents the production of glass in the float from cradle to gate.
The product stage includes the extraction and processing of raw materials and energies, transport to the manufacturer, manufacturing and processing of flat glass.

FLAT GLASS MANUFACTURING PROCESS FLOW DIAGRAM

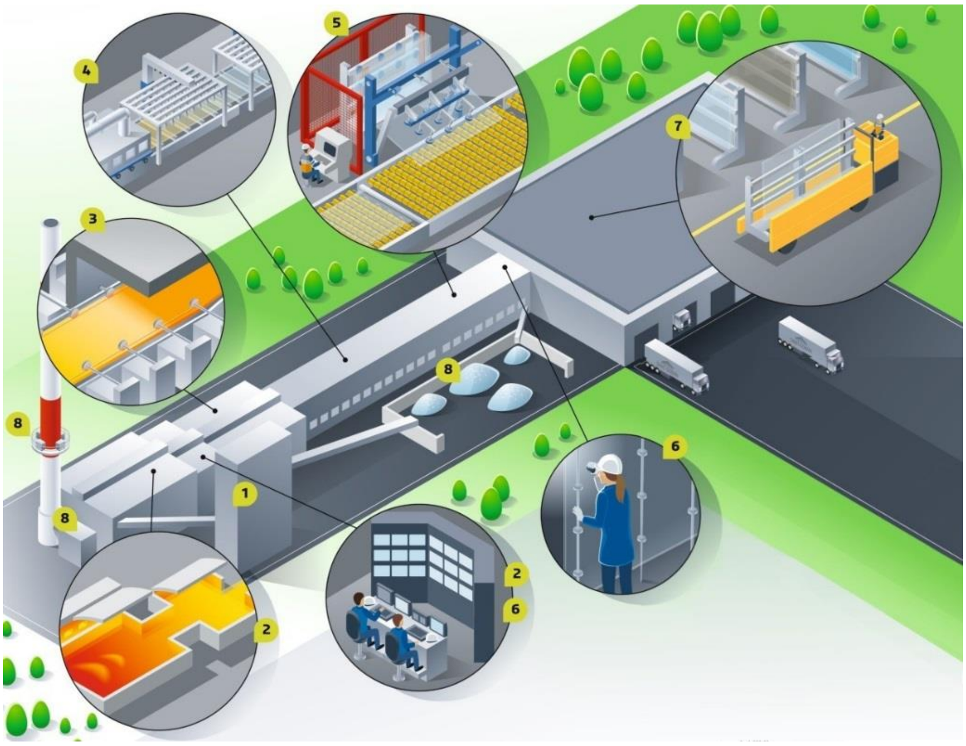


Figure 1 : Flow diagram of the manufacturing process.

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 (from 2 to 19 millimeters).
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 stillage.
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: 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.

LCA results

The table below present the environmental impacts associated with the production of one square meter of FLAT GLASS. This is a Cradle-to-Gate EPD. The environmental impacts of all the other stages in the life cycle of FLAT GLASS are not declared (INA).

ENVIRONMENTAL IMPACTS FLAT GLASS 3 mm

Parameters	Product stage	Construction process 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	
Global Warming Potential (GWP) - *kg CO_2 equiv/FU*	9,65	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	4.52E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	6.20E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport.														
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	2.27E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects.														
Photochemical ozone creation (POCP) *kg Ethene equiv/FU*	3.91E-3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU*	5.92E-5	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	1.43E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Consumption of non-renewable resources. thereby lowering their availability for future generations.														

RESOURCE USE FLAT GLASS 3 mm

Parameters	Product stage	Construction process 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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	4.15	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	4.15	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	1.46E2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	1.46E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of secondary material *kg/FU*	8.25E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable secondary fuels- *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable secondary fuels - *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of net fresh water - *m^3/FU*	2.13E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

WASTE CATEGORIES FLAT GLASS 3 mm

Parameters	Product stage	Construction process 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	
Hazardous waste disposed *kg/FU*	6.60E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Non-hazardous (excluding inert) waste disposed *kg/FU*	2.11E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Radioactive waste disposed *kg/FU*	3.88E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

OUTPUT FLOWS FLAT GLASS 3 mm

Parameters	Product stage	Construction process 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	
Components for re-use *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for recycling *kg/FU*	2.14E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for energy recovery *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Exported energy. detailed by energy carrier *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

TRACI 2.1 – 3 mm

Parameters	Product stage	Construction process 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	
TRACI 2.1. Acidification [kg SO2 eq.]	7.22E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Eutrophication [kg N eq.]	3.55E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Global Warming Air. incl. biogenic carbon [kg CO2 eq.]	9.65	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Ozone Depletion Air [kg CFC 11 eq.]	5.70E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Resources. Fossil fuels [MJ surplus energy]	1.81E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

ENVIRONMENTAL IMPACTS FLAT GLASS 4 mm

Parameters	Product stage	Construction process 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	
Global Warming Potential (GWP) - *kg CO_2 equiv/FU*	1.27E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	6.03E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	8.23E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport.														
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	3.02E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects.														
Photochemical ozone creation (POCP) *kg Ethene equiv/FU*	5.18E-3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU*	7.89E-5	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	1.89E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Consumption of non-renewable resources. thereby lowering their availability for future generations.														

RESOURCE USE FLAT GLASS 4 mm

Parameters	Product stage	Construction process 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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	5.42	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	5.42	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	1.93E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	1.93E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of secondary material *kg/FU*	1.10	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable secondary fuels- *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable secondary fuels - *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of net fresh water - *m^3/FU*	2.82E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

WASTE CATEGORIES FLAT GLASS 4 mm

Parameters	Product stage	Construction process 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	
Hazardous waste disposed *kg/FU*	7.73E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Non-hazardous (excluding inert) waste disposed *kg/FU*	2.81E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Radioactive waste disposed *kg/FU*	5.15E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

OUTPUT FLOWS FLAT GLASS 4 mm

Parameters	Product stage	Construction process 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	
Components for re-use *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for recycling *kg/FU*	2.86E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for energy recovery *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Exported energy. detailed by energy carrier *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

TRACI 2.1 – 4 mm															
Parameters	**Product stage**	**Construction process 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**	
TRACI 2.1. Acidification [kg SO2 eq.]	**9.57E-2**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Eutrophication [kg N eq.]	**4.75E-2**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Global Warming Air. incl. biogenic carbon [kg CO2 eq.]	**1.27E+1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Ozone Depletion Air [kg CFC 11 eq.]	**7.60E-7**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Resources. Fossil fuels [MJ surplus energy]	**2.39E+1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**

FLAT GLASS 5 mm

ENVIRONMENTAL IMPACTS FLAT GLASS 5 mm															
Parameters	Product stage	Construction process 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	
Global Warming Potential (GWP) - *kg CO_2 equiv/FU*	1.58E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	7.54E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	1.02E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport.														
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	3.77E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects.														
Photochemical ozone creation (POCP) *kg Ethene equiv/FU*	6.44E-3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU*	9.86E-5	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	2.35E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Consumption of non-renewable resources. thereby lowering their availability for future generations.														

RESOURCE USE FLAT GLASS 5 mm

Parameters	Product stage	Construction process 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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	6.7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	6.7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	2.40E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	2.40E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of secondary material *kg/FU*	1.38	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable secondary fuels- *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable secondary fuels - *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of net fresh water - *m^3/FU*	3.52E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

WASTE CATEGORIES FLAT GLASS 5 mm															
Parameters	Product stage	Construction process 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	
Hazardous waste disposed *kg/FU*	8.86E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Non-hazardous (excluding inert) waste disposed *kg/FU*	3.51E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Radioactive waste disposed *kg/FU*	6.42E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

OUTPUT FLOWS FLAT GLASS 5 mm

Parameters	Product stage	Construction process 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	
Components for re-use *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for recycling *kg/FU*	3.57E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for energy recovery *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Exported energy. detailed by energy carrier *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

TRACI 2.1 – 5 mm

Parameters	Product stage	Construction process 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	
TRACI 2.1. Acidification [kg SO2 eq.]	1.19E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Eutrophication [kg N eq.]	5.94E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Global Warming Air. incl. biogenic carbon [kg CO2 eq.]	1.58E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Ozone Depletion Air [kg CFC 11 eq.]	9.49E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Resources. Fossil fuels [MJ surplus energy]	2.97E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

ENVIRONMENTAL IMPACTS FLAT GLASS 6 mm

Parameters	Product stage	Construction process 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	
Global Warming Potential (GWP) - *kg CO_2 equiv/FU*	1.89E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	9.04E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	1.23E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport.														
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	4.52E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects.														
Photochemical ozone creation (POCP) *kg Ethene equiv/FU*	7.71E-3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU*	1.18E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	2.81E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Consumption of non-renewable resources. thereby lowering their availability for future generations.														

RESOURCE USE FLAT GLASS 6 mm

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				
	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 excluding renewable primary energy resources used as raw materials - *MJ/FU*	7.97	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	7.97	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	2.86E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	2.86E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of secondary material *kg/FU*	1.65	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable secondary fuels- *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable secondary fuels - *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of net fresh water - m^3/FU	4.21E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

WASTE CATEGORIES FLAT GLASS 6 mm

Parameters	Product stage	Construction process 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	
Hazardous waste disposed *kg/FU*	9.99E-7	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Non-hazardous (excluding inert) waste disposed *kg/FU*	4.21E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Radioactive waste disposed *kg/FU*	7.69E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

OUTPUT FLOWS FLAT GLASS 6 mm

Parameters	Product stage	Construction process 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	
Components for re-use *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for recycling *kg/FU*	4.29E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for energy recovery *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Exported energy. detailed by energy carrier *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

TRACI 2.1 – 6 mm															
Parameters	**Product stage**	**Construction process 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**	
TRACI 2.1. Acidification [kg SO2 eq.]	**1.43E-1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Eutrophication [kg N eq.]	**7.12E-2**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Global Warming Air. incl. biogenic carbon [kg CO2 eq.]	**1.89E+1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Ozone Depletion Air [kg CFC 11 eq.]	**1.14E-6**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Resources. Fossil fuels [MJ surplus energy]	**3.54E+1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**

ENVIRONMENTAL IMPACTS FLAT GLASS 8 mm

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				
	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
Global Warming Potential (GWP) - *kg CO_2 equiv/FU*	2.50E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	1.21E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	1.63E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport.														
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	6.01E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects.														
Photochemical ozone creation (POCP) *kg Ethene equiv/FU*	1.02E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU*	1.58E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	3.73E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Consumption of non-renewable resources. thereby lowering their availability for future generations.														

RESOURCE USE FLAT GLASS 8 mm

Parameters	Product stage	Construction process 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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	1.05E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	1.05E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	3.80E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	3.80E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of secondary material *kg/FU*	2.20	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable secondary fuels- *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable secondary fuels - *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of net fresh water - *m^3/FU*	5.59E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

WASTE CATEGORIES FLAT GLASS 8 mm

Parameters	Product stage	Construction process 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	
Hazardous waste disposed *kg/FU*	1.23E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Non-hazardous (excluding inert) waste disposed *kg/FU*	5.61E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Radioactive waste disposed *kg/FU*	1.02E-3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

OUTPUT FLOWS FLAT GLASS 8 mm

Parameters	Product stage	Construction process 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	
Components for re-use *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for recycling *kg/FU*	5.71E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for energy recovery *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Exported energy. detailed by energy carrier *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

TRACI 2.1 – 8 mm

Parameters	Product stage	Construction process 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	
TRACI 2.1. Acidification [kg SO2 eq.]	1.90E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Eutrophication [kg N eq.]	9.49E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Global Warming Air. incl. biogenic carbon [kg CO2 eq.]	2.50E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Ozone Depletion Air [kg CFC 11 eq.]	1.52E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Resources. Fossil fuels [MJ surplus energy]	4.70E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

ENVIRONMENTAL IMPACTS FLAT GLASS 10 mm

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				
	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
Global Warming Potential (GWP) - *kg CO_2 equiv/FU*	3.12E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	1.51E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	2.04E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport.														
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	7.51E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects.														
Photochemical ozone creation (POCP) *kg Ethene equiv/FU*	1.28E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU*	1.97E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	4.64E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Consumption of non-renewable resources. thereby lowering their availability for future generations.														

RESOURCE USE FLAT GLASS 10 MM

Parameters	Product stage	Construction process 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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	1.31E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	1.31E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	4.74E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	4.74E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of secondary material *kg/FU*	2.75	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable secondary fuels- *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable secondary fuels - *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of net fresh water - *m^3/FU*	6.98E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

WASTE CATEGORIES FLAT GLASS 10 MM

Parameters	Product stage	Construction process 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	
Hazardous waste disposed *kg/FU*	1.45E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Non-hazardous (excluding inert) waste disposed *kg/FU*	7.01E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Radioactive waste disposed *kg/FU*	1.28E-3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

OUTPUT FLOWS FLAT GLASS 10 mm

Parameters	Product stage	Construction process 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	
Components for re-use *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for recycling *kg/FU*	7.14E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for energy recovery *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Exported energy. detailed by energy carrier *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

TRACI 2.1 – 10 mm															
Parameters	Product stage	Construction process 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	
TRACI 2.1. Acidification [kg SO2 eq.]	2.37E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Eutrophication [kg N eq.]	1.19E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Global Warming Air. incl. biogenic carbon [kg CO2 eq.]	3.12E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Ozone Depletion Air [kg CFC 11 eq.]	1.90E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
TRACI 2.1. Resources. Fossil fuels [MJ surplus energy]	5.85E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

ENVIRONMENTAL IMPACTS FLAT GLASS 12 mm

Parameters	Product stage	Construction process 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	
Global Warming Potential (GWP) - *kg CO_2 equiv/FU*	3.74E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas. carbon dioxide. which is assigned a value of 1.														
Ozone Depletion (ODP) *kg CFC 11 equiv/FU*	1.81E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons). Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.														
Acidification potential (AP) *kg SO_2 equiv/FU*	2.44E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production. heating and transport.														
Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU*	9.00E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Excessive enrichment of waters and continental surfaces with nutrients. and the associated adverse biological effects.														
Photochemical ozone creation (POCP) *kg Ethene equiv/FU*	1.53E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.														
Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU*	2.37E-4	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - *MJ/FU*	5.56E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
	Consumption of non-renewable resources. thereby lowering their availability for future generations.														

RESOURCE USE FLAT GLASS 12 mm

Parameters	Product stage	Construction process 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	
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/FU*	1.56E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/FU*	1.56E+1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - *MJ/FU*	5.67E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy used as raw materials *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/FU*	5.67E+2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of secondary material *kg/FU*	3.3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of renewable secondary fuels- *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable secondary fuels - *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Use of net fresh water - *m^3/FU*	8.36E-2	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

WASTE CATEGORIES FLAT GLASS 12 mm

Parameters	Product stage	Construction process 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	
Hazardous waste disposed *kg/FU*	1.68E-6	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Non-hazardous (excluding inert) waste disposed *kg/FU*	8.41E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Radioactive waste disposed *kg/FU*	1.53E-3	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

OUTPUT FLOWS FLAT GLASS 12 mm

Parameters	Product stage	Construction process 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	
Components for re-use *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for recycling *kg/FU*	8.57E-1	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Materials for energy recovery *kg/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA
Exported energy. detailed by energy carrier *MJ/FU*	0	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA	INA

TRACI 2.1 – 12 mm															
Parameters	**Product stage**	**Construction process 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**	
TRACI 2.1. Acidification [kg SO2 eq.]	**2.84E-1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Eutrophication [kg N eq.]	**1.42E-1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Global Warming Air. incl. biogenic carbon [kg CO2 eq.]	**3.74E+1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Ozone Depletion Air [kg CFC 11 eq.]	**2.28E-6**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**
TRACI 2.1. Resources. Fossil fuels [MJ surplus energy]	**7.00E+1**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**	**INA**

LCA results interpretation

In the production of FLAT GLASS two main sources of impacts can be identified.

One is the energy consumed in the furnace and the other one is the impacts generated in the production of one of the main raw materials, the soda ash.

Soda ash is in the origin of 21% of the GWP, 60% of the abiotic depletion for non-fossil fuels (ADP elements) and more than 20% of the energy consumption.

Planiclear and Parsol glass have the same process and a similar recipe, except for metallic oxides which give the coloration to the glass.

With the very low variations linked to this component, results are seen as representative for both products.

	Environnemental impacts (A1-A3) FLAT GLASS 6 mm	Unit
Global warming	1.89E+1	kg CO_2 equiv/FU
Non-Renewable resources consumption[1]	2.81E+2	MJ/FU
Energy consumption[2]	2.93E+2	MJ/FU
Water consumption[3]	4.21E-2	m^3/FU
Waste production[4]	4.22E-1	kg/FU

[1]: This indicator corresponds to the abiotic depletion potential of fossil resources.
[2]: This indicator corresponds to the total use of primary energy (renewable and non-renewable)
[3]: This indicator corresponds to the use of fresh net water.
[4]: This indicator corresponds to the sum of hazardous. non-hazardous and radioactive waste disposed.

Health characteristics

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 Environmental Information

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.

Saint-Gobain's long term objectives:

Non recovered waste (2010-2025): -50% Long-term: zero non-recovered waste
Energy consumption: -15% (2010-2025) CO_2 emissions: -20% (2010-2025) Emissions of NOx. SO_2 and dust: -20% for each emissions category (2010-2025)
Water discharge: -80% (2010-2025) Long-term: zero industrial water discharge in liquid form
2025: promote the preservation of natural areas at Company sites as much as possible
2025: all environmental events are recorded. registered and investigated

More information on our website: www.saint-gobain.com and our Registration Document.

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 Building product disclosure and optimization - 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-off, 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 intent to discard it and therefore it would never have entered the solid waste stream.

Pre-consumer cullet	~11%
Post-consumer cullet	< 1%

In the future, Saint-Gobain Glass intends to continue the increase of recycled material in its products, especially when recycling building post-consumer cullet glass dismantling and recycling networks will be available in every country.

Responsible sourcing

(Required for BREEAM International new construction 2013 – MAT 03 Responsible sourcing)

Cuautla (México) Saint-Gobain factories is certified ISO 14001.
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).

References

DIN EN 572-2:2012-11 - Glass in building - Basic soda lime silicate glass products - Part 2: Float glass

EN 15804 + A1(2013) – Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction product.

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GPI 3.0 - GENERAL PROGRAMME INSTRUCTIONS FOR THE INTERNATIONAL EPD® SYSTEM

EN 410 - Glass in building - Determination of luminous and solar characteristics of glazing

EN 12758 - Glazing and airborne sound insulation - Product descriptions and determination of properties

ANSI/NFRC 200 - 2017_E0A1 Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence

NFRC 301 - 2017_E0A2 Standard Test Method for Emittance of Glazing Products

ISO 14001 – Environmental management systems

ISO 21930:2017 – Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services

CIE (15-2004) – Technical Report: Colorimetry, 3rd Edition.