The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025 and EN 15804:2012+A2:2019/AC:2021 and
PCR 2019:14 Construction products and construction services, Version 1.2.5 / 2022-11-01

SWISSPACER ADVANCE and ULTIMATE

20 mm width

EPD of multiple products, based on worst-case results

Date of publication	2023-12-14
Revision date	N/A
Valid until	2028-12-14
Version:	1

Programme: The International EPD® System
www.environdec.com
Program operator: EPD International AB.
Registration number: S-P-11837

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
EPD is also registered in INIES (https://www.inies.fr/) with registration number: 20231135594

swisspacer SAINT-GOBAIN

General information

The EPD owner has the sole ownership, liability and responsibility for the EPD.

Manufacturer

Vetrotech Saint-Gobain (Int.) AG Zweigniederlassung Kreuzlingen SWISSPACER Sonnenwiesenstrasse 158280 Kreuzlingen, Switzerland

EPD registration number

S-P-11837

Owner of the declaration

Vetrotech Saint-Gobain (Int.) AG Zweigniederlassung Kreuzlingen SWISSPACER Sonnenwiesenstrasse 158280 Kreuzlingen, Switzerland

CPC Classification

363 “Semi-manufactures of Plastics”

Geographical scope of the EPD®:

Europe

Cradle to grave and module D

Demonstration of verification:

An independent verification of the declaration was made, according to ISO 14025:2010. This verification was external and conducted by the following third party based on the PCR mentioned above.

Product name and manufacturer represented

SWISSPACER Advance 20 mm and SWISSPACER Ultimate 20 mm, the first being used as the reference product in this study.

Product	Weight
SWS Advance 20 mm	61.5 g
SWS Ultimate 20 mm	61.5 g

Production Plants

- Bojkowska 61, 44-141 Gliwice, Poland;
- Sonnenwiesenstrasse 15, 8280 Kreuzlingen, Switzerland;
- Am Glaswerk 4, 02929 Uhsmannsdorf, Germany

EPD prepared by

Marie-Charlotte Harquet (Saint-Gobain), Joffrey Martin (Saint-Gobain) and Paolo Junior Mrad (Saint-Gobain)

Contact

Bjorn Kluth (bjorn.kluth@saint-gobain.com)

Declaration issued

2023-12-14, valid until: 2028-12-13

Type of EPD

EPD of multiple products, based on worst-case results

Program information

Program used

The International EPD® System

EPD International AB - Box 210 60 - SE-100 31 Stockholm - Sweden

More information at www.environdec.com - info@environdec.com

PCR identification

EN 15804:2012 + A2/2019 Sustainability of construction works - Environmental product declaration - core rules for the product category of construction product and PCR 2019:14 Construction products, version 1.2.5 / 2022-11-01

CEN standard EN 15804+A2 serve as the core Product Category Rules (PCR)

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

Product Category Rules (PCR)

CEN standard EN 15804 serve as the core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14 Construction products, version 1.2.5

PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Life cycle assessment (LCA)

LCA accountability: Joffrey MARTIN, Saint-Gobain

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006:
☒ EPD verification by individual verifier

Third party verifier: ELYS CONSEIL
Yannick LE GUERN - yannick.leguern@elys-conseil.com
Approved by: The International EPD© System

Procedure for follow-up of data during EPD validity involves third part verifier: ☐ Yes ☒ No

Independent verification of the Environmental Product Declaration and data according to standard EN ISO 14025:2010

○ Internal ● External

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

Product information

Product description and description of use

This Environmental Product Declaration (EPD) describes the environmental impacts of 1 linear meter of a 20 mm width SWISSPACER Ultimate and SWISSPACER Advance spacer bar with a weight of 61.5 grams.

SWISSPACER warm edge spacer bars are glass fibre reinforced plastic hollow profiles with a multilayer high-tech foil as an adhesion surface. A spacer bar determines the gap between the panes of an insulating glass unit. It serves as a limiter for the sealant and as a storage for the desiccant, and thus contributes to the permanent hermetic seal of insulating glass. The warm edge prevents condensation and reduces the risk of mould, thus contributing to improved living comfort

The service life of SWISSPACER Ultimate or SWISPACER Advance spacer bar equals a glass' average lifetime; set to 30 years by default according to Glass PCR 17014.

Technical data / physical characteristics

Wooden windows	ADVANCE	ULTIMATE
Psi value [W/mK]	0.039	0.031
PVC windows	**ADVANCE**	**ULTIMATE**
Psi value [W/mK]	0.039	0.032
Wood-aluminium windows	**ADVANCE**	**ULTIMATE**
Psi value [W/mK]	0.042	0.032
Aluminium windows	**ADVANCE**	**ULTIMATE**
Psi value [W/mK]	0.047	0.036

Description of the main components and/or materials for 1 linear meter of product for the calculation of the EPD:

Parameter	Value
Weight for 1 linear meter of the product	61.5 g
Width	20 mm

Components	Weight (in %)
Polymer resin and glass fibre	more than 95 %
Desiccant, colour pigment, glue and minor components	less than 5 %

Packaging	Quantity (kg) for 1 DU	Weight biogenic carbon kg C/kg
Cardboard	1.80E-03	43%
Wood Pallet	8.18E-05	41%
Strappings	3.76E-06	0%
Polyethylene foil	3.79E-05	0%

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).

The verifier and the program operator make no claim nor accept any responsibility for the legality of this product.

LCA calculation information

DECLARED UNIT

One linear meter of a 20 mm SWISSPACER Ultimate or SWISSPACER Advance spacer bar with a weight of 61.5 grams.

TYPE OF EPD

Cradle-to-grave; mandatory stages: A1-A3; B1-B7; C1-C4 & D

REFERENCE SERVICE LIFE (RSL)

According to PCR EN 17074:2019, the reference service life is 30 years

CUT-OFF RULES

All significant parameters shall be included. According to EN 15804+A2, process energy and materials that account for less than 1 % of the total energy and mass consumed may be excluded. The aggregate of all excluded inputs and outputs must not exceed 5 % of the total mass and energy consumed.

Substances of very high concern (SVHC), as defined in the REACH Regulation (Article 57), with a proportion higher than 0.1 % of the final glass product weight shall be included in the Life Cycle Inventory and the cut-off rules shall not apply.

BACKGROUND DATA SOURCE

GaBi data were used to evaluate the environmental impacts.

Main database used: ecoinvent v3.8 (2021) and Gabi 2022.2 (2022)

Flows related to human activities such as employee transport are excluded. The construction of plants and the manufacture of machinery and transport systems are excluded, as the associated flows are likely to be negligible compared to the manufacture of the construction product, relative to the lifetime of these systems.

GEOGRAPHICAL COVERAGE AND TIME PERIOD

The information was primarily collected in the year 2019. The data and information originate from the production sites for SWISSPACER products in Switzerland, Germany and Poland.

Electricity modeled using residual electricity mix for Switzerland, Germany and Poland according to AIB 2019.

SOFTWARE

GaBi 10.6.2.9

VARIABILITY

The difference between SWISSPACER Advance 20 mm and SWISSPACER Ultimate 20 mm can be higher than 10% for some environmental indicators. According to PCR, the highest results are displayed including the lowest amounts of recycled and biogenic content.

The results presented in this EPD are representative for both products.

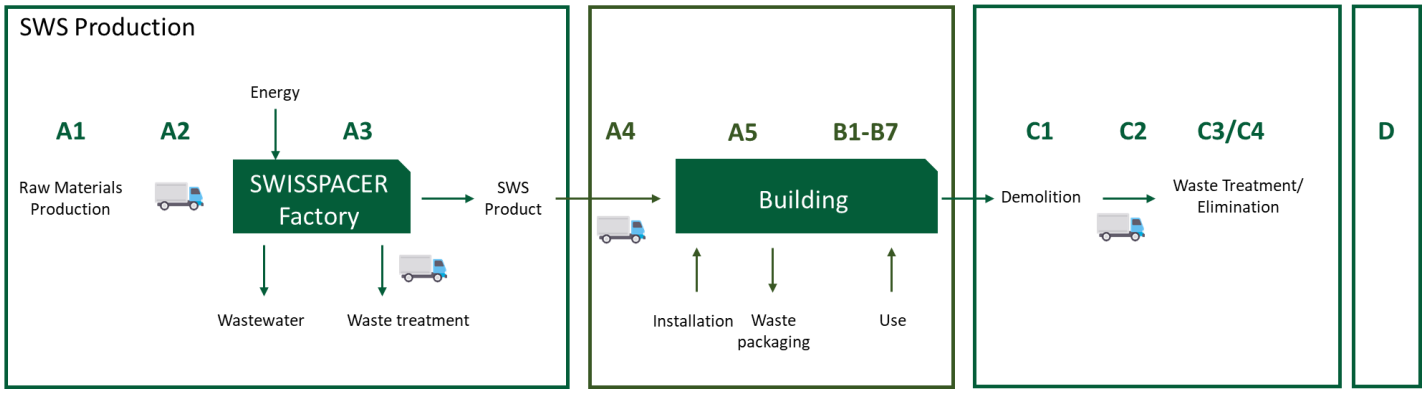
ALLOCATIONS

Allocation criteria are based on mass. The polluter pays principle as well the modularity principles were followed.

Life cycle stages

	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END-OF-LIFE-STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	Raw material supply	Transport	Manufacturing	Transport	Construction-Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-recovery
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Module declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	CH, PL, DE			Europe													
Specific data used	>90 % GWP-GHG																
Variation products	<10% for GWP-GHG																
Variation sites	-18% to +3%																

This is a cradle to grave LCA. (X = Included in LCA, MND = Module Not Declared).



A1 Raw materials supply

This module takes into account the extraction and processing of all raw materials and energy consumption upstream of the studied manufacturing process.

A2 Transport

The raw materials are transported to the manufacturing site. The modelling includes road, boat and train.

A3 Manufacturing

This module includes the manufacturing of the product and packaging. Specifically, it covers the manufacturing of polymeric membranes, the assembly, and packaging steps. A loss rate is considered in this step as well as the amount of packaging waste (cardboard mandrel and polyethylene). In addition, the production of packaging is taken into account at this stage.

SWISSPACER produces profiles made of plastic. In the production process, we use automated lines for extruding and drying granulate. The production process starts with warming and drying the styrene-acrylonitrile resin (SAN) granules with dry air inbuffer. the granules are automatically weighed, dosed, and mixed with colour pigments in a single line. The mixture is then transported to the extruder‘s feeding

hopper and afterwards to the extruder‘s cylinder. The feed screw transports the mixture to the extrusion tool. Melting of extruded mass takes place in a thermal process through the introduction of heat from the outside, generated by heating elements on the sides of the extruder and by friction. The SAN is melted and pumped into a forming tool that gives the profile a proper shape. The still warm and unstable profile coming from the tool needs to be cooled in the calibration process and receive its final shape. The vacuum generated in the calibration zone makes the surface of the profiles fit to the sides of the calibration zone. After a cooldown in water and having passed the suction mechanism, profile is perforated by means of a heated perforation wheel. Next, glue is applied to the profile, and a foil is affixed. These profiles are cut to specific sizes. The line opera- tor binds the spacer bars and, if required, adds elements such as linear connectors. Finally, the profiles are packed into boxes or onto pallets.

CONSTRUCTION STAGE A4-A5

A4 Transport

This module includes transport from the production gate to the construction site. The vehicle model used is a truck with a maximum capacity of 27 tons payload, traveling an average of 1,233 km to reach the construction site.

Parameters	Value
Type of fuel and vehicle consumption or type of vehicle used for transport, e.g. long-haul truck, boat, etc.	Truck-type vehicle - "GLO: Truck-trailer ts": EURO 4, 34-40 t gross weight / 27 t payload, 85% average utilization by mass; Reference year for data set: 2015. Professional database thinkstep data.
Distance to site	1233 km
Capacity utilization (including empty returns)	Use of GaBi data, default: 85% of mass capacity 30% empty returns
Bulk density of transported products	500 kg/m3
Volume capacity utilization coefficient	Coefficient < 1

A5 Construction - Installation

This module includes the installation materials and the treatment of their waste when the product is installed on site. According to PCR EN 17074, there is no waste on site, with the exception of packaging, which is disposed of in accordance with the end-of-life scenario.

Parameters	Value
Auxiliary plant inputs	No auxiliary inputs are taken into account for the installation due to the diversity of existing methods in accordance with PCR NF EN 17074.
Use of water	Not concerned
Use of other resources	Not concerned
Quantitative description of energy type	Not concerned

(regional mix) and consumption during installation process	
Waste generated on construction site prior to treatment of waste generated by system installation (specified by type)	Recycled waste: 0 kg/m Landfilled waste: 2.37E-04 kg/DU Waste incinerated with energy recovery: 1.28E-03 kg/DU Waste incinerated without energy recovery: 6.33E-05 kg/DU
Materials (specified by type) generated by waste treatment on the construction site, e.g. collection for recycling, energy recovery, disposal (specified by route)	Not applicable
Direct emissions into ambient air, soil and water	Not applicable

B1-B7 Utilization stage (exclusion of potential savings)

The use stage is divided into seven modules:

- B1: Use or application of the installed product
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Rehabilitation
- B6: Energy requirements during the operating phase
- B7: Water requirements during the operating phase.

The declared module B is zero, as no maintenance, repair or replacement is required during the product's lifetime.

C1-C4 End-of-life stage

This stage is subdivided into four modules C1, C2, C3 and C4 or "Deconstruction/demolition", "Transport to waste treatment", "Waste treatment", and "Disposal". At present, spacers are not recycled and are buried with the rest of the construction waste.

Parameters	Value / Description
Collection process specified by type	0 kg collected individually, 61.5 g collected with mixed construction waste
Recovery system specified by type	0 kg for reuse 0 kg for recycling 0 kg for energy recovery
Disposal specified by type	61.5 g of product or material for final disposal in a landfill site
Assumptions for scenario development (e.g. transport)	50 km for transport to sanitary landfill

D Reuse, recovery, recycling

The module D accounts for the reuse, recovery and/or recycling potentials. This allows to account for substitution effects (i.e. impacts or benefits) of using secondary materials (by including recycled content in the product) and/or putting back on the market (by recycling the product at its end-of-life).

The only source of contribution to module D is the end of life of packaging and in particular, the incineration with energy recovery that represent and 81% of the end-of-life.

LCA results

The table below shows the environmental impacts associated with the production of one linear meter of 20 mm width SWISSPACER Advance or SWISSPACER Ultimate. This is a cradle-to-grave EPD.

According to PCR, highest results (including the lowest amounts of recycled and biogenic content) are displayed which correspond to SWS Advance.

EF 3.0 was used as the impact model. Specific data was supplied by the plant and generic data originated from GaBi and ecoinvent databases.

All emissions to air, water, or soil, as well as all materials and energy consumed were included.

Raw materials and energy consumption as well as transport distances were taken directly from the manufacturing site (production data from 2019).

All figures refer to a declared 20 mm width SWISSPACER unit with a weight of 0.0615 kg.

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

ENVIRONMENTAL IMPACTS of 20 mm SWISSPACER Ultimate or SWISSPACER Advance														
Environmental Impacts Indicators	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Climate Change - total [kg CO2 eq.]	2.58E-01	4.57E-03	4.13E-03	0	0	0	0	0	0	0	0	3.71E-04	0	3.35E-03	-1.04E-03
Climate Change, fossil [kg CO2 eq.]	2.50E-01	4.49E-03	1.91E-04	0	0	0	0	0	0	0	0	3.64E-04	0	3.18E-03	-1.02E-03
Climate Change, biogenic [kg CO2 eq.]	7.27E-03	5.78E-05	3.93E-03	0	0	0	0	0	0	0	0	4.69E-06	0	1.70E-04	-1.04E-05
Climate Change, land use and land use change [kg CO2 eq.]	1.68E-04	2.53E-05	5.89E-08	0	0	0	0	0	0	0	0	2.05E-06	0	1.98E-06	-1.78E-07
Ozone depletion [kg CFC-11 eq.]	2.37E-09	2.72E-16	3.95E-14	0	0	0	0	0	0	0	0	2.20E-17	0	4.59E-15	-9.57E-11
Acidification [Mole of H+ eq.]	1.06E-03	5.59E-06	7.33E-07	0	0	0	0	0	0	0	0	4.53E-07	0	1.07E-05	-2.83E-06
Eutrophication freshwater [kg P eq.]	1.19E-05	1.35E-08	2.36E-09	0	0	0	0	0	0	0	0	1.10E-09	0	5.35E-07	-6.50E-08
Eutrophication, marine [kg N eq.]	2.02E-04	2.01E-06	2.90E-07	0	0	0	0	0	0	0	0	1.63E-07	0	2.45E-06	-4.88E-07
Eutrophication, terrestrial [Mole of N eq.]	2.08E-03	2.35E-05	3.23E-06	0	0	0	0	0	0	0	0	1.90E-06	0	2.69E-05	-5.16E-06
Photochemical ozone formation, human health [kg NMVOC eq.]	6.37E-04	4.93E-06	9.58E-07	0	0	0	0	0	0	0	0	4.00E-07	0	7.77E-06	-1.54E-06
Resource use, mineral and metals [kg Sb eq.] [1]	5.78E-07	3.79E-10	8.62E-12	0	0	0	0	0	0	0	0	3.07E-11	0	2.31E-10	-3.34E-10
Resource use, fossils [MJ][1]	5.42E+00	6.06E-02	1.05E-03	0	0	0	0	0	0	0	0	4.91E-03	0	4.47E-02	-1.72E-02
Water use [m³ world equiv.][1]	6.29E-02	4.07E-05	2.93E-04	0	0	0	0	0	0	0	0	3.30E-06	0	6.22E-06	-8.79E-05

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

OPTIONAL INDICATORS of 20 mm SWISSPACER Ultimate or SWISSPACER Advance														
Optional indicators	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Particulate matter [Disease incidences]	7.22E-09	3.26E-11	4.41E-12	0	0	0	0	0	0	0	0	2.65E-12	0	1.09E-10	-2.34E-11
Ionising radiation, human health [kBq U235 eq.] [2]	3.56E-02	1.10E-05	6.64E-06	0	0	0	0	0	0	0	0	8.89E-07	0	7.86E-05	-1.25E-04
Ecotoxicity, freshwater [CTUe] [1]	6.82E+00	4.21E-02	6.55E-04	0	0	0	0	0	0	0	0	3.41E-03	0	4.21E-02	-8.01E-03
Human toxicity, cancer [CTUh] [1]	2.92E-09	8.48E-13	3.16E-14	0	0	0	0	0	0	0	0	6.88E-14	0	2.14E-12	-2.39E-13
Human toxicity, non-cancer [CTUh] [1]	2.29E-09	4.46E-11	2.31E-12	0	0	0	0	0	0	0	0	3.61E-12	0	1.89E-10	-5.35E-12
Land Use [Pt] [1]	4.95E-01	2.09E-02	2.56E-04	0	0	0	0	0	0	0	0	1.69E-03	0	3.82E-03	-3.64E-03

[2] Disclaimer: This impact category deals mainly with the eventual impact of doze ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accident, occupational exposure not due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also measured by the indicator.

RESOURCE USE of 20 mm SWISSPACER Ultimate or SWISSPACER Advance															
Resources Use indicators	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Use of renewable primary energy (PERE) [MJ]	3.60E-01	3.44E-03	1.86E-04	0	0	0	0	0	0	0	0	2.79E-04	0	3.96E-03	-3.91E-03
Primary energy resources used as raw materials (PERM) [MJ]	2.91E-02	0	-2.26E-02	0	0	0	0	0	0	0	0	0	0	0	0
Total use of renewable primary energy resources (PERT) [MJ]	3.89E-01	3.44E-03	-2.24E-02	0	0	0	0	0	0	0	0	2.79E-04	0	3.96E-03	-3.91E-03
Use of non-renewable primary energy (PENRE) [MJ]	5.42E+00	6.07E-02	1.05E-03	0	0	0	0	0	0	0	0	4.93E-03	0	4.48E-02	-1.72E-02
Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	1.14E+00	0	-1.52E-03	0	0	0	0	0	0	0	0	0	0	0	0
Total use of non-renewable primary energy resources (PENRT) [MJ]	6.56E+00	6.07E-02	-4.69E-04	0	0	0	0	0	0	0	0	4.93E-03	0	4.48E-02	-1.72E-02
Input of secondary material (SM) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of renewable secondary fuels (RSF) [MJ]	1.41E-22	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF) [MJ]	1.65E-21	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Use of net fresh water (FW) [m3]	1.57E-03	3.90E-06	6.91E-06	0	0	0	0	0	0	0	0	3.16E-07	0	1.57E-06	-2.28E-06

WASTE CATEGORIES of 20 mm SWISSPACER Ultimate or SWISSPACER Advance															
Waste category Indicators	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Hazardous waste disposed (HWD) [kg]	5.01E-05	2.91E-13	1.13E-13	0	0	0	0	0	0	0	0	2.36E-14	0	6.48E-12	-6.10E-13
Non-hazardous waste disposed (NHWD) [kg]	2.05E-02	8.71E-06	2.74E-04	0	0	0	0	0	0	0	0	7.06E-07	0	6.14E-02	-5.60E-06
Radioactive waste disposed (RWD) [kg]	7.82E-05	7.48E-08	4.14E-08	0	0	0	0	0	0	0	0	6.07E-09	0	5.44E-07	-1.06E-06

OUTPUT FLOWS of 20 mm SWISSPACER Ultimate or SWISSPACER Advance															
Output Flows Indicators	Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	
Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Materials for Recycling (MFR) [kg]	3.46E-03	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported electrical energy (EEE) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Additional indicators from EN 15804+A2															
	Product stage	Construction 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
GWP-GHG	2.57E-01	4.56E-03	1.05E-03	0	0	0	0	0	0	0	0	3.69E-04	0	3.19E-03	-1.06E-05

Biogenic Carbon Content in Product Stage	Unit	Quantity
Biogenic carbon content in product (at factory exit)	Kg.C	0
Biogenic carbon content in packaging (at factory exit)	Kg.C	5.58E-04

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

There is no biogenic carbon content in spacer bar products, but some in the associated packaging.

LCA interpretation

Climate change - total

When analysing the figures above for Climate change, it can clearly be seen that the majority of contribution to this environmental impact stems from the production modules (A1-A3). The production of raw materials, and SAN and glass fibre in particular, is responsible for the majority of emissions. GHGs are also generated during manufacturing through the consumption of electricity and natural gas.

Non-renewable resources consumption

Consumption of non-renewable resources is once again the highest in production modules. This is due to the energy used to produce raw materials and the type of plastic used (derived from non-renewable fossil fuels). The plant's consumption of natural gas and electricity also influences this indicator. The contribution of the other modules to this impact is very low, and mainly due to the non-renewable resources consumed during transport.

Energy consumption

For the same reasons, the emissions profile is similar to the previous indicator in that very little renewable energy is used.

Water consumption

As water is not used in any of the other modules (A4 - A5, C1 - C4), the contribution to water consumption is low. For the production phase, water is used in the manufacturing plant and in the production of raw materials, and it is here that the contribution is highest.

Waste production

Waste generation does not follow the same trend as the above impacts. This is because module C corresponds to the end-of-life phase of the spacer, and it is therefore during this stage that "spacer waste" is generated. However, there remains a slight impact linked to the production module, since waste is generated on site.

Data quality

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

Geographical rating	Temporal rating	Technology Rating	Total score (average)
1,9 Good	2.2 Good	1.9 Good	2 Good

Additional information

SWISSPACER is a partner for "warm edge" spacers and its products offer better PSI values than aluminium or steel spacers (see table at end of paragraph), as confirmed by tests carried out by ift Rosenheim directive WA-08/3 (Link). The results of these tests are verified by the Warm Edge Working Group and documented in the official data sheets on spacer values issued by the Bundesverband Flachglas (German Federal Flat Glass Association).

SWISSPACER products are also certified by the Passive House Institute. For many years, the Darmstadt (Germany) institute and SWISSPACER have been collaborating on studies that provide information for the market. One such study, for example, examined the influence of spacers in insulated window glazing on the total energy demand of buildings in different climate zones (cold climate, cold-moderate climate, warm-moderate climate, warm climate). Compared with aluminium spacers, highly efficient "warm edge" plastic spacers reduce energy consumption, CO2 emissions and heating costs in buildings. In another study on living comfort, the Passive House Institute examined the effects of "warm edge" spacers on well-being, comfort and prevention of mold formation.

Please refer to www.swisspacer.com for more information about the company, its products and studies.

Sustainable resource management at Saint-Gobain

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

Saint-Gobain has set a target for 2030 of having "all our product ranges and systems covered by Life Cycle Assessments (LCA) and all published results (e.g. in the form of Environmental Product Declarations, EPDs) verified by third parties. This objective applies to all products manufactured by Saint-Gobain or marketed products that are part of systems sold by Saint-Gobain."

The contribution of our products to sustainable buildings (Required for the optimization and diffusion of LEED v4 building products - raw material sourcing)

For any questions/documents/certification, please contact our local sales teams.

More documents on https://www.swisspacer.com/fr/downloads

Window system	Wood	PVC	Wood / Aluminium	Aluminium
	1.4-1.3 W/m²K	1.2 W/m²K	1.4 W/m²K	1.6 W/m²K
Glazing	Double | triple insulating glazing			
Aluminium spacers	0.082 | 0.089	0.076 | 0.078	0.094 | 0.100	0.110 | 0.120
Stainless steel spacers	0.053 | 0.054	0.051 | 0.050	0..059 | 0.060	0.068 | 0.064
SWISSPACER Advance	0.039 | 0.037	0.039 | 0.037	0.042 | 0.040	0.047 | 0.042
SWISSPACER Ultimate	0.031 | 0.029	0.032 | 0.030	0.032 | 0.030	0.036 | 0.031

Differences versus previous versions

Previous version of the EPD was published in 2021 for these products. This previous version covered products from 6 mm to 56 mm with displayed results for 16 mm. Also, this EPD was cradle-to-gate, covering only module A1-A3. The results 'increase is therefore due to a change of width from 16 mm to 20 mm (i.e. a change of weight) in the product displayed.

To ensure a right comparison, the following table displays the results from the previous EPD (EPD1 (2021) / A1-A3) and from the current EPD for only modules A1-A3 (EPD2 (2023) / A1-A3) and for all life cycle (EPD2 (2023)).

	EPD1 (2021) / A1-A3	EPD2 (2023) / A1-A3	EPD2 (2023)
Global warming (kgCO2eq)	2.20E-01	2.58E-01	2.70E-01
Resource use, fossils [MJ]	4.40E+00	5.42E+00	5.53E+00
Use of net fresh water (FW) [m3]	1.3 E-03	1.57E-03	1.58E-03
Non-hazardous waste disposed (NHWD) [kg]	2.88E-02	2.06E-02	8.23E-02

Electricity modelling

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	Climate Change (kgCO2e/kWh)	Total use of renewable primary energy resources (MJ/kWh)	Total use of non-renewable primary energy resources (MJ/kWh)
Poland	0.973	1.481	9.422
Germany	0.659	0.146	9.645
Switzerland	0.045	4.182	3.978

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