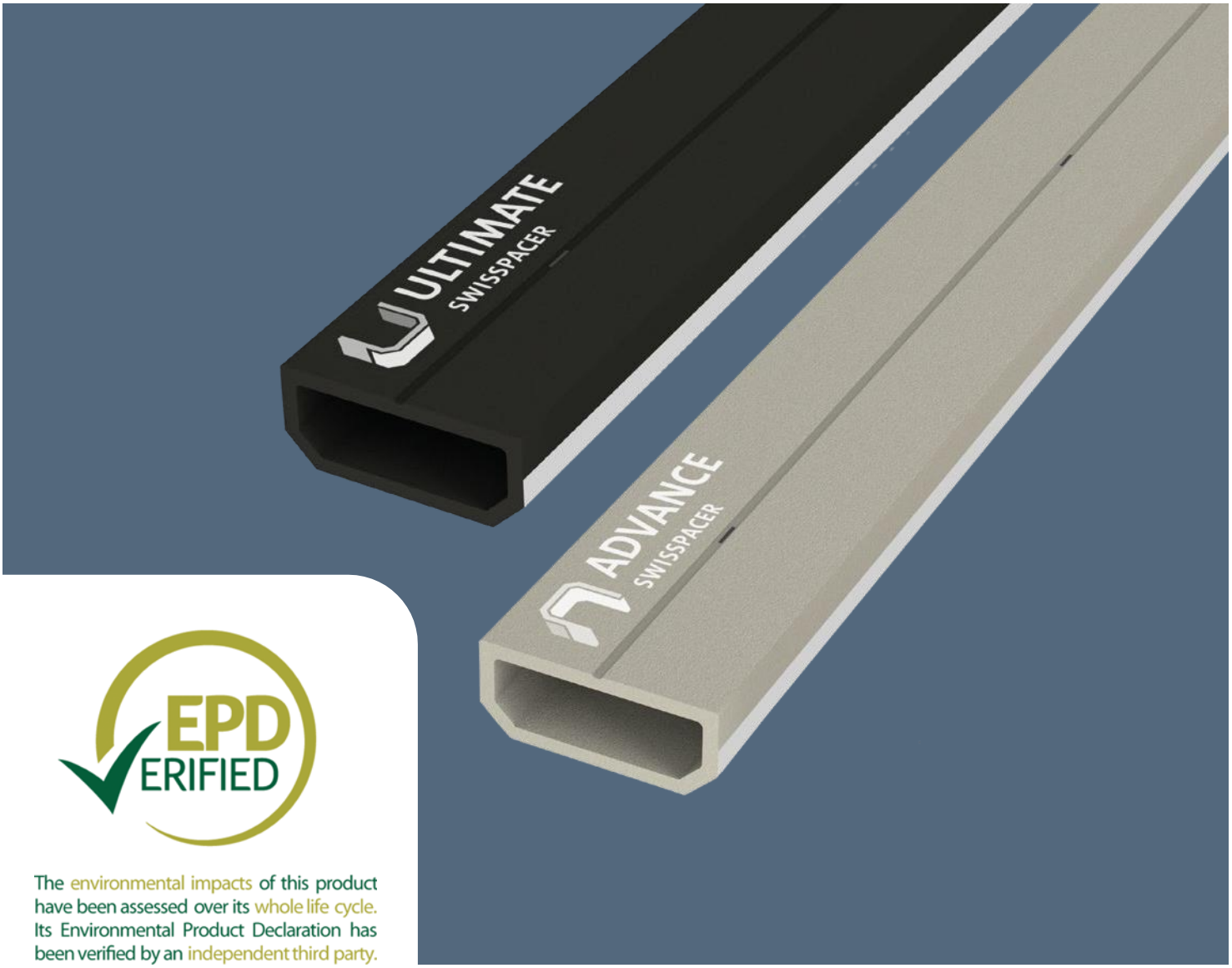

EPD VERIFIED

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 and
PCR 2012:01 Construction products and construction services, Version 2.33 / 2020-09-18

SWISSPACER ADVANCE and ULTIMATE

from 6 mm to 56 mm

Date of publication	2021-10-14
Revision date	2026-11-24
Valid until	2026-10-13
Version:	2

Scope of the EPD® Europe

Registration number
The International EPD® System:
S-P-04588

SWISSPACER
The edge of tomorrow.

ECO PLATFORM EPD EN 15804 VERIFIED

EPD®
THE INTERNATIONAL EPD® SYSTEM

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 15
8280 Kreuzlingen, Switzerland

Programme used
The International EPD® System
More information at www.environdec.com

EPD registration number
S-P-04588

PCR identification
EN 15804 Sustainability of construction works – Environmental product declaration – core rules for the product category of construction product and PCR 2012:01 Construction products and construction services, version 2.33 / 2020-09-18

Owner of the declaration
Vetrotech Saint-Gobain (Int.) AG
Zweigniederlassung Kreuzlingen SWISSPACER
Sonnenwiesenstrasse 15
8280 Kreuzlingen, Switzerland

CPC Classification
37113 “Float glass and surface ground or polished glass, in sheets.”

Product name and manufacturer represented
SWISSPACER ADVANCE and SWISSPACER ULTIMATE
Manufacturer:
Vetrotech Saint-Gobain (Int.) AG
Zweigniederlassung Kreuzlingen SWISSPACER
Sonnenwiesenstrasse 15
8280 Kreuzlingen, Switzerland

Plants
Gliwice (Poland); Kreuzlingen (Switzerland); Uhsmannsdorf (Germany)

EPD prepared by
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Declaration issued
2021-10-14, valid until: 2026-10-13

Verifier
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Accredited or approved by: The International EPD® System

CEN standard EN 15804 and standard EN 17074 serve as the core Product Category Rules (PCR)

LCA and EPD performed by	Saint-Gobain LCA central team
EPD program operator **Operated by**	The International EPD® System. EPD International AB, www.environdec.com
PCR review conducted by	Technical Committee of the International EPD® System International EPD® System: Massimo Marino Contact via info@environdec.com

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 from different programs may not be comparable.
EPDs of construction products may not be comparable if they do not comply with EN 15804.
For further information about comparability, see EN 15804 and ISO 14025.

Product description

Product description and description of use
This Environmental Product Declaration (EPD) describes the environmental impacts of 1 linear metre of a 16 mm SWISSPACER ULTIMATE or SWISSPACER ADVANCE spacer bar with a weight of 50.5 grams.

SWISSPACER warm edge spacer bars are glass fibre reinforced plastic hollow profiles with a multilayer high-tech foil as an adhesion surface. Using a SWISSPACER in an insulating glass unit, effectively reduces the heat transfer at the glazing edge. 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 considerably to the permanent hermetic seal of insulating glass. A SWISSPACER possesses best Psi values and is consequently used to achieve the lowest U values for windows and façades.

The service life of a SWISSPACER equals a building's average lifetime (which is often set to 50 years by default), but is at least equal to the service life of the insulating building component installed in the building.

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 metre of product for the calculation of the EPD:

Parameter	Value
Weight for 1 linear metre of the product	50.5 g
Width	16 mm

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

No hazardous substances listed in the „Candidate List of substances of very high concern for Authorisation" with a proportion higher than 0.1 % of the product weight were used in the life cycle of the product.

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

LCA calculation information

DECLARED UNIT
One linear metre of a 16 mm SWISSPACER ULTIMATE or SWISSPACER ADVANCE spacer bar with a weight of 50.5 grams.

SYSTEM BOUNDARIES
Cradle-to-gate; mandatory stages: A1-A3

REFERENCE SERVICE LIFE (RSL)
N/A; boundaries are cradle-to-gate - Thinkstep 2020

CUT-OFF RULES
All significant parameters shall be included. According to EN 15804, 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.

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 2020. The data and information originate from the production sites for SWISSPACER products in Switzerland, Germany and Poland.

Background data - ecoinvent 3.6

SOFTWARE
GaBi 9.2.0 - GaBi Envision

VARIABILITY
The difference between SWISSPACER ADVANCE and SWISSPACER ULTIMATE is less than 10 % for the GWP parameter. The results presented in this EPD are thus representative for both products, as the SWISSPACER ULTIMATE is less impacting than the SWISSPACER ADVANCE.

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

According to EN 15804, EPDs for construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPDs may not be comparable if they were produced with different programs. The EPD owner has the sole ownership, liability, and responsibility for the EPD. The intended use of the EPD is for B2B and B2C communication.

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
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

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

Product stage, life cycle modules A1-A3

Description of the stage:
The product stage is subdivided into the three modules A1, A2 and A3 or “Raw material supply”, “Transport” and “Manufacturing”. Declaration of these modules in an aggregated module A1-A3 is one possibility considered by the standard EN 15804. This rule was applied for this EPD.

Description of the scenarios and other additional technical information:

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 (average values).

A3 Manufacturing
This module includes the manufacturing of the product and packaging. Specifically, it covers the manufacturing of polymeric membranes, the assembly, winding 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 in a buffer. 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 operator 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
Not taken into account in this EPD.

End-of-life stage, C1-C4
Not taken into account in this EPD

Use stage (excluding potential savings), B1-B7
Not taken into account in this EPD.

Reuse/recovery/recycling potential, D
Not taken into account in this EPD.

LCA results

The table below shows the environmental impacts associated with the production of one linear meter of 16 mm SWISSPACER ADVANCE or SWISSPACER ULTIMATE as a coating mix. This is a cradle-to-gate EPD. The environmental impacts of all the other stages in the life cycle of the SWISSPACER product are not declared (MND).

CML 2001 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 16 mm SWISSPACER unit with a weight of 0.0505 kg.

LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

ENVIRONMENTAL IMPACTS of 16 mm SWISSPACER ULTIMATE or SWISSPACER ADVANCE	
Parameters	**Product stage**
	A1 / A2 / A3
Global Warming Potential (GWP) *[in kg CO_2 equiv/FU]*	2.20E-01
Ozone Depletion (ODP) *[in kg CFC 11 equiv/FU]*	1.74E-09
Acidification potential (AP) *[in kg SO_2 equiv/FU]*	7.82E-04
Eutrophication potential (EP) *[in kg $(PO_4)^{3-}$ equiv/FU]*	8.00E-05
Photochemical ozone creation potential (POPC) *[in kg ethene equiv/FU]*	5.72E-05
Abiotic depletion potential of non-fossil resources (ADP elements) *[in kg Sb equiv/FU]*	3.01E-06
Abiotic depletion potential of fossil resources (ADP fossil fuels) *[in MJ/FU]*	4.40E+00

RESOURCE USE 16 mm	
Parameters	**Product stage**
	A1 / A2 / A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials *[in MJ/FU]*	3.23E-01
Use of renewable primary energy used as raw materials *[in MJ/FU]*	2.64E-02
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *[in MJ/FU]*	1.83E-01
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials *[in MJ/FU]*	3.25E+00
Use of non-renewable primary energy used as raw materials *[in MJ/FU]*	1.35E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) *[in MJ/FU]*	3.48E+00
Use of secondary material *[in kg/FU]*	0
Use of renewable secondary fuels *[in MJ/FU]*	0
Use of non-renewable secondary fuels *[in MJ/FU]*	0
Use of net fresh water *[in m^3/FU]*	1.32E-03

WASTE CATEGORIES 16 mm	
Parameters	Product stage
	A1 / A2 / A3
Hazardous waste disposed *[in kg/FU]*	4.24E-05
Non-hazardous waste disposed (excluding inert) *[in kg/FU]*	2.88E-02
Radioactive waste disposed *[in kg/FU]*	2.95E-06

OUTPUT FLOWS 16 mm	
Parameters	Product stage
	A1 / A2 / A3
Components for re-use *[in kg/FU]*	0
Materials for recycling *[in kg/FU]*	0.0032
Materials for energy recovery *[in kg/FU]*	0
Exported energy, detailed by energy carrier *[in MJ/FU]*	0

LCA interpretation

The following figure refers to a declared unit of 1 linear metre of a 16 mm spacer bar with a weight of 50.5 grams of SWISSPACER ULTIMATE or SWISSPACER ADVANCE.

		Product (A1-A3)	Transport (A4)	Installation (A5)	Use (B)	End of life (C)	**Total** Environmental impacts of the product
Global warming	kg CO_2 equiv/FU	0.22	0.00	0.00	0.00		**0.22** kg CO_2 equiv/FU
Non-Renewable resources consumption [1]	MJ/FU	4.40	0.00	0.00	0.00		**4.40** MJ/FU
Energy consumption [2]	MJ/FU	4.95	0.00	0.00	0.00		**4.95** MJ/FU
Water consumption [3]	m^3/FU	0.0013	0.0000	0.0000	0.0000		**0.0013** m^3/FU
Waste production [4]	kg/FU	0.03	0.00	0.00	0.00		**0.03** kg/FU

[1] This indicator corresponds to the abiotic depletion potential of fossil resources.

[2] This indicator corresponds to the total consumption of primary energy (renewable and non-renewable)

[3] This indicator corresponds to the consumption of fresh net water.

[4] This indicator corresponds to the total of hazardous, non-hazardous and radioactive waste disposed.

Influence of width

This EPD covers a spacer bar width ranging from 6 mm to 56 mm. The environmental performance of other spacer bar widths can be obtained using a multiplication factor. The multiplication factors indicate that impacts are proportional to product mass. All the results refer to spacer bars with a width of 16 mm and values are used as reference values.

The following table shows the multiplication factors for each individual thickness in the product family.

In order to determine the environmental impacts associated with a determinate product thickness, the results indicated in this EPD must be multiplied by the corresponding multiplication factor. A conservative principle was applied to obtain this factor with the real impact of the product being slightly lower than indicated in the table.

PRODUCT WIDTH	Mass weight in g	MULTIPLICATION FACTOR
6 mm	23.9	0.474
7 mm	24.6	0.488
8 mm	27.9	0.553
9 mm	30.5	0.604
10 mm	33.6	0.666
11 mm	39.3	0.779
12 mm	42.4	0.84
13 mm	43	0.852
14 mm	48.5	0.961
15 mm	48.9	0.969
16 mm	50.5	1
18 mm	57.3	1.135
20 mm	61.5	1.218
22 mm	66.5	1.317
24 mm	75.7	1.5
27 mm	79.7	1.579
32 mm	99.8	1.977
36 mm	110.3	2.185
45 mm	136.7	2.707
56 mm	163.3	3.234

Additional information

SWISSPACER and sustainability

SWISSPACER has been a reliable partner for warm edge spacer bars for many years and its products are among the best on market, as confirmed on a regular basis in tests conducted by the ift Rosenheim (Germany). The results of these tests verified by the Warm Edge Working Group and documented in the official data sheets on spacer bar values of the Bundesverband Flachglas (German Federal Flat Glass Association).

In addition, SWISSPACER products are certified by the Passive House Institute. For years, the renowned institute from Darmstadt (Germany) and SWISSPACER have been working together on studies that provide fundamental information for the market. One of the studies, for example, investigated the influence of spacer bars in the insulating glazing of windows on the total energy demand of buildings in different climate zones (cold climate, cold-moderate climate, warm-moderate climate, warm climate). Compared to aluminium spacer bars, highly efficient warm edge plastic spacer bars ensure significantly less energy consumption, CO_2 emissions and heating costs for buildings. In another study on living comfort, the Passive House Institute investigated the highly positive effects of warm edge spacer bars on well-being, comfort and the prevention of mould formation.

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

Sustainable resource management at Saint-Gobain

In light of the global ecological challenges, Saint-Gobain developed its sustainable resource management policy in 2015 to facilitate the transition to a circular economy. Achieving this requires a threefold approach: a maximum of recycled content in the products, a minimum of waste at the workplace and recovering of the remaining waste. Saint-Gobain set itself the target of reducing its unrecovered production waste by 50 % compared to 2010 by the year 2025.

For further information, refer to:
https://www.saint-gobain.com/en/explore-2050

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7. General programme instruction of the International EPD® System, version 3.0.1

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Differences versus previous versions

The changes done in this new version are linked to some part of the layout and on some wording corrections.