



ENVIRONMENTAL PRODUCT DECLARATION

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

Vertex mesh

from: SAINT-GOBAIN ADFORS CZ, s.r.o

Version 1

Publication date: 2023-03-31

Validity: 5 years

Valid until: 2028-03-30

Scope of the EPD[®]: Europe

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

Programme operator: EPD International AB

Production plant: Litomyšl
Sokolovská 106, Litomyšl 570 01, Czech Republic
(Czech Republic)



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.

General information

Company information

Manufacturer: SAINT-GOBAIN ADFORS CZ, s.r.o Sokolovská 106, Litomyšl 570 01, Czech Republic, Czech Republic. <https://eu.adfors.com/>

Production plant: Litomyšl: Sokolovská 106, Litomyšl 570 01, Czech Republic (Czech Republic)

Framework: The LCA is based on 2020 production data for one site Czech Republic.

Geographical scope : Europe

Prepared EN: IVL Swedish Environmental Research Institute, EPD International Secretariat

UN CPC CODE: 54790 Other building completion and finishing services

Owner of the declaration: SAINT-GOBAIN ADFORS CZ, s.r.o

Product name and manufacturer represented: Vertex mesh. SAINT-GOBAIN ADFORS CZ, s.r.o

This EPD covers information modules A1 to C4 (cradle to grave) + module D as defined in EN 15804:2012 + A2:2019. This EPD includes several references within the analyzed family of products.

EPD[®] prepared by: Brichacek Milos (SAINT-GOBAIN ADFORS CZ, s.r.o., (Milos.Brichacek@saint-gobain.com) & Sandra, Perez-Jimenez (Saint-Gobain LCA central team, sandra.perez-jimenez@saint-gobain.com)

The intended use of this EPD is for B2B communication.

EPD[®] registration number: S-P-08932

Declaration issued: 2023-03-31, **valid until:** 2028-03-30

Demonstration of verification: an independent verification of the declaration was made, according to EN ISO 14025:2010. This verification was external and conducted by a third party, based on the PCR mentioned above (see information below).

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

CEN standard EN 15804:2012 + A2:2019 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): PCR 2019:14 Construction Products, version 1.11

PCR review was conducted by: El Comité Técnico del Sistema Internacional EPD[®]
President: Claudia A. Peña. Contact via info@environdec.com

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

EPD process certification EPD verification

Third party verifier : Marcel Gomez

Marcel Gómez Consultoria Ambiental Tlf 0034 630 64 35 93 - info@marcelgomez.com

In case of recognized individual verifiers: Approved by: The International EPD[®] System

Procedure for follow-up of data during EPD validity involves third part verifier:

Yes No

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

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804:2012 + A2:2019. For further information about comparability, see EN 15804:2012 + A2:2019 and ISO 14025:2006.

Product description

Product description and description of use

Vertex® ETICS (External Thermal Insulation Composite System) is a reinforcing fiberglass mesh used in building construction for external wall applications. The reinforcement mesh has a high tensile strength and low elongation to prevent the formation of cracks, and an alkali-resistant coating to protect the wall mesh while the render dries. The mesh is produced from glass fiber known for its stable fabric quality, and the fiberglass render mesh is also easy to cut and apply, making it the ideal solution for external reinforcement.

ADFORS Vertex® is CE certified according to ETA-13/0392.

The product is sold in rolls. The width of each roll is 100 cm ($\pm 1\%$), the length is 50 m ($\pm 1\%$), each roll is packed in a cardboard box and protected by a plastic film made of low-density polyethylene (LDPE).

In all configurations, glass fiber is used as the base, styrene-acrylic is used as both binder and coating, and finally starch mixed with other additives is used to give volume.

Technical data/physical characteristics:

Vertex mesh R 131 A101

Essential characteristics	Performance	Harmonized technical specification
Tensile strength (wrap/weft), N/50 mm	min. 1900 / min. 1900	EAD 040016-00-0404:2016
Elongation (wrap/weft), %	max. 5,0 / max. 5,0	
Tensile strength after alkalis conditioning (wrap/weft), N/50mm	min. 1000 / min. 1000	
Elongation after alkalis conditioning (warp/weft), %	max. 3,8 / max 3,8	

Product		Parameter				
		Mass per unit (g/m ²)	Thickness (mm)	Width (m)	Length (m)	Density (g/m ³)
Vertex mesh	R 131 A101 (reference)	160	0,52	1	0,5	308
	R 117 A101	145	0,50	1	0,5	290
	R 120 A101	159	0,65	1	0,5	245
	R 122 A101	155	0,65	1	0,5	238
	R 123 A101	150	0,64	1	0,5	234
	R 128 A101	150	0,88	1	0,5	170
	R 129 A101	160	0,55	1	0,5	291
	R 134 A101	165	0,52	1	0,5	317
	R 137 A101	165	0,65	1	0,5	254
	R 148 A101	167	0,67	1	0,5	249

Declaration of the main product components and/or materials

Description of the main components and/or materials for 1 m² of mesh for the calculation of the EPD®:

PARAMETER	VALUE
Quantity of mesh for 1 m ² of product	0,160 kg/m ² (glass yarn + coating + additives)
Thickness	0,52 mm
Packaging for the transportation and distribution	In one pallet there are 1815 m ² of mesh (290kg). The rolls are packed and put in a cardboard box. Then they are transported on a EUR pallet. Wooden pallet: 1,64E-05 kg/m ² Low density polyethylene film (LDPE): 4,36E-07 kg/m ² Paper (label): 1,25E-06 kg/m ² PET: 1,76E-08 kg/m ² Cardboard: 6,01E-06 kg/m ²
Product used for the Installation	The installation method differs from the final user. This stage has not been described nor assessed

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).

The verifier and the program operator do not make any claim nor have any responsibility of the legality of the product.

Description of the main product components and/or materials:

Vertex mesh R 131 A101

Product components	Weight (%)	Post-consumer material weight (%)	Renewable material weight (%)
Standard product	100%	0,0 %	0,0 %
Base	13,10%	0 %	0 %
Binder/ coating	2,52%	0 %	0 %
Additive	0.38%	0 %	0 %
Product	Weight (kg/m²)		
Vertex mesh R 131 A101	0,160		
Packaging materials	Weight (kg/kg)	Weight (%)	
Wooden pallet	1,03E-04	0,001 – 1.0 %	
Low-density polyethylene (LDPE) film	2,73E-06	0,0001 – 0,0005 %	
Paper (label)	7,81E-06	0,0001 – 0,001 %	
Polyethylene terephthalate (PET)	1,10E-07	0,0001 – 0,0005 %	
Cardboard	3,76E-05	0,001 – 0,005 %	

LCA calculation information

EPD SCOPE	Cradle to grave and module D
DECLARED UNIT	Providing a reinforcement of the cement base layer on 1 m ² of wall
SYSTEM BOUNDARIES	Mandatory Stages = A1-A3; A4-A5, B1-B7; C1-C4 and D
REFERENCE SERVICE LIFE (RSL)	The Reference Service Life (RSL) of the mesh product is 50 years.
CUT-OFF RULES	Life Cycle Inventory data for a minimum of 99% of total inflows to the upstream and core module shall be included. Flows related to human activities such as employee transport are excluded. Transportation in-site is excluded The construction of plants, production of machines and transportation systems are excluded
ALLOCATIONS	Allocation has been avoided when possible. For those cases, when recycled material has been used, a physical allocation based on mass is used. The polluter pays, and modularity principles have been followed
GEOGRAPHICAL COVERAGE AND TIME PERIOD	Data included is collected from 1 production site in Czech Republic (Litomyšl) Production year from 2020 Background data: Ecoinvent v3.8 (2022) and GaBi ts 2022

EPDs of construction products may be not comparable if they do not comply with EN 15804:2012 + A2:2019 or ISO 21930:2017. Environmental Product Declarations within the same product category from different programs may not be comparable”.

LCA scope

System boundaries (X=included. MND=module not declared)																		
	PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY	
	Raw material supply	Transport	Manufacturing	Transport	Construction-Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal		Reuse-recovery
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	RER	RER	RER	RER	RER	-	-	-	-	-	-	-	RER	RER	RER	RER	RER	
Specific data used	>95% GWP- GHG																	
Variation products	Maximum variability: 6%																	
Variation sites	One site for all products																	

Life cycle stages

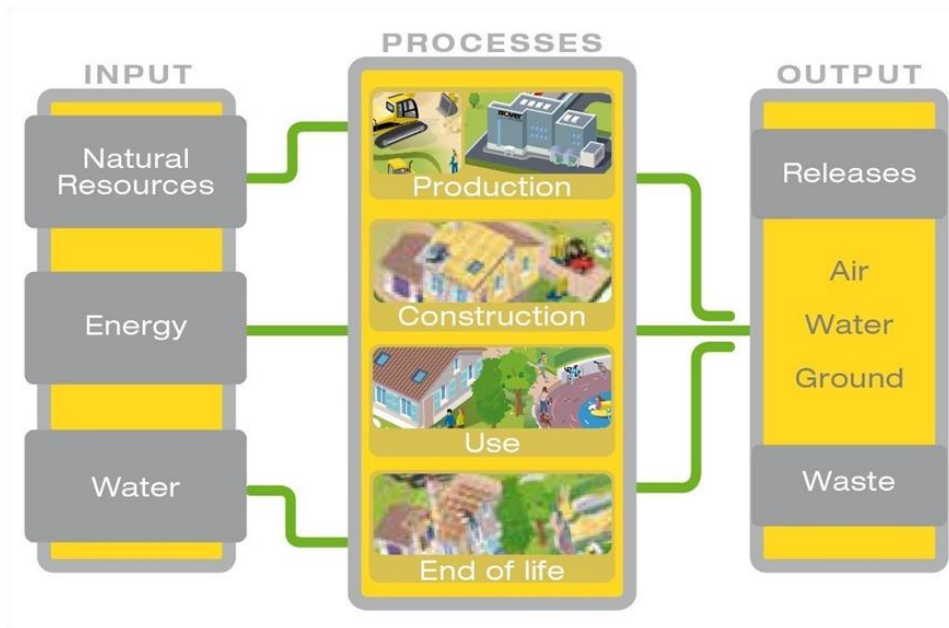


Figure 1. Flow diagram of the Life Cycle

A1-A3, Product stage

Description of the stage: the product stage of the mesh products is subdivided into 3 modules A1, A2 and A3 respectively “Raw material supply”, “transport” and “manufacturing”.

The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15 804 standard. This rule is applied in this EPD.

Description of the scenarios and other additional technical information:

A1, Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process

Specifically, the raw material supply covers production of binder components and sourcing (quarry) of raw materials for fiber production, e.g., sand and borax for glass wool. Besides these raw materials, recycled materials (agglomerates) are also used as input.

A2, Transport to the manufacturer

The raw materials are transported to the manufacturing site. In our case, the modeling includes road (average values) of each raw material.

A3, Manufacturing

This module includes the manufacturing of the product and packaging. Specifically, it covers the manufacturing of glass, mesh, and the packaging.

This module also includes the emissions and wastes generated during manufacturing.

A4-A5, Construction process stage

Description of the stage: the construction process is divided into 2 modules: A4, transport to the building site and A5, installation in the building. Since there is a product loss during installation (5 %). The quantification of raw material compensation (A5) and its transport to the building site (A4) are considered.

A4, Transport to the building site: this module includes transport from the production gate to the building site. Transport is calculated based on a scenario with the parameters described in the following table.

PARAMETER	VALUE
Fuel type and consumption of vehicle or vehicle type used for transport e.g., long distance truck, boat, etc.	Average truck trailer (27 t payload) with a real 24 t payload, diesel consumption 38 liters for 100 km
Distance	1060 km. Average distance between Eastern Europe and Western Europe
Capacity utilisation (including empty returns)	Use of GaBi data, default: 85% of mass capacity 30% empty returns
Bulk density of transported products*	308 kg/m ³
Volume capacity utilisation factor	Coefficient < 1

A5, Installation in the building: this module includes:

No additional accessory was considered for the implementation phase of mesh product.
No energy is needed to install the product (manual installation)

PARAMETER	VALUE/DESCRIPTION
Auxiliary inputs for the installation	The installation method was not communicated by the client. Hence this part has not been described nor assessed
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	3%
Distance	50 km to landfill by truck
Output materials (specified by type) as results of waste processing at the building site e.g., of collection for recycling, for energy recovering, disposal (specified by route)	Wooden pallet: 1,64E-05 kg/m ² - According to the European website "eurostat" pallets are: 31% recycled and 69% sent to landfill Cardboard 6,01E-06 kg/m ² - According to the European website "eurostat" cardboard is: 80% recycled and 20% sent to landfill 100% sent to landfill: - 5% waste of mesh during installation equivalent to 8g/m ² - Paper label 1,25E-06 kg/m ² - Polyethylene 1,76E-08 kg/m ² - Low density polyethylene film (LDPE) 4,36E-07 kg/m ² The distances used for the landfill and recycling center are 50 km

B1-B7, Use stage (excluding potential savings)

Description of the stage: the use stage is divided into the following modules:

- B1: Use
- B2: Maintenance
- B3: Repair
- B4: Replacement
- B5: Refurbishment
- B6: Operational energy use
- B7: Operational water use

Description of the scenarios and additional technical information:

Once installation is complete, no actions or technical operations are required during the use stages until the end-of-life stage. Therefore, mesh products have no impact (excluding potential energy savings) on this stage.

C1-C4, End of Life Stage

C1, Deconstruction, demolition

The de-construction and/or dismantling of mesh products take part of the demolition of the entire building. In our case, the environmental impact is assumed to be lesser than 1% of the total environmental impacts and can be neglected

C2, Transport to waste processing

The model use for the transportation (see A4, transportation to the building site) is applied.

C3, Waste processing for reuse, recovery and/or recycling

The product is landfilled without reuse, recovery, or recycling.

C4, Disposal

The mesh is assumed to be 100% landfilled.

Description of the scenarios and additional technical information - End of life:

Parameter	Value/description
Collection process specified by type	The entire product is collected alongside any mixed construction waste and sent to landfill 0,160 kg of mesh (collected with mixed construction waste)
Recovery system specified by type	There is no recovery, recycling, or reuse of the product once it has reached its end-of-life phase.
Disposal specified by type	The product alongside the mixed construction waste from demolishing will go to landfill 0,160 kg of mesh are landfilled
Assumptions for scenario development (e.g. transportation)	The product alongside the mixed construction waste from demolishing will go to landfill The waste going to landfill will be transported by truck with 27 t payload, using diesel as a fuel consuming 38 liters per 100km Distance covered is 50 km

D, Reuse/recovery/recycling potential

100% of wastes are landfilled. There is no reuse, nor recovery, nor recycling of this product. Hence, no recycling benefits are reported on stage D.








LCA results

As specified in EN 15804:2012+A2:2019 and the PCR 2019:14 Construction Products, version 1.11. The environmental impacts are declared and reported using the baseline characterization factors are from the ILCD. Raw materials and energy consumption, as well as transport distances have been taken directly from the manufacturing plant (Production data according 2020 and transport data according 2020).

According to the EN 15804:2012+A2:2019 standard, the LCIA results are relative expressions translating impacts into environmental themes such as climate change, ozone depletion, etc. (midpoint impact categories). Thus, the LCIA results do not predict impacts on category endpoints such as impact on the extinction of species or human health. In addition, the results do not provide information about the exceeding of thresholds, safety margins or risks.











All the results refer for Vertex mesh (R131 A101) with a weight of 0,160 kg/m². The results are representative of all the included products on the EPD.

Environmental Impacts









	Environmental indicators	Product stage	Construction stage		Use stage							End of life stage			Reuse, Recovery Recycling	
		A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Climate Change [kg CO ₂ eq.]	4,57E-01	2,10E-02	1,50E-02	0	0	0	0	0	0	0	0	1,90E-02	0	2,00E-03	0
	Climate Change (fossil) [kg CO ₂ eq.]	4,45E-01	2,10E-02	1,50E-02	0	0	0	0	0	0	0	0	1,80E-02	0	2,00E-03	0
	Climate Change (biogenic) [kg CO ₂ eq.]	1,11E-02	2,66E-04	3,43E-04	0	0	0	0	0	0	0	0	2,38E-04	0	-5,45E-05	0
	Climate Change (land use change) [kg CO ₂ eq.]	2,26E-04	1,16E-04	1,39E-05	0	0	0	0	0	0	0	0	1,04E-04	0	4,33E-06	0
	Ozone depletion [kg CFC-11 eq.]	2,96E-08	1,25E-15	8,89E-10	0	0	0	0	0	0	0	0	1,14E-15	0	5,51E-15	0
	Acidification terrestrial and freshwater [Mole of H+ eq.]	7,96E-04	2,30E-05	2,58E-05	0	0	0	0	0	0	0	0	2,07E-05	0	1,66E-05	0
	Eutrophication freshwater [kg P eq.]	3,71E-05	1,91E-07	1,13E-06	0	0	0	0	0	0	0	0	1,71E-07	0	1,22E-08	0
	Eutrophication freshwater [kg (PO ₄) ³ eq.]	1,21E-05	6,23E-08	3,67E-07	0	0	0	0	0	0	0	0	5,57E-08	0	3,97E-09	0
	Eutrophication marine [kg N eq.]	2,02E-04	7,84E-06	6,68E-06	0	0	0	0	0	0	0	0	7,04E-06	0	4,25E-06	0
	Eutrophication terrestrial [Mole of N eq.]	2,27E-03	9,23E-05	7,15E-05	0	0	0	0	0	0	0	0	8,28E-05	0	4,67E-05	0
	Photochemical ozone formation - human health [kg NMVOC eq.]	5,87E-04	2,00E-05	1,93E-05	0	0	0	0	0	0	0	0	1,80E-05	0	1,29E-05	0
	Resource use, mineral and metals [kg Sb eq.] ¹	2,28E-07	1,75E-09	6,96E-09	0	0	0	0	0	0	0	0	1,56E-09	0	2,40E-10	0
	Resource use, energy carriers [MJ] ¹	8,40E+00	2,79E-01	2,70E-01	0	0	0	0	0	0	0	0	2,50E-01	0	3,10E-02	0
	Water deprivation potential [m ³ world equiv.] ¹	7,40E-02	1,87E-04	2,00E-03	0	0	0	0	0	0	0	0	1,68E-04	0	2,57E-04	0

¹ The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator
SAINT-GOBAIN ADFORS CZ, s.r.o.


Resources Use

Resources Use indicators		Product stage	Construction stage		Use stage							End of life stage			D Reuse, recovery, recycling	
		A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Use of renewable primary energy (PERE) [MJ]	6,22E-01	1,60E-02	2,00E-02	0	0	0	0	0	0	0	0	1,40E-02	0	5,00E-03	0
	Primary energy resources used as raw materials (PERM) [MJ]	7,00E-02	0	2,00E-03	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of renewable primary energy resources (PERT) [MJ]	6,92E-01	1,60E-02	2,20E-02	0	0	0	0	0	0	0	0	1,40E-02	0	5,00E-03	0
	Use of non-renewable primary energy (PENRE) [MJ]	8,40E+00	2,80E-01	2,70E-01	0	0	0	0	0	0	0	0	2,50E-01	0	3,10E-02	0
	Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	1,00E-03	0	3,22E-05	0	0	0	0	0	0	0	0	0	0	0	0
	Total use of non-renewable primary energy resources (PENRT) [MJ]	8,40E+00	2,80E-01	2,70E-01	0	0	0	0	0	0	0	0	2,50E-01	0	3,10E-02	0
	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]	1,39E-13	0	4,176E-15	0	0	0	0	0	0	0	0	0	0	0	0
	Use of non-renewable secondary fuels (NRSF) [MJ]	1,64E-12	0	4,905E-14	0	0	0	0	0	0	0	0	0	0	0	0
	Use of net fresh water (FW) [m3]	2,20E-03	1,79E-05	7,88E-05	0	0	0	0	0	0	0	0	1,61E-05	0	7,80E-06	0

Waste Category & Output flows



Waste Category & Output Flows		Product stage	Construction stage		Use stage							End of life stage				D Reuse, recovery, recycling
		A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational 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]	5,18E-07	1,34E-12	1,55E-08	0	0	0	0	0	0	0	0	1,20E-12	0	1,59E-12	0
	Non-hazardous waste disposed (NHWD) [kg]	2,40E-02	4,01E-05	6,00E-03	0	0	0	0	0	0	0	0	3,59E-05	0	0,157	0
	Radioactive waste disposed (RWD) [kg]	3,61E-04	3,44E-07	1,09E-05	0	0	0	0	0	0	0	0	3,13E-07	0	3,413E-07	0
	Components for re-use (CRU) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Materials for Recycling (MFR) [kg]	7,24E-03	0	2,17E-04	0	0	0	0	0	0	0	0	0	0	0	0
	Material for Energy Recovery (MER) [kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exported electrical energy (EEE) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Exported thermal energy (EET) [MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Additional voluntary indicators from EN 15804 (according to ISO 21930:2017)

		Product stage	Construction stage	Use stage							End of life stage				Reuse, Recovery Recycling	
	Environmental indicators	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
	Climate Change [kg CO ₂ eq.] ²	4,45E-01	2,00E-02	1,50E-02	0	0	0	0	0	0	0	0	1,80E-02	0	0	0

² The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Information on biogenic carbon content

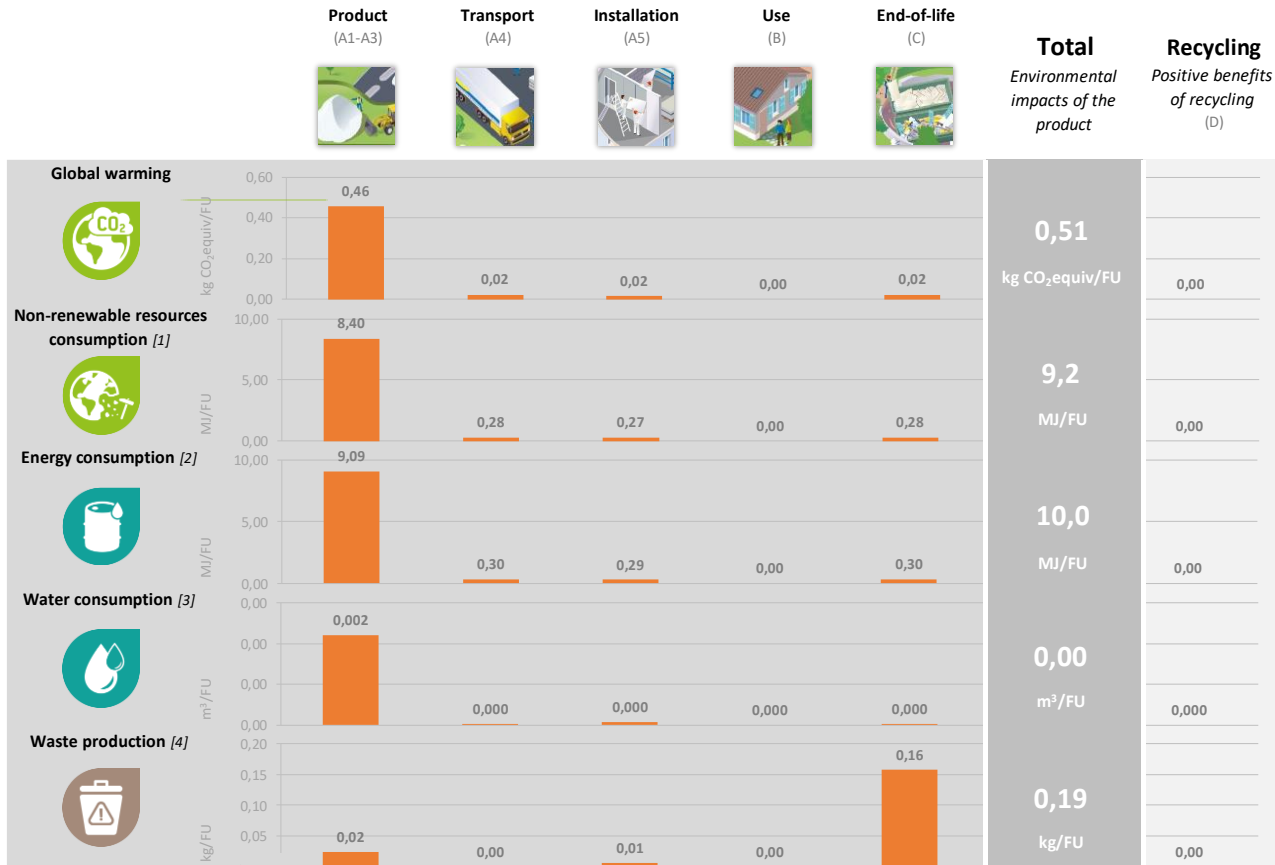
		Product stage
	Biogenic Carbon Content	A1 / A2 / A3
	Biogenic carbon content in product [kg]	2,00E-03
	Biogenic carbon content in packaging [kg]	1,93E-06

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

The biogenic carbon content in the product, is due to the production of starch, used as additive. On the other hand, the biogenic carbon content for packaging is quantified for the cardboard, the paper (label) and the wooden pallet.

LCA interpretation

The following figure refers to a declared unit of providing a reinforcement of the cement base layer on 1 m² of wall. The product analyzed is Vertex mesh (R131 A101).



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

[2] This indicator corresponds to the total use of primary energy.

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

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

For the Vertex mesh (R131 A101) product, the production stages (A1-A3) have significant contributions in the categories of global warming, consumption of non-renewable resources and energy consumption. These impacts are due to 1) In-plant production: the energy sources consumed (electricity and natural gas) for the manufacture of the glass fiber yarn and the production of the coating; the water consumed in the process, as well as the waste management; 2) coating production: due to the production of styrene-butadiene (SBR) used as coating in the mesh production.

In contrast to the other indicators, the waste production has the biggest contribution at the end-of-life stage (C). This is because 100% of the waste is sent to landfill. There is also an impact related to the production module as we generate waste on the manufacturing site. In installation stage (A5), the quantified quantity is due to packaging and the scrap generated during mesh installation.

Impact variation

An assessment of the influence of the variations on the whole life cycle results of the Vertex mesh (R131 A101) product range was carried out for the GWP-GHG indicator (kg CO₂ eq.). The impacts presented were calculated for Vertex mesh (R131 A101), with a mass per unit area of 0.160 kg/m² which was used as reference in this study. To ensure that all the products declared in the EPD do not exceed the +/- 10% variance between them and the reference product (Vertex mesh (R131 A101) 0.160 kg/m²), the results per product were calculated and their respective variance.

Environmental indicator calculated for 1 m ²	Product range: Vertex mesh (kg/m ²)											
	R131 A101	Var.*	R 117 A101	Var.*	R 123 A101	Val.	R 128 A101	Var.*	R 122 A101	Var.*	R 120 A101	Var.*
	0,160 (reference)		0,145		0,150		0,150		0,155		0,159	
GWP-GHG [kg CO ₂ eq.]	0,50	0%	0,47	6,0%	0,47	6,0%	0,47	6,0%	0,49	2,0%	0,52	4,0%
Environmental indicator calculated for 1 m ²	Product range: Vertex mesh (kg/m ²)											
	R131 A101	Var.*	R 129 A101	Var.*	R 134 A101	Var.*	R 137 A101	Var.*	R 148 A101	Var.*		
	0,160 (reference)		0,160		0,165		0,165		0,167			
GWP-GHG [kg CO ₂ eq.]	0,50	0%	0,51	2,0%	0,52	4,0%	0,52	4,0%	0,51	2,2%		

* The absolute variance is calculated by subtracting the impact of the selected product from the value of the reference product (Vertex mesh (R131 A101) 0.160 kg/m²), then dividing the result by the latter and multiplying it by 100.

Appendix:

Electricity information

The electricity used in the model is residual mixes from:

TYPE OF INFORMATION	DESCRIPTION
Location	Representative of average production in Czech Republic
Geographical representativeness description	Biogas 3 % Biomass solid 2,32 % Coal gases 0,93 % Hard coal 6,03 % Heavy fuel oil 0,04 % Hydro 3,44 % Lignite 41,55 % Natural gas 4,24 % Nuclear 35,25 % Photovoltaics 2,47 % Wind 0,55 %
Reference year	2018
Type of data set	Cradle to gate from Thinkstep database Dataset: CZ Electricity grid mix ts
Source	Gabi database 2022: dataset valid until 2024
CO ₂ emission kg CO ₂ eq. / kWh	0,59 kg CO ₂ eq. / kWh

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 from SAINT-GOBAIN ADFORS CZ, s.r.o. After evaluating the inventory, according to the defined ranking in the LCA report, the assessment reflects poor inventory data quality for the geographical representation, fair for technological and good for temporal representation.

Environmental impacts according to EN 15804:2012 + A1

The following tables presents results of Vertex mesh (R131 A101) 0,160 kg/m² according to EN 15804 +A1.

	Product stage	Construction stage		Use stage							End of life stage				Reuse, recovery, recycling
	A1 / A2 / A3	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling
Environmental impacts	Global Warming Potential (GWP) [kg CO ₂ eq.]	4,45E-01	2,00E-02	1,50E-02	0	0	0	0	0	0	0	1,80E-02	0	0	0
	Ozone depletion (ODP) [kg CFC 11eq.]	2,97E-08	1,32E-18	8,92E-10	0	0	0	0	0	0	0	1,19E-18	0	1,68E-18	0
	Acidification potential (AP) [kg SO ₂ eq.]	6,49E-04	1,68E-05	2,09E-05	0	0	0	0	0	0	0	1,51E-05	0	1,34E-05	0
	Eutrophication potential (EP) [kg (PO ₄) ₃ -eq.]	1,07E-04	3,86E-06	3,50E-06	0	0	0	0	0	0	0	3,46E-06	0	1,49E-06	0
	Photochemical ozone creation (POCP) - [kg Ethylene eq.]	6,68E-05	1,96E-06	2,16E-06	0	0	0	0	0	0	0	1,76E-06	0	1,09E-06	0
	Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.]	2,07E-05	1,93E-09	6,21E-07	0	0	0	0	0	0	0	1,73E-09	0	8,44E-10	0
	Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ]	7,40E+00	2,79E-01	2,40E-01	0	0	0	0	0	0	0	2,49E-01	0	3,00E-02	0

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