Environmental Product Declaration

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

GRP Fiberglass rebar

from

Allform Sweden AB

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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EPD of multiple products based on average products and the material composition per kg does not change within the range.
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

General information

Programme information

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

Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): *Construction Products PCR 2019:14 version 1.3.4*
PCR review was conducted by: *The Technical Committee of the International EPD System. See www.environdec.com for a list of members. 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: *Anna Liljenroth, CarbonZero AB*
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: *Sigita Židonienė, Vesta Consulting* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:
Allform Sweden AB
Österskog 30 335 73 Hillerstorp

E-mail: info@allform.se
Tel: 0370-61 56 60
Website: www.allform.se

Responsible person: Sebastian Fornas, sebastian@allform.se

Description of the organisation: Allform Sweden AB is a company that offers complete solutions for castings of floors and valves as well as delivering products within the segment of concrete complements to the construction sector.

Name and location of production site: China

Product information

Product name: GRP (Glass Fibre Reinforced Plastic) Fiberglass rebar

Product description: The fiberglass rebars can be cast in without spacer tubes and post-laying. The rebards have a dywidag thread and are approved by Vattenfall's accredited testing laboratory for alkali resistance. The weight change after use is according to AMA's reference frames and the struts are ocularly unaffected. The fiberglass rebars are 5.8 m long and are shipped in bundles. If you are interested in fixed lengths, please contact us.

The fiberglass rebars are available in ø15 mm, where the yield strength is 40 kN per rebar or ø20 mm, with a yield strength of 90 kN per rebar.

Description of production process: The entire production of the stainless-steel form work ties takes place in China. The production steps are the following: Wire drawing – Cutting – Threading rolling – Cleaning – Packing.

UN CPC code: 3712 – Glass fibres and articles thereof, except woven fabrics

Geographical scope: China for suppliers and production, Sweden for distribution and end of life treatment of final product.

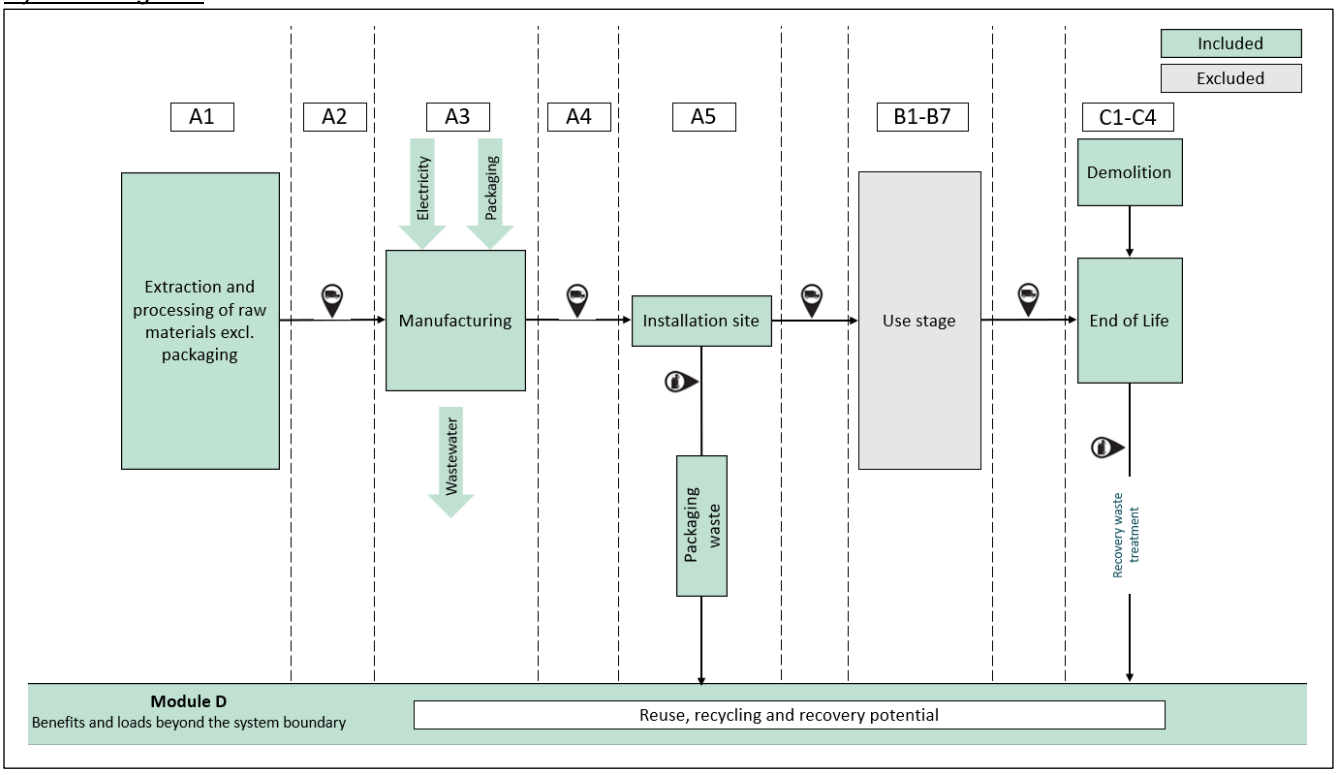
Products included: All the products have the same material composition per kg, hence no variation between products.

LCA information

Declared unit: 1 kg of rebar made in glass fibre reinforced plastic
Reference service life: Not applicable
Time representativeness: 2023
Database(s) and LCA software used: Calculation completed in LCA for Experts v. 10.9.0.31 with the database version 2024.1 and with some ecoinvent datasets (version 3.9.1). The characterization factors used in this study refer to PCR 2019:14 and EN 15804+A2 (based on EF 3.1).

Description of system boundaries:
Cradle to gate with options, modules C1–C4, module D, and optional modules (A1–A3 + C + D and additional modules A4+A5).

System diagram:



More information – methodology and assumptions:

A1 – Raw material supply
This module considers the extraction and processing of all raw materials, energy, and transportation that occurs upstream of the studied manufacturing process. The products are mainly made from glass fibre and resin.

A2 – Transport to the manufacturer
This module includes the transportation of raw materials to the manufacturing site. Specific information from the manufacturer was obtained regarding the transportation distance between the suppliers to the manufacturing factory

A3 - Manufacturing
This module includes all resources used during the production of the formwork ties mainly electricity and it also includes the production of packaging material in which the products are transported to costumers. The manufacturer has collected data from the production year of 2023. As there's only one manufacturing site, no variation in production sites occurs. The manufacturing energy is described in "Additional requirements section".

A4 – Transport
Since Allform Sweden are selling to wholesalers, the average distance to the most used wholesalers are used.

Transport to the building site

Scenario information	Unit per declared unit
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long-distance truck, boat, etc.	Truck-trailer, Euro 0 - 6 mix, < 40t gross weight
Distance	285 km
Capacity utilisation (including empty returns)	61%
Volume capacity utilisation factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaged products)	Not applicable

A5 – Construction installation
During the installation, most of the product (85%) is casted into the product. There is however most often a share that will remain outside of the wall and thereby needs to be cut off, this amount is approximated to 15%, but the exact amount will vary depending on the exact production conditions. Thereby 15% of the product is wasted during installation. There is however no extra energy consumed during this stage. The packaging of the product is also waste treated at this stage.

The following disposal routes were used for packaging (steel and cardboard), and the product waste (glass fibre product) based on Swedish statistics (2020).

Material	Recycling rate	Incineration rate	Landfill rate
Steel	100%	0%	0%
Cardboard	0%	100%	0%
Glass fibre product	0%	100%	0%

Scenario information	Unit per declared unit
Ancillary materials for installation	None
Water use	None
Other resource use	None
Quantitative description of energy type (regional mix) and consumption during the installation process	Not applicable
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	0.15 kg glass fibre (product) 0.0008 kg steel (packaging) 0.0004 kg corrugated board (packaging)
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery (specified by route)	0.15 kg glass fibre (product) for energy recovery 0.0008 kg steel (packaging) for recycling 0.0004 kg corrugated board (packaging) for energy recovery
Direct emissions to ambient air, soil and water	None

A transportation of 100 km has been considered for the waste occurring in A5.

B1-B7 – Use stage

This stage is not declared.

C1 Deconstruction/Demolition

This stage includes deconstructing the product when it is no longer in use. This means demolishing the concrete wall/concrete application when it is no longer needed. This work is estimated with an excavator.

C2 Transport

This module represents the transport distance to the waste processing facility. It is assumed that the transportation distance to the waste processing facility is 50 km.

C3 Waste processing

This module is not associated with any impact for this product. The product is considered to be incinerated and since the efficiency of the process is lower than 60%, this is accounted for in module C4.

C4 Disposal
This module includes any material that is landfilled or incineration with an efficiency lower than 60%. For this product, it is the incineration of the product. Only 0.85 kg of product is wasted in C4, since 0.15 kg is wasted in A5.

Process	Unit (expressed per declared unit)
Collection process specified by type	0.85 kg collected separately
	0 kg collected with mixed construction waste
Recovery system specified by type	0 kg for re-use
	0.85 kg glass fibre for incineration with energy recovery
Disposal specified by type	0 kg material for final deposition
Assumptions for scenario development, e.g. transportation	The transportation is modelled with the same specification as the truck transportation in module A2, except for the transportation distance that is set to 50 km.

D Benefits and loads beyond the system boundary
This module includes loads and benefits obtained from energy recovery and or recycling materials. For this product, it is the incineration of the product and the packaging (corrugated board) which leads to heat and electricity that is being recovered at that is assumed to substitute thermal energy from natural gas and average Swedish electricity mix.

Infrastructure
Plants, machine production and transportation systems are excluded from the calculations. However, electricity is one such input for which it is not possible to exclude the impact from infrastructure already included in the dataset, but no data on infrastructure has been manually added to the product system.

Cut-off criteria
The following procedures were followed for the exclusion of inputs and outputs

- All input and output flows in a unit process were considered i.e., taking into account the value of all flows in the unit process and the corresponding LCI where data was available
- Processes of infrastructure or capital goods are excluded from this study (except when it is already included in a dataset used)
- Generic national data was used for modules C1-C4 and D as no specific data was able to be collected
- The use of cut-off criterion on mass inputs and primary energy at the unit process level (1%) and at the information module level (5%) was applied

No hazardous and toxic materials or Substances of Very High Concern (SVHC) according to REACH is included in the inventory and the cut-off rules do not apply.

Allocation
Allocation criteria are based on mass. It was assumed that the manufacturing data is evenly distributed throughout the products, therefore all the inputs and outputs in module A3 are divided by the total weight of the products produced during the reference year.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	CN	CN	CN	SE	SE	-	-	-	-	-	-	-	SE	SE	SE	SE	SE
Specific data used	12%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/ declared unit
Glass fibre	0,70	5	0 and 0
Resin	0,28	5	0 and 0
Kaolin	0,02	0	0 and 0
TOTAL	1,00	2	0 and 0
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/ declared unit**
Iron wire	0,0008	0,08	0
Corrugated board	0,0004	0,04	0,00018
TOTAL	0,0012	0,12	0,00018

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Mass-% per functional or declared unit
Not relevant.			

Results of the environmental performance indicators

The estimated impact results in this section are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. Furthermore, the results of the end-of-life stage (module C) should be considered when using the results of the production stage (modules A1-A3).

Mandatory impact category indicators according to EN 15804

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	2,58E+00	2,24E-02	1,91E-01	5,52E-04	3,34E-03	*0,00E+00*	1,07E+00	-1,82E-01
GWP-biogenic	kg CO_2 eq.	8,96E-03	6,93E-05	6,60E-04	1,68E-06	1,03E-05	*0,00E+00*	1,71E-04	-1,44E-04
GWP-luluc	kg CO_2 eq.	2,26E-03	3,67E-04	3,20E-05	8,91E-06	5,46E-05	*0,00E+00*	7,10E-05	-1,36E-05
GWP-total	kg CO_2 eq.	2,59E+00	2,29E-02	1,92E-01	5,63E-04	3,40E-03	*0,00E+00*	1,07E+00	-1,82E-01
ODP	kg CFC 11 eq.	7,55E-08	3,22E-15	4,34E-14	7,81E-17	4,79E-16	*0,00E+00*	2,16E-13	-3,96E-13
AP	mol H^+ eq.	1,89E-02	2,86E-05	1,03E-04	2,74E-06	4,26E-06	*0,00E+00*	5,68E-04	-1,18E-04
EP-freshwater	kg P eq.	3,18E-04	9,32E-08	2,55E-08	2,27E-09	1,39E-08	*0,00E+00*	1,10E-07	-2,92E-07
EP-marine	kg N eq.	3,88E-03	1,05E-05	3,99E-05	1,29E-06	1,57E-06	*0,00E+00*	2,22E-04	-4,84E-05
EP-terrestrial	mol N eq.	4,13E-02	1,23E-04	4,56E-04	1,43E-05	1,83E-05	*0,00E+00*	2,53E-03	-5,02E-04

POCP	kg NMVOC eq.	1,27E-02	2,91E-05	1,05E-04	3,65E-06	4,33E-06	*0,00E+00*	5,81E-04	-1,33E-04
ADP-minerals&metals*	kg Sb eq.	1,15E-05	1,90E-09	5,74E-10	4,62E-11	2,83E-10	*0,00E+00*	2,40E-09	-1,16E-08
ADP-fossil*	MJ	4,69E+01	2,88E-01	1,09E-01	6,99E-03	4,28E-02	*0,00E+00*	5,11E-01	-4,13E+00
WDP*	m^3	8,01E-01	3,38E-04	2,38E-02	8,22E-06	5,03E-05	*0,00E+00*	1,34E-01	-1,34E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption								

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	2,59E+00	2,29E-02	1,91E-01	5,63E-04	3,40E-03	*0,00E+00*	1,07E+00	-1,82E-01
PM	Disease incidence	2,17E-07	2,84E-10	7,23E-10	3,27E-11	4,23E-11	*0,00E+00*	3,95E-09	-1,59E-09
IRP**	kBq U235 eq.	1,07E-01	7,60E-05	5,91E-04	1,85E-06	1,13E-05	*0,00E+00*	3,19E-03	-5,13E-02
ETP-fw*	CTUe	3,07E+01	2,14E-01	5,99E-02	5,19E-03	3,18E-02	*0,00E+00*	2,70E-01	-7,82E-02
HTTP-c*	CTUh	2,06E-09	4,31E-12	3,64E-12	1,05E-13	6,42E-13	*0,00E+00*	1,87E-11	-5,78E-11
HTTP-nc*	CTUh	2,35E-08	1,94E-10	2,73E-10	4,71E-12	2,88E-11	*0,00E+00*	1,45E-09	-5,81E-10
SQP*	Dimensionless	7,21E+00	1,41E-01	3,61E-02	3,44E-03	2,11E-02	*0,00E+00*	1,52E-01	-8,80E-01

** 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.*

*** This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Resource use indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1,56E+01	2,48E-02	2,67E-02	6,02E-04	3,69E-03	*0,00E+00*	1,30E-01	-1,79E+00
PERM	MJ	6,00E-03	*0,00E+00*	-6,00E-03	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*
PERT	MJ	1,56E+01	2,48E-02	2,07E-02	6,02E-04	3,69E-03	*0,00E+00*	1,30E-01	-1,79E+00
PENRE	MJ	3,87E+01	2,88E-01	1,09E-01	6,99E-03	4,28E-02	*0,00E+00*	5,11E-01	-4,13E+00
PENRM	MJ	8,21E+00	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	-8,21E+00	*0,00E+00*
PENRT	MJ	4,69E+01	2,88E-01	1,09E-01	6,99E-03	4,28E-02	*0,00E+00*	-7,70E+00	-4,13E+00
SM	kg	4,92E-02	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*
RSF	MJ	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*
NRSF	MJ	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*
FW	m^3	1,93E-02	2,76E-05	5,64E-04	6,71E-07	4,11E-06	*0,00E+00*	3,17E-03	-2,38E-03
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

Waste indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed	kg	2,00E-03	1,10E-11	5,39E-11	2,68E-13	1,64E-12	*0,00E+00*	2,70E-10	-2,84E-09
Non-hazardous waste disposed	kg	1,53E-01	4,70E-05	2,59E-02	1,14E-06	6,99E-06	*0,00E+00*	1,47E-01	-2,52E-03
Radioactive waste disposed	kg	4,88E-04	5,24E-07	3,95E-06	1,27E-08	7,80E-08	*0,00E+00*	2,09E-05	-4,43E-04

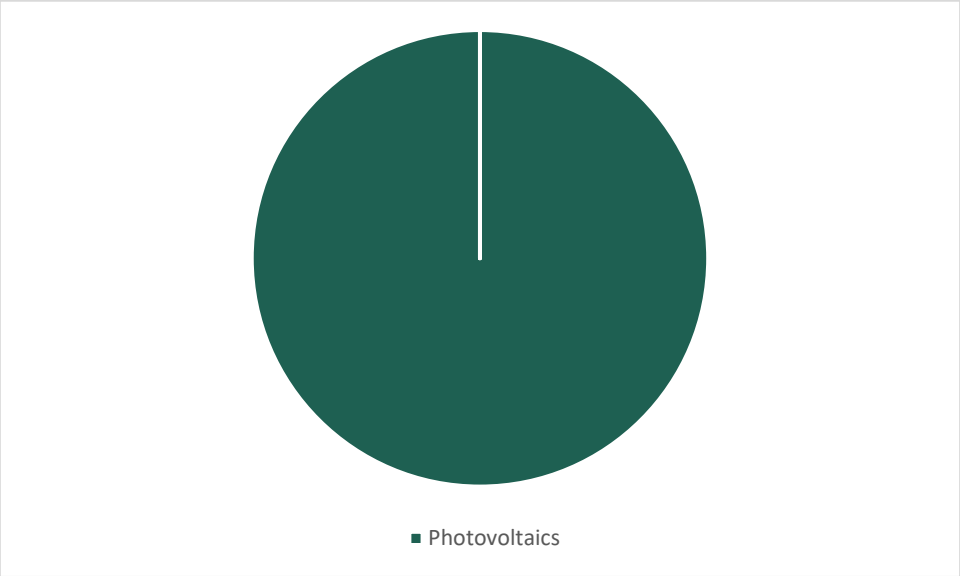
Output flow indicators

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*
Material for recycling	kg	*0,00E+00*	*0,00E+00*	8,00E-04	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*
Materials for energy recovery	kg	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*	*0,00E+00*
Exported energy, electricity	MJ	*0,00E+00*	*0,00E+00*	2,11E-01	*0,00E+00*	*0,00E+00*	*0,00E+00*	1,19E+00	*0,00E+00*
Exported energy, thermal	MJ	*0,00E+00*	*0,00E+00*	3,97E-01	*0,00E+00*	*0,00E+00*	*0,00E+00*	2,24E+00	*0,00E+00*

Additional requirements

Electricity mix from the use of electricity in manufacturing.

In the manufacturing step, the supplier uses a specific electricity mix, comprising of only of photovoltaics. The climate impact (GWP-GHG) of the used electricity mix is 0.028 kg CO_2-eq per kWh, the reference year of the datasets are 2020 and the mix is valid for 2023.



Supplier's electricity mix

References

Construction Products PCR 2019:14 version 1.3.4	EPD International (2024) PCR 2019:14 Construction products and construction services, version 1.3.4
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
GPI 4.0	General Programme Instructions of the International EPD® System. Version 4.0.
ISO 14020:2000	Environmental labels and declarations — General principles
ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
LCA report	LCA report for Snap ties/rebars/threaded rods (Liljenroth, Stockwell), March 2025.
SCB – Swedish Statistics	(2020) Treated waste by treatment category and waste category. Every second year 2010 - 2020 https://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__MI__MI0305/MI0305T003/ Assessed 2025-02-11.

Contact Information

EPD owner:	Email: info@allform.se Address: Österskog 30 335 73 Hillerstorp
LCA author:	Anna Liljenroth Email: anna.liljenroth@carbonzero.se Address: Tåstrupsgatan 2, SE-262 63 Ängelholm, Sweden
Third-party verifier:	Sigita Židonienė Email: sigita@vestaconsulting.lt Address: Bebrų str. 1, LT-08124 Vilnius, Lithuania
Program operator:	EPD International AB Email: info@environdec.com Telephone: +46 (0)73 311 30 20 Address: SE-11427 Stockholm, Sweden

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