

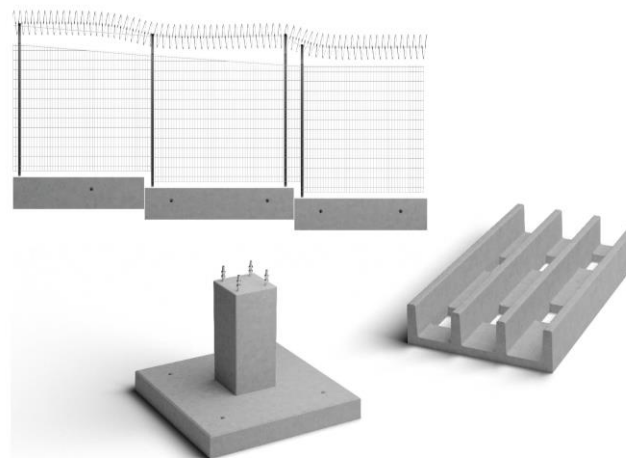


ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Concrete anti-undermining barriers, switchyard foundations and cable troughs
(Undergrävningsskydd, ställverksfundament och kabelrännor i betong)

Gunnar Prefab AB



EPD HUB, HUB-7584

Published on 25.09.2026, last updated on 25.09.2026, valid until 24.09.2031

Life Cycle Assessment study has been performed in accordance with the requirements of EN 15804, EPD Hub PCR version 1.2.1 (14 Apr 2026) and JRC characterization factors EF 3.1.



Created with One Click LCA



GENERAL INFORMATION

MANUFACTURER

Manufacturer	Gunnar Prefab AB
Address	Berg Olles väg 26, 795 32, Rättvik
Contact details	gp@gunnarprefab.se
Website	https://gunnarprefab.se

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804:2012+A2:2019/AC:2021 and ISO 14025
PCR	EPD Hub Core PCR Version 1.2.1, 14 Apr 2026 EN 16757 Product Category Rules for concrete and concrete elements
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-B1, and modules C1-C4, D
EPD author	Daniel Kivistö, Gunnar Prefab AB
EPD verification	Independent verification of this EPD and data, according to ISO 14025: o Internal verification p External verification
EPD verifier	Haiha Nguyen as an authorized verifier for EPD Hub

This EPD is intended for business-to-business and/or business-to-consumer communication. The manufacturer 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 and if they are not compared in a building context.

PRODUCT

Product name	Concrete anti-undermining barriers, switchyard foundations and cable troughs (Undergrävningsskydd, ställverksfundament och kabelrännor i betong)
Place(s) of raw material origin	Europe
Place of production	Rättvik, Sweden
Place(s) of installation and use	Sweden
Period for data	01/01/2025 - 31/12/2025
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	+7%
A1-A3 Specific data	94,1%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 tonne of product
Declared unit mass	1000 kg
Mass of packaging	2,43 kg
GWP-fossil, A1-A3 (kgCO₂e)	143
GWP-total, A1-A3 (kgCO₂e)	143
Secondary material, inputs (%)	2,6
Total energy use, A1-A3 (kWh)	453
Net freshwater use, A1-A3 (m³)	1,44

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Gunnar Prefab AB is a leading Swedish manufacturer and supplier of prefabricated concrete products for infrastructure, construction, and civil engineering projects. The company started in 1995 and develops, manufactures, and delivers a wide range of concrete solutions to customers throughout Sweden, with production facilities located in Rättvik. Continuous product development and a strong focus on customer-specific solutions are central parts of the business.

Since becoming part of the S:t Eriks Group, Gunnar Prefab has strengthened its position as a reliable supplier of high-quality concrete products within one of Sweden's leading groups in concrete and natural stone solutions.



Troughs and foundations at the warehouse in Rättvik.

PRODUCT DESCRIPTION

This EPD refers to Gunnar Prefab's precast concrete products for electrical infrastructure, including Protektor anti-undermining barriers, switchyard foundations and cable troughs with wooden and concrete covers. The products are manufactured from reinforced concrete and are intended for use in electrical switchyards and other infrastructure applications. The products are manufactured for a minimum of 100 years (L100) and exposure class XC4/XF3, strength C35/45, vct 0,50.

The anti-undermining barrier Protektor is installed underground and functions both as protection against undermining and as a foundation beam for perimeter fencing systems. The product can be manufactured in various lengths and is ideal for providing stable and durable protection in areas where the ground slopes or has varying elevations. This EPD does not include the metal fence.

The switchyard foundations are buried and used to support electrical apparatus and other equipment through cast-in anchor bolt groups. The foundations are manufactured in a variety of designs and sizes to suit different projects; they all meet the highest standards of strength and precision.

The cable troughs are installed within the switchyard area to facilitate the routing, protection, and organization of electrical cables and conduits. The troughs are manufactured in various sizes, and the modular cable trough system allows the cable routing to be easily crossed and routed around obstacles in accordance with project-specific requirements, enabling adaptation to complex infrastructures. There are both traffic-resistant cable troughs for areas subject to heavy traffic and non-traffic-resistant variants.

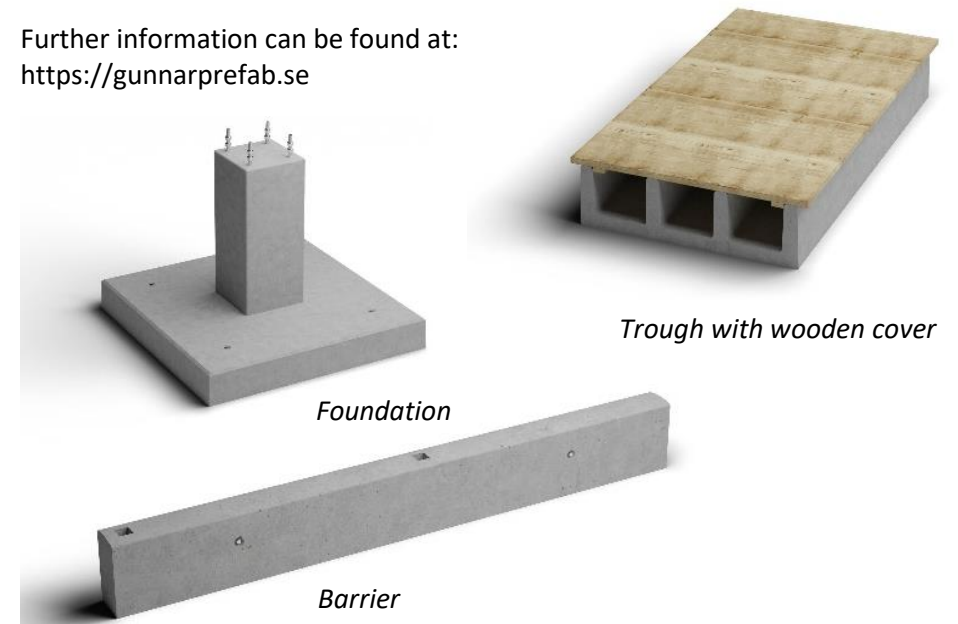
Covers to the troughs are also included in this EPD. They are either made of concrete or pressure-impregnated timber with a hot-dip galvanised metal sheet underside.

This EPD refers to products with the same or similar recipes produced on the same site in Rättvik, Sweden. The reinforcement in the products varies between 2-3%. The recipe for the anti-undermining barrier Protektor has been used as a reference product, as this item has sold the most in terms of weight. It has a GWP fossil A1-A3 value of 143 kgCO₂e. The switchyard foundation has a slightly higher climate footprint; 1% higher than the reference product (145 kg CO₂e). The troughs have the highest climate footprint. Troughs with wooden covers are 5% higher (150 kgCO₂e), and those with concrete covers are 7% higher (153 kgCO₂e) than the reference product.

These GWP values are net-values. The GWP indicators including the emissions from waste fuels (GWP, gross) are reported separately in this EPD in "Appendix I" on the final page.

The concrete can be recycled and used as aggregate for new concrete or as filler material for example roads.

Further information can be found at:
<https://gunnarprefab.se>



PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass %	Material origin
Metals	1,86	Scandinavia
Minerals	97,9	SE
Fossil materials	0,24	EU

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0,34

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 tonne of product
Mass per declared unit	1000 kg
Functional unit	1 tonne of barrier, strength class C35/45, exposure class XC4/ XF3, fulfilling structural load-bearing performance with a RSL of 100 years.
Reference service life	100 years

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1% (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
x	x	x	x	x	x	ND	ND	ND	ND	ND	ND	x	x	x	x	x	
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recycling

Not declared = ND.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission. A market-based approach is used in modelling the electricity mix utilized in the factory.

The concrete mixture consists of cement, aggregates, water and concrete admixtures. The products also include steel reinforcement and embedded hot-dip galvanized steel components, such as threaded rods, as well as lifting devices/anchors for handling the products both during production and at the customer's site. (A1)

Raw materials are transported by lorry and, in some cases, by sea. Most suppliers are located in Sweden, a few in Europe, and a negligible number in Asia. The shortest transport distance applies to the aggregate, which is sourced from a nearby quarry. The longest transport distance applies to some cast-in steel components only used in foundations. (A2)

The production begins with assembling the mould using timber and formwork plywood. Alternatively, the fixed steel moulds used for cable troughs and the Protektor excavation protection system are inspected and cleaned before production.



Troughs with wooden covers in the factory.

A thin layer of form oil is sprayed onto the mould to achieve a smoother surface and to ensure that the elements can be released more easily from the casting bed. Reinforcement mesh and reinforcing bars are tied together into cages according to the reinforcement drawings, while spacers are installed to ensure the correct concrete cover thickness. Other cast-in components are also installed at this stage.

The materials for the concrete are weighed according to the specified mix design into their respective containers or onto conveyor belts. The aggregates are then transported by conveyor belts to the concrete mixer, where they are mixed before cement is added. After a short mixing period, water is added, followed shortly thereafter by admixtures. The concrete mix is then transported by a mixer truck from the concrete plant to the production hall where the product is to be cast. The concrete is discharged into buckets, which are subsequently used to fill the moulds. Finally, the surface is screeded level with the edge of the mould.

Once the product has cured, it is removed from the mould, inspected for quality, and then taken to storage. The production facilities are temperature-controlled to ensure that the concrete achieves the required strength.

Demolding and handling inside the factory are performed using an overhead crane, while handling and loading outside in the yard are performed using forklifts. The troughs and foundations are stored on pallets and the barriers in wooden cradles. The pallets and the cradles are 100% recycled.

During production, material losses are estimated to 0,5%. The discarded concrete and steel are sent to a recycling plant located 3,5 km from the factory. Electricity and district heating are used in the factory. Fuel used for on-site transportation is included. (A3)



Switchyard foundations at the warehouse.

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

Average distance of transportation from production plant to building site is based on a scenario of 200 km. The transportation method is lorry and the fuel is diesel. Vehicle capacity utilization is assumed to be 100% which means full load. In reality, it may vary but it is assumed to be negligible. Empty returns are not taken into account as the return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as products are fastened properly. (A4)

Installation (A5) includes the energy use. In order to describe and analyse the climate impact of installing the products, a scenario has been developed with the help of in-house expertise. Energy consumption for installation is calculated on an average 2060 kg (1 piece of Protektor barrier) and 3,5 liter diesel per hour for an excavator using a lifting chain. Production loss at installation is assumed negligible as the precast products are delivered ready made from the factory.

During transportation wooden cradles are used for the barrier Protektor. They are re-used in-house, so there is no packaging waste generated from them. For the troughs and foundations, recycled wooden pallets are used during transport and they go to waste after installation. The wood is recycled (32%), incinerated (30%) and landfilled (38%) according to EUROSTAT. The average transport distance to the waste facility is estimated at 50 km, using a lorry as the most common mode of transport. (A5)

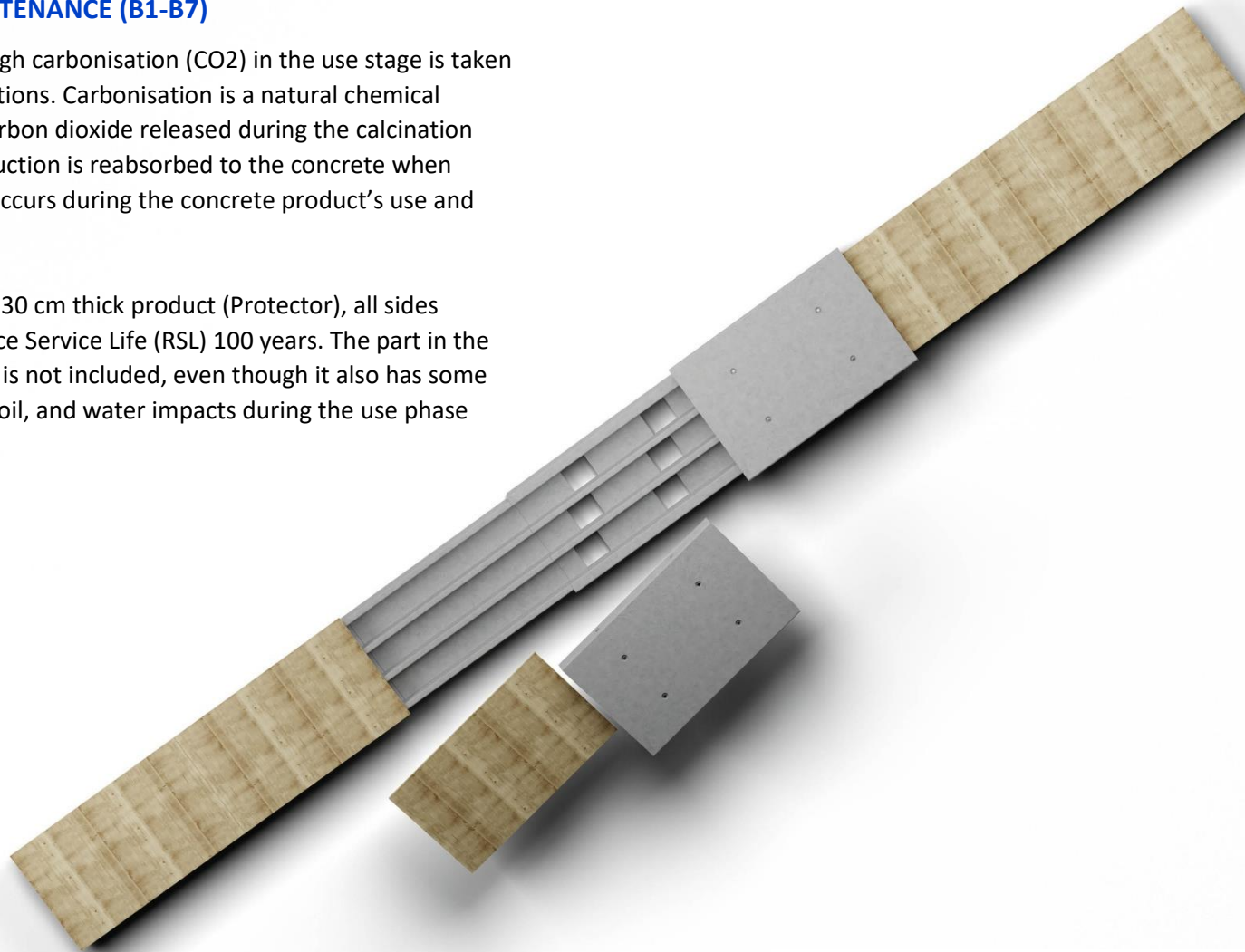


The anti-undermining barrier Protektor installed with a fence.

PRODUCT USE AND MAINTENANCE (B1-B7)

Carbon dioxide uptake through carbonisation (CO_2) in the use stage is taken into account in these calculations. Carbonisation is a natural chemical process where part of the carbon dioxide released during the calcination process during cement production is reabsorbed to the concrete when exposed to air. This usually occurs during the concrete product's use and final stage.

The calculation is made on a 30 cm thick product (Protector), all sides exposed to rain and Reference Service Life (RSL) 100 years. The part in the ground (80% of the product) is not included, even though it also has some carbon dioxide uptake. Air, soil, and water impacts during the use phase have not been studied.



Assembled troughs with wooden and concrete covers.

PRODUCT END OF LIFE (C1-C4, D)

End-of-life treatment takes place at regional construction and demolition waste facilities in Sweden. (C&D)

At the end-of-life, in the demolition phase, 100% of the waste is assumed to be collected as separate construction waste. The demolition process consumes energy in the form of diesel fuel used by building machines. Energy consumption is assumed to be the same as in the installation phase. (C1)

The dismantled concrete products are delivered to the nearest construction waste treatment plant. It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. Transportation distance to the closest disposal area is estimated as 50 km and the most common transportation method is lorry. (C2)

At the waste treatment plant, waste that can be reused or recycled is separated and diverted for further use. It can be assumed that 100% of the concrete elements are transported to a waste treatment plant, where the elements are crushed and separated. The process losses of the waste treatment plant are assumed to be negligible. (C3)

70% of the concrete is recycled and the remaining 30% is sent to landfill. Source: Gervasio, H. & Dimova, S., JRC Technical report: Model for Life Cycle Assessment (LCA) of buildings. Published March 2018.

85% of the steel is recycled and the remaining 15% is sent to landfill. Source: World Steel Association, report: Life cycle inventory (LCI) study, 2020 data release. Published May 2021.

Due to the recycling potential of concrete, it can be crushed and used as secondary raw material, which avoids the use of virgin raw materials. The 70% of concrete and 85% of the steel going to waste processing is converted

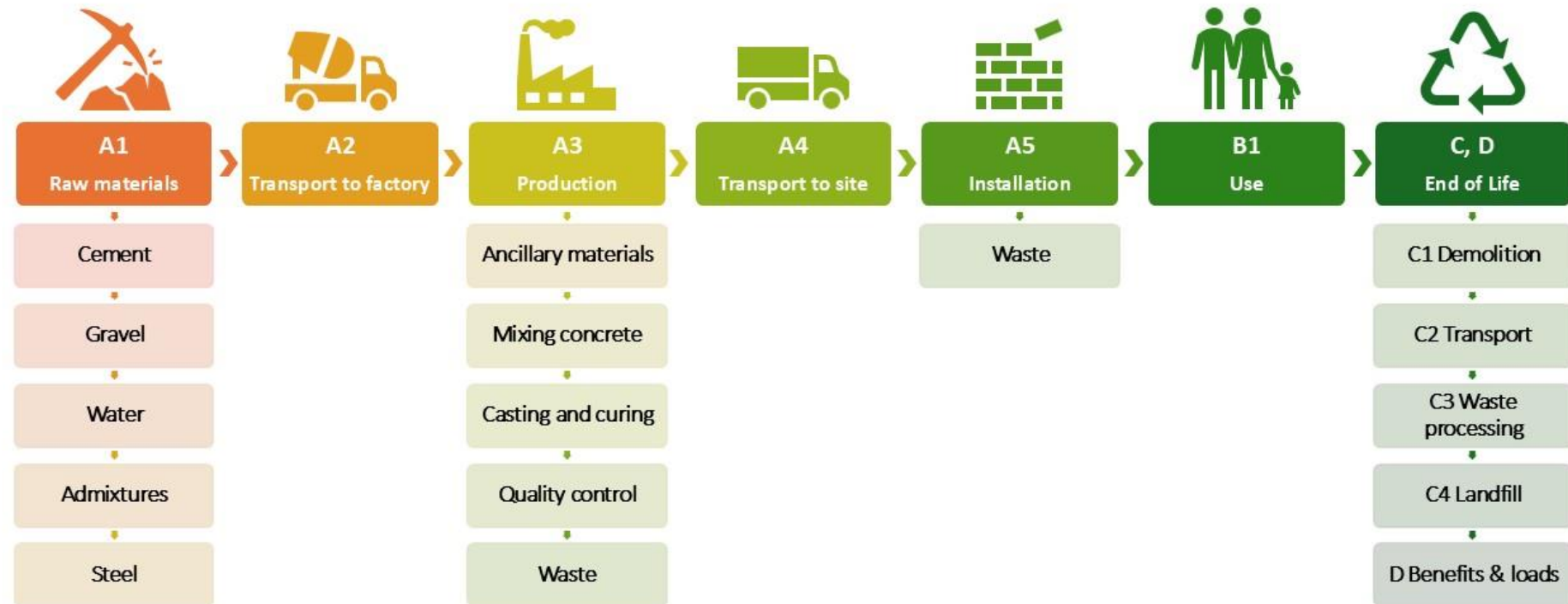
into secondary raw materials after recycling. 100% of the steel meshes and 22-63% of the steel castings are recycled material and not counted for in the end of life. The recycled material content in the concrete itself is assumed to be 1,3%. (D)

The end-of-life scenarios (C1-C4) and potential reuse, recovery, and recycling (D) described in this EPD are currently in use and reflect the most likely and representative practices for the product's lifecycle. These scenarios are based on industry standards and typical regional waste management procedures in Sweden, ensuring realistic and applicable modelling of environmental impacts.



A cross-section of the ground shows the installation of a foundation.

LIFE CYCLE FLOW DIAGRAM



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

The production of capital equipment, construction activities, and infrastructure, maintenance and operation of capital equipment, personnel-related activities, energy and water use related to company management and sales activities are excluded.

All industrial processes from raw material acquisition and pre-processing, production, product distribution and installation, and end-of-life management are included. For easier modelling and because of lack of accuracy in available modelling resources some constituents under 0,1% of product mass are excluded.

Transportation and waste streams of the packaging materials used for delivering the raw materials to the factory are omitted since the quantified mass contribution is less than 0,1%.

VALIDATION OF DATA

Data collection for production, transport, and packaging was conducted using time and site-specific information, as defined in the general information section. Upstream process calculations rely on generic data as defined in the Bibliography section. Manufacturer-provided specific and generic data were used for the product's manufacturing stage. The analysis was performed in One Click LCA EPD Generator, with the 'Cut-Off, EN 15804+A2' allocation method, and characterization factors according to EN 15804:2012+A2:2019/AC:2021 and JRC EF 3.1.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	No allocation
Packaging material	No allocation
Ancillary materials	Physical Properties
Manufacturing energy and waste	Physical Properties

All estimations and assumptions are given below.

Modules A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. It may vary but as the role of transportation emission in total results is small and so the variety in load assumed to be negligible.

Module A4: Transportation doesn't cause losses. Volume capacity utilisation factor is assumed to be 1 for the packaged products. Additionally, vehicle types are assumed according to the delivery in the last year and transportation distance 200 km is based on a scenario.

Module A5: Installation energy is included to account for product installation at site.

Module C1: Consumed energy for demolition process is assumed to be the same as in A5.

Module C2: Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is assumed as lorry which is the most common.

Modules C3, C4: 70% of the concrete is recycled and 30% is sent to landfill. 85% of the steel is recycled and 15% is sent to landfill.

PRODUCT & MANUFACTURING SITES GROUPING

Type of grouping	Multiple products
Grouping method	Based on a representative product
Variation in GWP-fossil for A1-A3	+7%

This EPD refers to products with the same or similar recipes produced on the same site in Rättvik, Sweden. The products are anti-undermining barriers, switchyards foundations and cable troughs with wooden and concrete covers. The metal fence that can be attached to the barrier is not included. The reinforcement in the products varies between 2-3%.

The recipe for the anti-undermining barrier Protektor has been used as a reference product, as this item has sold the most in terms of weight. It has a GWP fossil A1-A3 value of 143 kgCO₂e. The switchyard foundation has a slightly higher climate footprint; 1% higher than the reference product (145 kg CO₂e). The troughs have the highest climate footprint. Troughs with wooden covers are 5% higher (150 kgCO₂e), and those with concrete covers are 7% higher (153 kgCO₂e) than the reference product.

These GWP values are net-values. The GWP indicators including the emissions from waste fuels (GWP, gross) are reported separately in this EPD in "Appendix I" on the final page.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator for EPD Hub V3 and EPD Process Certification v3.2.5. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. The EPD Generator uses Ecoinvent v3.10.1/3.11/3.12 and One Click LCA databases as sources of environmental data. Allocation used in Ecoinvent 3.10.1/3.11/3.12 environmental data sources follow the methodology 'allocation, Cut-off, EN 15804+A2'.

A5:

EUROSTAT:

https://ec.europa.eu/eurostat/databrowser/view/env_waspac_custom_85_19174/default/table?lang=en

C3-C4:

Gervasio, H. & Dimova, S., JRC Technical report: Model for Life Cycle Assessment (LCA) of buildings. Published March 2018. Link:

<https://publications.jrc.ec.europa.eu/repository/handle/JRC110082>

World Steel Association, report: Life cycle inventory (LCI) study, 2020 data release. Published May 2021. Link: <https://worldsteel.org/wp-content/uploads/Life-cycle-inventory-LCI-study-2020-data-release.pdf>

<https://worldsteel.org/wp-content/uploads/Life-cycle-inventory-LCI-study-2020-data-release.pdf>

ENVIRONMENTAL IMPACT DATA

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

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	1,35E+02	1,21E+00	6,61E+00	1,43E+02	1,35E+01	6,24E+00	-2,83E+00	ND	ND	ND	ND	ND	ND	6,16E+00	5,37E+00	5,28E-01	1,87E+00	-9,81E+00
GWP – fossil	kg CO ₂ e	1,35E+02	1,21E+00	6,61E+00	1,43E+02	1,34E+01	6,24E+00	-2,83E+00	ND	ND	ND	ND	ND	ND	6,16E+00	5,37E+00	5,27E-01	1,86E+00	-8,50E+00
GWP – biogenic	kg CO ₂ e	1,49E-02	1,23E-04	-5,68E-03	9,35E-03	3,32E-03	6,25E-04	0,00E+00	ND	ND	ND	ND	ND	ND	1,17E-03	1,32E-03	3,61E-04	8,36E-04	-1,31E+00
GWP – LULUC	kg CO ₂ e	4,61E-02	6,18E-04	8,37E-03	5,50E-02	6,23E-03	7,97E-04	0,00E+00	ND	ND	ND	ND	ND	ND	6,31E-04	2,49E-03	9,28E-04	1,07E-03	-6,96E-03
Ozone depletion pot.	kg CFC-11e	5,76E-07	1,92E-08	1,12E-07	7,07E-07	2,13E-07	9,56E-08	0,00E+00	ND	ND	ND	ND	ND	ND	9,14E-08	8,51E-08	7,50E-09	5,19E-08	-6,39E-08
Acidification potential	mol H ⁺ e	2,68E-01	1,57E-02	5,26E-02	3,36E-01	3,55E-02	5,59E-02	0,00E+00	ND	ND	ND	ND	ND	ND	5,50E-02	1,42E-02	5,09E-03	1,31E-02	-4,89E-02
EP-freshwater ²⁾	kg Pe	7,96E-03	8,22E-05	1,46E-03	9,50E-03	1,49E-03	2,08E-04	0,00E+00	ND	ND	ND	ND	ND	ND	1,98E-04	5,96E-04	3,89E-04	1,63E-04	-3,27E-03
EP-marine	kg Ne	8,79E-02	3,64E-03	1,59E-02	1,07E-01	9,28E-03	2,63E-02	0,00E+00	ND	ND	ND	ND	ND	ND	2,56E-02	3,71E-03	1,09E-03	5,01E-03	-1,14E-02
EP-terrestrial	mol Ne	1,02E+00	4,03E-02	1,71E-01	1,23E+00	9,95E-02	2,83E-01	0,00E+00	ND	ND	ND	ND	ND	ND	2,81E-01	3,97E-02	1,20E-02	5,48E-02	-1,36E-01
POCP (“smog”) ³⁾	kg NMVOCe	2,79E-01	1,24E-02	5,25E-02	3,44E-01	5,34E-02	8,46E-02	0,00E+00	ND	ND	ND	ND	ND	ND	8,39E-02	2,13E-02	3,59E-03	1,98E-02	-3,84E-02
ADP-minerals & metals ⁴⁾	kg Sbe	3,71E-02	2,28E-06	1,40E-05	3,71E-02	3,98E-05	2,50E-06	0,00E+00	ND	ND	ND	ND	ND	ND	2,21E-06	1,59E-05	2,56E-05	2,78E-06	-5,11E-05
ADP-fossil resources	MJ	1,09E+03	1,63E+01	2,90E+02	1,39E+03	1,99E+02	8,18E+01	0,00E+00	ND	ND	ND	ND	ND	ND	8,02E+01	7,94E+01	8,71E+00	4,57E+01	-1,00E+02
Water use ⁵⁾	m ³ e depr.	3,96E+01	7,09E-02	2,82E+00	4,25E+01	1,16E+00	2,55E-01	0,00E+00	ND	ND	ND	ND	ND	ND	2,07E-01	4,62E-01	1,96E-01	2,01E+00	-1,06E+01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,49E-06	7,00E-08	1,04E-06	3,60E-06	1,29E-06	1,58E-06	0,00E+00	ND	ND	ND	ND	ND	ND	1,57E-06	5,16E-07	6,19E-08	3,00E-07	-7,49E-07
Ionizing radiation ⁶⁾	kBq 11235e	1,92E+01	1,08E-02	1,63E+01	3,55E+01	1,66E-01	3,95E-02	0,00E+00	ND	ND	ND	ND	ND	ND	3,41E-02	6,64E-02	1,49E-01	2,73E-02	-6,54E-01
Ecotoxicity (freshwater)	CTUe	4,70E+02	2,76E+00	9,40E+01	5,67E+02	4,07E+01	6,26E+00	0,00E+00	ND	ND	ND	ND	ND	ND	4,58E+01	1,63E+01	2,79E+01	3,05E+01	-2,92E+01
Human toxicity, cancer	CTUh	4,05E-08	2,13E-10	1,47E-09	4,22E-08	2,13E-09	6,83E-10	0,00E+00	ND	ND	ND	ND	ND	ND	6,28E-10	8,51E-10	3,71E-10	3,38E-10	-1,81E-09
Human tox. non-cancer	CTUh	3,88E-07	6,86E-09	4,78E-08	4,43E-07	1,23E-07	1,28E-08	0,00E+00	ND	ND	ND	ND	ND	ND	9,87E-09	4,91E-08	2,43E-08	7,60E-09	-6,49E-08
SQP ⁷⁾	-	2,51E+02	8,72E+00	9,50E+01	3,55E+02	1,98E+02	7,10E+00	0,00E+00	ND	ND	ND	ND	ND	ND	5,30E+00	7,92E+01	9,77E+00	8,97E+01	-8,27E+01

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. 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; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy ⁸⁾	MJ	1,58E+02	1,78E-01	2,65E+01	1,85E+02	2,76E+00	-4,69E+01	0,00E+00	ND	ND	ND	ND	ND	ND	5,03E-01	1,10E+00	1,74E+00	4,27E-01	5,18E-01
Renew. PER as material	MJ	9,74E-01	0,00E+00	-4,75E-03	9,69E-01	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-6,79E-01	-2,91E-01	1,30E+01
Total use of renew. PER	MJ	1,59E+02	1,78E-01	2,65E+01	1,86E+02	2,76E+00	-4,69E+01	0,00E+00	ND	ND	ND	ND	ND	ND	5,03E-01	1,10E+00	1,06E+00	1,36E-01	1,35E+01
Non-re. PER as energy	MJ	7,69E+02	1,51E+01	2,86E+02	1,07E+03	1,99E+02	8,18E+01	0,00E+00	ND	ND	ND	ND	ND	ND	8,02E+01	7,94E+01	8,71E+00	4,57E+01	-1,00E+02
Non-re. PER as material	MJ	1,20E+01	0,00E+00	-5,83E-02	1,19E+01	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	-8,33E+00	-3,57E+00	8,71E-01
Total use of non-re. PER	MJ	7,81E+02	1,51E+01	2,86E+02	1,08E+03	1,99E+02	8,18E+01	0,00E+00	ND	ND	ND	ND	ND	ND	8,02E+01	7,94E+01	3,81E-01	4,21E+01	-9,93E+01
Secondary materials	kg	2,60E+01	7,27E-03	2,24E-01	2,62E+01	8,31E-02	3,43E-02	0,00E+00	ND	ND	ND	ND	ND	ND	3,32E-02	3,32E-02	8,23E-03	1,14E-02	6,36E-01
Renew. secondary fuels	MJ	1,54E+02	5,32E-05	1,60E-04	1,54E+02	1,09E-03	9,81E-05	0,00E+00	ND	ND	ND	ND	ND	ND	8,70E-05	4,34E-04	2,75E-04	2,37E-04	-7,51E-04
Non-ren. secondary fuels	MJ	2,23E+02	0,00E+00	0,00E+00	2,23E+02	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water	m ³	1,36E+00	1,74E-03	7,86E-02	1,44E+00	2,90E-02	1,19E-03	0,00E+00	ND	ND	ND	ND	ND	ND	5,14E-03	1,16E-02	4,52E-03	4,72E-02	-2,50E-01

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	6,90E+00	6,25E-02	4,45E-01	7,41E+00	1,27E+00	9,95E-02	0,00E+00	ND	ND	ND	ND	ND	ND	8,99E-02	5,06E-01	4,18E-02	5,20E-02	-3,05E+00
Non-hazardous waste	kg	4,24E+01	1,17E+00	1,28E+01	5,63E+01	2,50E+01	5,55E+00	0,00E+00	ND	ND	ND	ND	ND	ND	1,31E+00	1,00E+01	2,00E+00	1,20E+00	-1,63E+01
Radioactive waste	kg	5,21E-03	2,60E-06	3,48E-03	8,69E-03	3,97E-05	9,72E-06	0,00E+00	ND	ND	ND	ND	ND	ND	8,38E-06	1,59E-05	3,81E-05	6,66E-06	-1,59E-04

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	1,22E+00	0,00E+00	4,90E+00	6,12E+00	0,00E+00	1,03E+00	0,00E+00	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	7,05E+02	0,00E+00	0,00E+00
Materials for energy rec	kg	1,90E-02	0,00E+00	0,00E+00	1,90E-02	0,00E+00	0,00E+00	0,00E+00	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	9,14E-03	0,00E+00	0,00E+00	9,14E-03	0,00E+00	5,13E+00	0,00E+00	ND	ND	ND	ND	ND	ND	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	0,00E+00	0,00E+00	0,00E+00	2,16E+00	0,00E+00	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy – Heat	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,97E+00	0,00E+00	ND	ND	ND	ND	ND	ND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

ADDITIONAL INDICATOR – GWP-GHG

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG ⁹⁾	kg CO ₂ e	1,35E+02	1,21E+00	6,62E+00	1,43E+02	1,35E+01	6,24E+00	-2,83E+00	ND	ND	ND	ND	ND	ND	6,16E+00	5,37E+00	5,28E-01	1,87E+00	-8,51E+00

9) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. In addition, the characterisation factors for the flows – CH₄ fossil, CH₄ biogenic and Dinitrogen monoxide – were updated. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterisation factor for biogenic CO₂ is set to z

SCENARIO DOCUMENTATION

DATA SOURCES

Manufacturing energy scenario documentation

1. Electricity, medium voltage, residual mix, Sweden, Ecoinvent, 0.0512 kgCO₂e/kWh
2. Market for heat, district or industrial, other than natural gas, Albania, Ecoinvent, 0.0715 kgCO₂e/MJ
3. Market for diesel, burned in building machine, World, Ecoinvent, 0.10 kgCO₂e/MJ

Transport scenario documentation - A4 (Transport resources)

1. Market for transport, freight, lorry, >32 metric ton, diesel, EURO 6, 125.0 km

Transport to the building site (A4) - Scenario documentation

Scenario parameter	Value
Capacity utilization (no empty returns) %	100
Bulk density of transported products, kg/m ³	1040
Volume capacity utilization factor	1

Installation at the building site (A5) - Scenario documentation

Scenario parameter	Value
Energy: type and consumption (MJ or kWh)	Diesel, burned in building machine (17 kWh) for an excavator using a lifting chain calculated on an average 2060 kg and 3,5 liter diesel per hour.
Water use (m ³)	-
Ancillary materials: type and mass (kg)	-
Waste materials: type and mass (kg)	3,5 kg of wooden pallets.
Waste materials: output routes	Wooden packaging 38% landfill, 32% recycled, 30% incinerated.
Direct emissions (kg)	-

End of life (C1-C4) - Scenario documentation

Scenario information	Value
Collection process: collected separately (kg)	Concrete: 687 kg recycling and 294,4 kg landfill. Steel: 15,81 kg recycling and 2,79 kg landfill.
Collection process: Mixed waste (kg)	-
Recovery: re-use (kg)	0
Recovery: recycling (kg)	702,8
Recovery: energy recovery (kg)	0
Disposal (kg)	297,2
Scenario assumptions e.g. transportation (mode, km) & other	Transported 50 km (recycling) and 50 km (landfill) by lorry

THIRD-PARTY VERIFICATION STATEMENT

EPD Hub declares that this EPD is verified in accordance with ISO 14025 by an independent, third-party verifier. The project report on the Life Cycle Assessment and the report(s) on features of environmental relevance are filed at EPD Hub. EPD Hub PCR and ECO Platform verification checklist are used.

EPD Hub is not able to identify any unjustified deviations from the PCR and EN 15804+A2 in the Environmental Product Declaration and its project report.

EPD Hub maintains its independence as a third-party body; it was not involved in the execution of the LCA or in the development of the declaration and has no conflicts of interest regarding this verification.

The company-specific data and upstream and downstream data have been examined as regards plausibility and consistency. The publisher is responsible for ensuring the factual integrity and legal compliance of this declaration.

The software used in creation of this LCA and EPD is verified by EPD Hub to conform to the procedural and methodological requirements outlined in ISO 14025:2010, ISO 14040/14044, EN 15804+A2, and EPD Hub Core Product Category Rules and General Program Instructions.

Verified tools

Tool verifier: Magaly Gonzalez Vazquez

Tool verification validity: 27 March 2025 - 26 March 2028

Haiha Nguyen as an authorized verifier for EPD Hub Limited 25.09.2026



ANNEX I – GROSS VALUES

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

CORE ENVIRONMENTAL GROSS IMPACT INDICATORS – EN 15804+A2, EF 3.1

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total ¹⁾	kg CO ₂ e	1,54E+02	1,21E+00	6,61E+00	1,61E+02	1,35E+01	6,24E+00	-2,83E+00	ND	ND	ND	ND	ND	ND	6,16E+00	5,37E+00	5,28E-01	1,87E+00	-9,81E+00
GWP – fossil	kg CO ₂ e	1,54E+02	1,21E+00	6,61E+00	1,61E+02	1,34E+01	6,24E+00	-2,83E+00	ND	ND	ND	ND	ND	ND	6,16E+00	5,37E+00	5,27E-01	1,86E+00	-8,50E+00
GWP – biogenic	kg CO ₂ e	1,51E-02	1,23E-04	-5,68E-03	9,58E-03	3,32E-03	6,25E-04	0,00E+00	ND	ND	ND	ND	ND	ND	1,17E-03	1,32E-03	3,61E-04	8,36E-04	-1,31E+00
GWP – LULUC	kg CO ₂ e	4,80E-02	6,19E-04	8,37E-03	5,70E-02	6,23E-03	7,97E-04	0,00E+00	ND	ND	ND	ND	ND	ND	6,31E-04	2,49E-03	9,28E-04	1,07E-03	-6,96E-03
Ozone depletion pot.	kg CFC ₋₁₁ e	6,03E-07	1,92E-08	1,12E-07	7,35E-07	2,13E-07	9,56E-08	0,00E+00	ND	ND	ND	ND	ND	ND	9,14E-08	8,51E-08	7,50E-09	5,19E-08	-6,39E-08
Acidification potential	mol H ⁺ e	2,97E-01	1,57E-02	5,26E-02	3,66E-01	3,55E-02	5,59E-02	0,00E+00	ND	ND	ND	ND	ND	ND	5,50E-02	1,42E-02	5,09E-03	1,31E-02	-4,89E-02
EP-freshwater ²⁾	kg Pe	8,77E-03	8,23E-05	1,46E-03	1,03E-02	1,49E-03	2,08E-04	0,00E+00	ND	ND	ND	ND	ND	ND	1,98E-04	5,96E-04	3,89E-04	1,63E-04	-3,27E-03
EP-marine	kg Ne	9,86E-02	3,64E-03	1,59E-02	1,18E-01	9,28E-03	2,63E-02	0,00E+00	ND	ND	ND	ND	ND	ND	2,56E-02	3,71E-03	1,09E-03	5,01E-03	-1,14E-02
EP-terrestrial	mol Ne	1,14E+00	4,03E-02	1,71E-01	1,35E+00	9,95E-02	2,83E-01	0,00E+00	ND	ND	ND	ND	ND	ND	2,81E-01	3,97E-02	1,20E-02	5,48E-02	-1,36E-01
POCP ("smog") ³⁾	kg NMVOCe	3,12E-01	1,25E-02	5,25E-02	3,77E-01	5,34E-02	8,46E-02	0,00E+00	ND	ND	ND	ND	ND	ND	8,39E-02	2,13E-02	3,59E-03	1,98E-02	-3,84E-02
ADP-minerals & metals ⁴⁾	kg Sbe	4,29E-02	2,28E-06	1,40E-05	4,29E-02	3,98E-05	2,50E-06	0,00E+00	ND	ND	ND	ND	ND	ND	2,21E-06	1,59E-05	2,56E-05	2,78E-06	-5,11E-05
ADP-fossil resources	MJ	1,22E+03	1,63E+01	2,90E+02	1,53E+03	1,99E+02	8,18E+01	0,00E+00	ND	ND	ND	ND	ND	ND	8,02E+01	7,94E+01	8,71E+00	4,57E+01	-1,00E+02
Water use ⁵⁾	m ³ e depr.	4,25E+01	7,09E-02	2,82E+00	4,54E+01	1,16E+00	2,55E-01	0,00E+00	ND	ND	ND	ND	ND	ND	2,07E-01	4,62E-01	1,96E-01	2,01E+00	-1,06E+01

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO₄e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.