ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

MURBLOCK BAS ECO

FINJA BETONG AB

Programme: The International EPD® System, www.environdec.com	Programme operator: EPD International AB	EPD registration number: S-P-04504	Publication date: 2023-04-07	Revision date: 2023-04-27	Valid until: 2028-04-03	Geographical scope: Scandinavia

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

MANUFACTURER INFORMATION

Manufacturer	Finja Betong AB
Address	Betongvägen 1, 28193 Finja
Contact details	info@finja.se
Website	www.finja.se

PRODUCT IDENTIFICATION

Product name	Murblock Bas ECO
Place(s) of production	Finja, Sweden
CPC code	3755

The International EPD System

EPDs within the same product category but from different programmes may not be comparable.

EPD INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPD program operator	The International EPD System
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the Int´l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021) is used. c-PCR 003 Concrete and elements version: 2023-01-02
EPD author	Martin Varma, Finja Betong AB
EPD verification	Independent verification of this EPD and data, according to ISO 14025: □ Internal certification ☑ External verification
Verification date	2023-04-04
EPD verifier	Hetal Parekh Udas, One Click LCA LTD
EPD number	S-P-04504
ECO Platform nr.	-
Publishing date	2023-04-07
EPD valid until	2028-04-03

PRODUCT INFORMATION

PRODUCT DESCRIPTION

Masonry block unit with carbon sink consisting of added bio char. The blocks are made of expanded clay, binders and aggregates.

PRODUCT APPLICATION

Masonry works for load and non-load bearing applications. For example, walls, columns and partitions.

TECHNICAL SPECIFICATIONS

Compressive strength: 3 MPa
Density: 650 kg / cubic meter +-10%

PRODUCT STANDARDS

SS-EN 771-3:2000+A1:2015

PHYSICAL PROPERTIES OF THE PRODUCT

See product information at www.finja.se

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.finja.se.

PRODUCT RAW MATERIAL COMPOSITION

Product and Packaging Material	Weight, kg	Post-consumer %	Renewable %	Country Region of origin
Expanded clay	300-500	-	-	EU
Aggregate	200-300	-	-	Sweden
Cement	50-100	-	-	Sweden
Bio char	10-30	100	-	EU
Water	50-100	-	-	Sweden

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	97	EU, Sweden
Fossil materials	-	-
Bio-based materials	3	EU

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

PRODUCT LIFE-CYCLE

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.

The materials cement, expanded clay aggregate, sand/gravel aggregate and bio-char are mixed with water at the factory plant. The concrete is placed in molds and are hydraulically pressed to desired measures. The masonry units are placed on pallets and located in the storage building before final transport to the customers warehouse or Finjas plant in Strängnäs.

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.

When ordered from customer the product is loaded for transport. The transports are optimised for maximum possible usage of load capacity. During installation material loss will occur, mainly when handling the product.

PRODUCT USE AND MAINTENANCE (B1-B7)

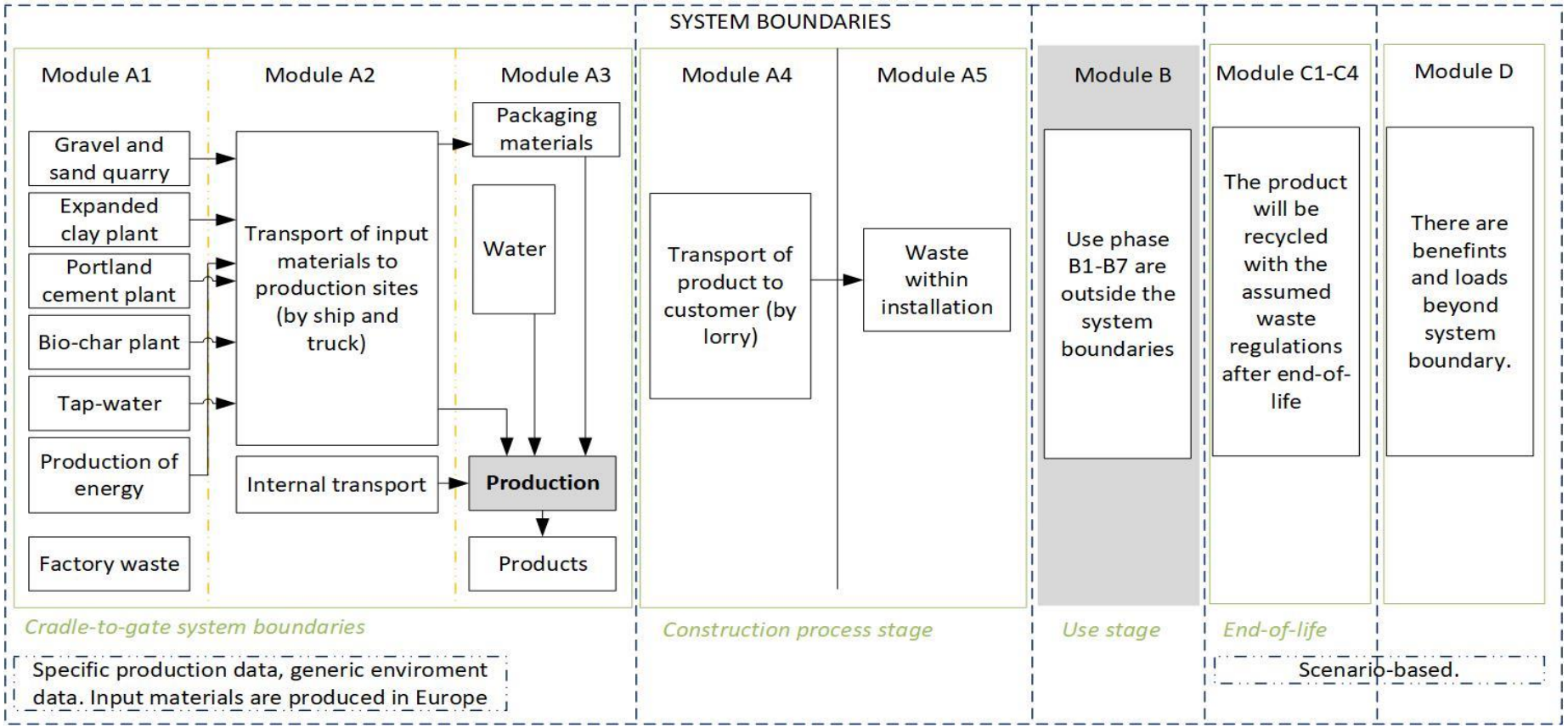
This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

After service life demolition is made mechanically. It is assumed to be 80% of the demolished material will be recycled as new lightweight aggregate and 20% will be land fill. The demolition process consumes diesel fuel used by building machines for example, excavator equipped with hydraulic hammer.
The demolished masonry units are delivered to the closest waste treatment plant for crushing and sorting.

There are benefits and loads outside system boundaries.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2021

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 cubic meter of Murblock Bas ECO
Mass per declared unit	650 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	11
Biogenic carbon content in packaging, kg C	0.3071

SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with the following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), A5 (Assembly) as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

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	D	D
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Geography, by two-letter ISO country code or regions. The International EPD System only.																		
EU	EU	EU	EU	EU	-	-	-	-	-	-	-	EU	EU	EU	EU	EU		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 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 life cycle analysis includes all modules from raw material extraction and transport, production, distribution, and end-of-life stages.
Cut-offs are made for packaging for in going packaging since the impact is below 0,1%

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per EN 15804, allocation is conducted in the following order:

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.

3. Allocation should be based on economic values.

It is not possible to locate ancillary material, energy consumption and waste separately for each product. Due to that this data is allocated based on annual production rate for year 2021 and made with high accuracy.
As the production process are similar for different types of masonry units the annual total of energy consumption, and waste are allocated by weight.

A4: It is assumed that the vehicle capacity is used to full load. 50 % of the product is delivered to the customer from the factory in Hässleholm. The remaining half of the products are first transported to Finja Betong's warehouse in Strängnäs before it is transported to the customer. The distance to customer is a mean value of 366 km in terms of deliveries made in 2021 of masonry units. Empty returns are not considered as it is assumed that return trip is used by transportation companies to serve the needs of other clients. Transport from customer to place of usage is not accounted for.
A5: Material loss is assumed to be 5 %. Use of water and electricity during installation in not included as it is assumed they have a very small environmental impact.

C1: Energy consumption at demolition process is assumed to be 10 kWh/ton. The source of energy is diesel fuel used by building machines.

C2: The mass of the product is assumed to be the same after service life as the declared unit. After service life the product is assumed to be sent to the closest recycling facility. Transportation distance to the closest disposal area is estimated as 50 km and the transportation method is lorry. It is assumed that the vehicle capacity is used to full load.

C3: It is assumed that 100% of products is collected at demolition site and that attached recyclable materials (such as reinforcement bars) are sent directly to recycling facilities. Losses in sorting process are assumed to be neglectable. Assumption is made that all recycled material of the product is used as new aggregate in masonry units production. Acting as carbon storage in cement-based material the inert biochar is assumed not to be released when masonry units are recycled.

C4: Since the product is assumed to be recycled, this stage is not considered.

D: Since the product is assumed to be recycled, there are benefits deriving from the recycling of the product after its end-of-life stage. The greatest benefits derive from no need to produce new expanded clay.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 -standard.

AVERAGES AND VARIABILITY

As the EPD is valid for one product produced in one specific production plant there are no averages or variabilities accounted for.

ENVIRONMENTAL IMPACT DATA

Note: additional environmental impact data may be presented in annexes.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total	kg CO_2e	7,15E1	6,5E0	5,17E0	8,32E1	2,16E1	5,58E0	MND	MND	MND	MND	MND	MND	MND	2,14E0	2,83E0	8,73E1	2,29E1	-1,4E2
GWP – fossil	kg CO_2e	1,77E2	6,75E0	5,16E0	1,89E2	2,18E1	1,09E1	MND	MND	MND	MND	MND	MND	MND	2,14E0	2,83E0	1,71E0	1,52E0	-1,4E2
GWP – biogenic	kg CO_2e	-1,05E2	1,4E-3	7,4E-3	-1,05E2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	5,96E-4	2,15E-3	8,56E1	2,14E1	8,69E1
GWP – LULUC	kg CO_2e	1,04E-1	3,49E-3	2,27E-3	1,1E-1	6,85E-3	5,96E-3	MND	MND	MND	MND	MND	MND	MND	1,81E-4	8,89E-4	1,44E-4	4,74E-4	-4,27E-2
Ozone depletion pot.	kg CFC_{-11}e	4,93E-6	1,49E-6	4,16E-7	6,83E-6	5,36E-6	6,63E-7	MND	MND	MND	MND	MND	MND	MND	4,63E-7	6,95E-7	3,69E-7	4,59E-7	-3,27E-6
Acidification potential	mol H^+e	2,88E0	9,21E-2	2,38E-2	3E0	7,02E-2	1,56E-1	MND	MND	MND	MND	MND	MND	MND	2,24E-2	9,1E-3	1,79E-2	1,36E-2	-1,09E0
EP-freshwater[3)]	kg Pe	2,89E-3	4,75E-5	8,29E-5	3,02E-3	1,85E-4	1,65E-4	MND	MND	MND	MND	MND	MND	MND	8,66E-6	2,4E-5	6,91E-6	1,58E-5	-5,27E-3
EP-marine	kg Ne	1,34E-1	2,2E-2	7,7E-3	1,64E-1	1,54E-2	9,74E-3	MND	MND	MND	MND	MND	MND	MND	9,9E-3	2E-3	7,9E-3	5,15E-3	-1,24E-1
EP-terrestrial	mol Ne	1,73E0	2,45E-1	8,39E-2	2,06E0	1,72E-1	1,2E-1	MND	MND	MND	MND	MND	MND	MND	1,09E-1	2,23E-2	8,66E-2	5,67E-2	-1,41E0
POCP (“smog”)	kg NMVOCe	6,08E-1	6,77E-2	2,79E-2	7,04E-1	6,74E-2	4,1E-2	MND	MND	MND	MND	MND	MND	MND	2,98E-2	8,74E-3	2,38E-2	1,6E-2	-4,1E-1
ADP-minerals & metals	kg Sbe	7,87E-5	6,24E-5	3,27E-5	1,74E-4	3,89E-4	3,11E-5	MND	MND	MND	MND	MND	MND	MND	3,27E-6	5,04E-5	2,61E-6	1,6E-5	-1,1E-3
ADP-fossil resources	MJ	2,73E2	4,69E1	2,39E2	5,59E2	3,54E2	5,01E1	MND	MND	MND	MND	MND	MND	MND	2,95E1	4,6E1	2,35E1	3,1E1	-1,2E3
Water use[2)]	m^3e depr.	2,15E1	3,15E-1	1,99E1	4,17E1	1,32E0	2,23E0	MND	MND	MND	MND	MND	MND	MND	5,5E-2	1,71E-1	4,39E-2	9,28E-1	-2,21E1

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential. 2) 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 experienced with the indicator. 3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO_4e.

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

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	2,3E-5	4,34E-7	4,17E-7	2,39E-5	1,91E-6	1,46E-6	MND	MND	MND	MND	MND	MND	MND	5,94E-7	2,48E-7	2,54E-6	7,97E-7	-1,38E-5
Ionizing radiation[5)]	kBq U235e	2,7E3	4,22E-1	8,99E0	2,71E3	1,55E0	1,36E2	MND	MND	MND	MND	MND	MND	MND	1,26E-1	2,01E-1	1,01E-1	1,29E-1	-1,56E0
Ecotoxicity (freshwater)	CTUe	2,48E3	7,09E1	8,16E1	2,63E3	2,71E2	1,49E2	MND	MND	MND	MND	MND	MND	MND	1,73E1	3,51E1	1,38E1	2,12E1	-4,7E3
Human toxicity, cancer	CTUh	1,04E-7	2,99E-9	3,01E-9	1,1E-7	6,82E-9	6,06E-9	MND	MND	MND	MND	MND	MND	MND	6,2E-10	8,85E-10	4,94E-10	6,21E-10	-5,14E-8
Human tox. non-cancer	CTUh	1,38E-6	7,63E-8	3,59E-8	1,49E-6	3,09E-7	9,38E-8	MND	MND	MND	MND	MND	MND	MND	1,53E-8	4,01E-8	1,22E-8	1,8E-8	-1,43E-6
SQP	-	8,55E2	8,67E1	3,88E0	9,45E2	5,35E2	7,7E1	MND	MND	MND	MND	MND	MND	MND	7,57E-1	6,94E1	6,05E-1	3,89E1	-1,9E2

4) SQP = Land use related impacts/soil quality. 5) 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.

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	MJ	3,2E2	6,01E-1	7,91E0	3,28E2	4,46E0	1,68E1	MND	MND	MND	MND	MND	MND	MND	1,6E-1	5,78E-1	1,27E-1	3E-1	-1,22E2
Renew. PER as material	MJ	1,05E3	0E0	1,08E1	1,06E3	0E0	-1,08E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-8,43E2	-2,11E2	-8,95E2
Total use of renew. PER	MJ	1,37E3	6,01E-1	1,87E1	1,39E3	4,46E0	5,95E0	MND	MND	MND	MND	MND	MND	MND	1,6E-1	5,78E-1	-8,42E2	-2,1E2	-1,02E3
Non-re. PER as energy	MJ	8,79E2	4,69E1	2,2E2	1,15E3	3,54E2	7,94E1	MND	MND	MND	MND	MND	MND	MND	2,95E1	4,6E1	2,35E1	3,1E1	-1,19E3
Non-re. PER as material	MJ	0E0	0E0	1,96E1	1,96E1	0E0	-1,96E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-3,99E1
Total use of non-re. PER	MJ	8,79E2	4,69E1	2,39E2	1,17E3	3,54E2	5,98E1	MND	MND	MND	MND	MND	MND	MND	2,95E1	4,6E1	2,35E1	3,1E1	-1,23E3
Secondary materials	kg	7,17E1	0E0	7,43E-3	7,17E1	0E0	3,59E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-8,53E-1
Renew. secondary fuels	MJ	2,49E2	0E0	0E0	2,49E2	0E0	1,25E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	6,76E1	0E0	0E0	6,76E1	0E0	3,38E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	3,99E0	8,77E-3	2,21E-1	4,22E0	7,38E-2	2,17E-1	MND	MND	MND	MND	MND	MND	MND	2,6E-3	9,57E-3	2,08E-3	2,28E-2	-5,64E-1

6) 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	1,52E-1	4,76E-2	2,44E-1	4,44E-1	3,44E-1	5,14E-2	MND	MND	MND	MND	MND	MND	MND	3,17E-2	4,47E-2	0E0	3,54E-2	-8,12E0
Non-hazardous waste	kg	2,77E2	4,09E0	3,27E0	2,85E2	3,81E1	2,26E1	MND	MND	MND	MND	MND	MND	MND	3,39E-1	4,94E0	0E0	1,3E2	-2,08E2
Radioactive waste	kg	4,17E-3	3,22E-4	3,55E-3	8,04E-3	2,43E-3	5,49E-4	MND	MND	MND	MND	MND	MND	MND	2,06E-4	3,16E-4	0E0	2,06E-4	-1,65E-3

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	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	2,7E-4	0E0	0E0	2,7E-4	0E0	4,31E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	5,2E2	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	5,25E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0

ENVIRONMENTAL IMPACTS – GWP-GHG - THE INTERNATIONAL EPD SYSTEM

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG	kg CO_2e	1,77E2	6,75E0	5,16E0	1,89E2	2,18E1	1,09E1	MND	MND	MND	MND	MND	MND	MND	2,14E0	2,83E0	1,71E0	1,52E0	-1,4E2

8) This indicator includes all greenhouse gases excluding biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product as defined by IPCC AR 5 (IPCC 2013) This indicator Is almost equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Scenario parameter	Value
Electricity data source and quality	Electricity, Sweden, residual mix - One Click LCA profile from IEA
Electricity CO_2e / kWh	0.18
District heating data source and quality	N/A
District heating CO_2e / kWh	N/A

BIBLIOGRAPHY

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ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

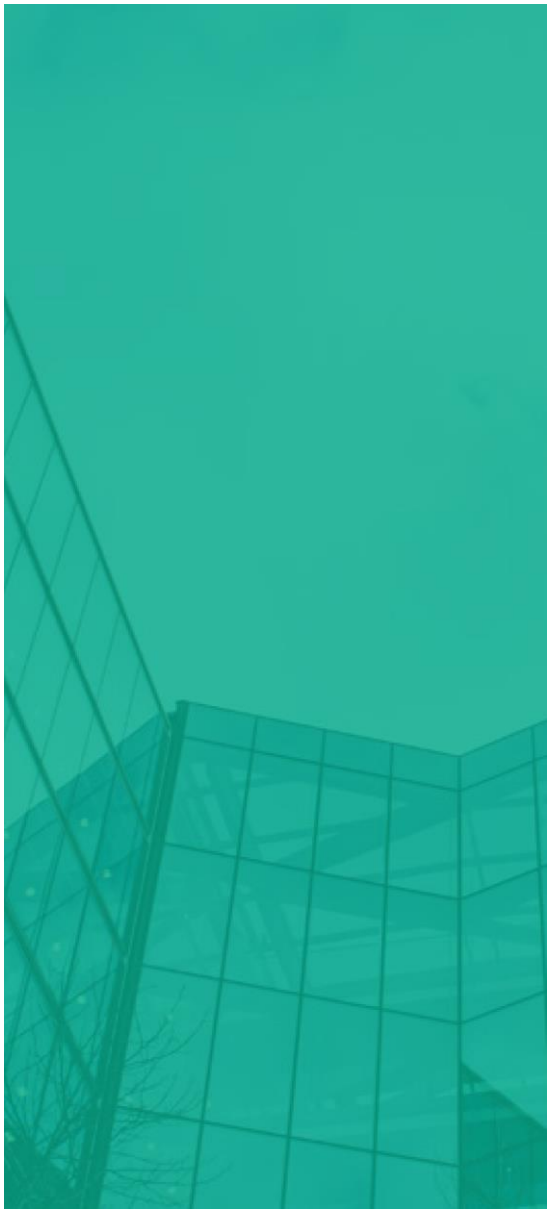
Ecoinvent database v3.6 (2019) and One Click LCA database.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

Int´l EPD System PCR 2019:14 Construction products, version 1.11 (05.02.2021)

EPD. General Programme Instructions of the international EPD® system. Version 4.0

Murblock Bas ECO LCA background report 26.04.2023



DIFFERENCES VERSUS PREVIOUS VERSIONS

The declared Core Environmental impact indicators, EN 15804+A2, PEF, have been amended to correct errors. The previous version of the calculations for balancing energy and biogenic carbon content were incorrect due to modifications in the One Click LCA software. Consequently, changes were necessary for the following life cycle stages: A1, A2, A3, A5, and D.

ABOUT THE MANUFACTURER

Finja is a Swedish family business whose journey began with a gravel pit acquired in 1957. Since then, and with a large amount of knowledge, dedication and courage, you now have today's company – one of the country's largest companies in the concrete industry.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Finja Betong AB
EPD author	Martin Varma, Finja Betong AB
EPD verifier	Hetal Parekh Udas, One Click LCA Ltd
EPD program operator	The International EPD System
Background data	This EPD is based on Ecoinvent 3.6 (cut-off) and One Click LCA databases.
LCA software	The LCA and EPD have been created using One Click LCA Pre-Verified EPD Generator for Concrete and cement-based products

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with EN 15804, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The background report (project report) for this EPD

Why does verification transparency matter? Read more online.

VERIFICATION OVERVIEW

Following independent third party has verified this specific EPD:

EPD verification information	Answer
Independent EPD verifier	Hetal Parekh Udas, One Click LCA
EPD verification started on	2023-02-15
EPD verification completed on	2023-04-04
Supply-chain specific data %	not relevant
Approver of the EPD verifier	The International EPD System

Author & tool verification	Answer
EPD author	Martin Varma, Finja Betong AB
EPD author training completion	2022-07-15
EPD Generator module	Concrete and cement-based
Independent software verifier	Ugo Pretato, Studio Fieschi & soci
Software verification date	2021-05-11

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of

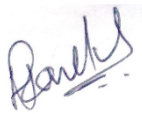
- the data collected and used in the LCA calculations,
- the way the LCA-based calculations have been carried out,
- the presentation of environmental data in the EPD, and
- other additional environmental information, as present

with respect to the procedural and methodological requirements in ISO 14025:2010 and EN 15804:2012+A2:2019.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.



Hetal Parekh Udas, One Click LCA Ltd

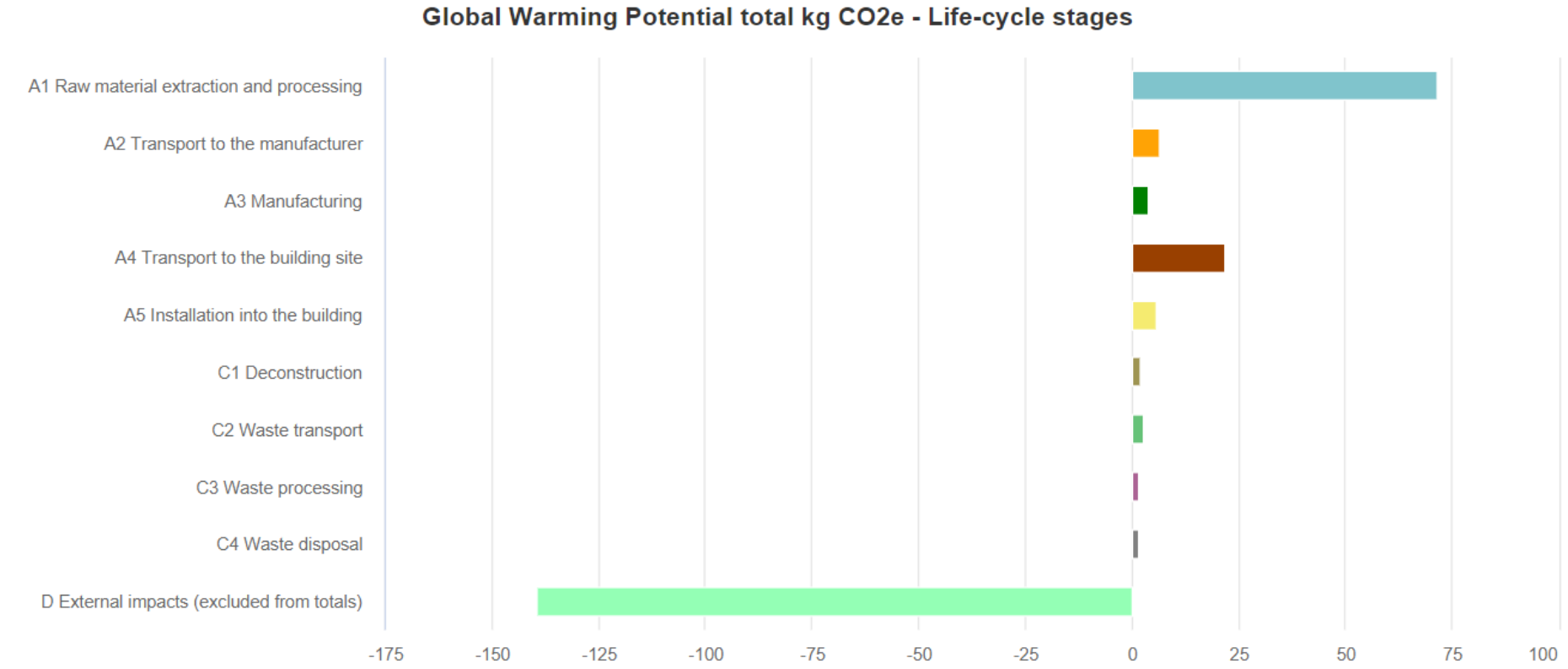
VERIFICATION AND REGISTRATION (ENVIRONDEC)

ISO standard ISO 21930 and CEN standard EN 15804 serves as the core Product Category Rules (PCR)	
PCR	PCR 2019:14 Construction products, version 1.11
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC 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.
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Third party verifier	Hetal Parekh Udas, One Click LCA Ltd
	Approved by: The International EPD® System Technical Committee, supported by the Secretariat
Procedure for follow-up during EPD validity involves third party verifier	☐ yes ☑ no

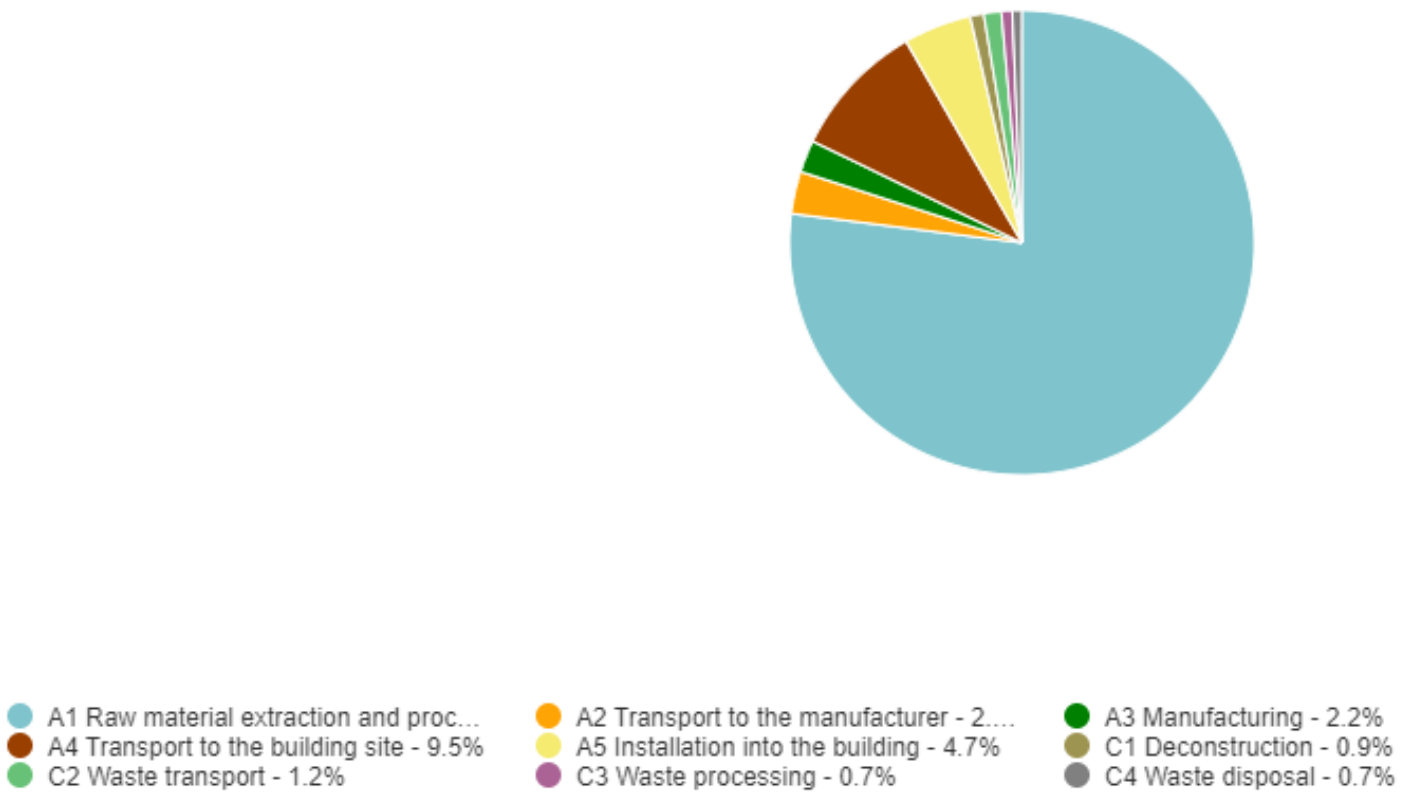
THE INTERNATIONAL EPD® SYSTEM

EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden, E-mail: info@environdec.com

ANNEX 1 : LIFE-CYCLE ASSESSMENT RESULT VISUALIZATION



Global Warming Potential fossil kg CO2e - Life-cycle stages



Global Warming Potential fossil kg CO2e - Resource types