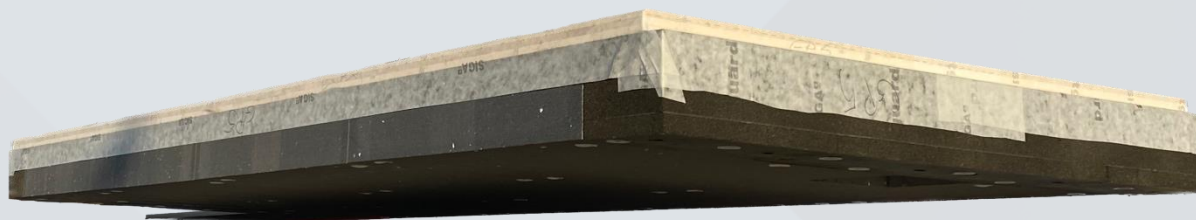


ENVIRONMENTAL PRODUCT DECLARATION

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

Klaragrunden

Klara Byggsystem
(Klara 500/1 AB)



EPD HUB, HUB-0513

Publishing date 22 June 2023, last updated date 22 June 2023, valid until date 22 June 2028

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Klara Byggsystem (Klara 500/1 AB)
Address	Ängelholmsvägen 263, 269 42 Båstad, Sweden
Contact details	info@klarabyggsystem.se
Website	www.klarabyggsystem.se

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with modules A1-A5 & C1-C4
EPD author	Lars Guttorp, Klara Byggsystem (Klara 500/1 AB)
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
EPD verifier	Neena Chandramathy, as an authorized verifier acting for EPD Hub Limited

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	Klaragrunden
Additional labels	-
Product reference	-
Place of production	Klippan, Sweden
Period for data	2022
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	-

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 square meter (m2)
Declared unit mass	30.95 kg
GWP-fossil, A1-A3 (kgCO2e)	2,84E1
GWP-total, A1-A3 (kgCO2e)	-7,44E0
Secondary material, inputs (%)	5.47
Secondary material, outputs (%)	84.3
Total energy use, A1-A3 (kWh)	187.0
Total water use, A1-A3 (m3e)	2,9E-1

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Klara Byggsystem combines product innovation with industrial scale prefabrication to enable more efficient, effective and sustainable construction. Their main product is Klaragrunden, a prefabricated house slab where concrete is substituted for wood and high-density insulation.

PRODUCT DESCRIPTION

Klaragrunden is a prefabricated house slab where concrete is replaced by cross laminated timber (CLT) or laminated veneer lumber (LVL) in combination with high-density insulation. It uses the same reliable and proven methods for moisture protection and insulation as a concrete slab and is just as durable. It is put in place in 1 day, lowers CO2e with 60-70 % and is 30-40 % more energy efficient compared to a concrete slab. It can also be fully dismantled and disassembled and then reused or recycled.

Exactly as with a concrete slab, the primary protection from moisture is the temperature difference between the warm indoor environment and the underlying ground. This is supplemented by sophisticated membranes to make Klaragrunden weatherproof during transport and construction as well as 100 % sealed from ground emissions and radon.

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

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	-	-
Fossil materials	29%	EU
Bio-based materials	71%	EU

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	9.7
Biogenic carbon content in packaging, kg C	-

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 square meter (m2)
Mass per declared unit	30.95 kg

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	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND			
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Operational	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

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

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.

Klaragrunden is produced from made to measure input materials and assembled to prefabricated elements, ready for installation on the building site. Insulation material with relevant density for each area of the product is applied to the massive wood load distribution panel. The wood is covered by a membrane that serves as weather protection during transport and installation on site. The process and configuration of inputs has been optimized to avoid waste.

All input materials are delivered as is with minimal amount of incoming packaging as per agreement with suppliers, only small amounts of plastic wrapping is used. The wooden pallets used for shipping of input materials are continuously reused. No product packaging is considered. Product is sent without packaging to construction site.

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.

Transport to construction site is carried out by lorry and declared values are based on transport of the declared amount (1 m²) and an example distance of 100 km from factory to construction site.

Installation on site is performed using a construction crane, cordless power tools and manual labour. The elements are joined by steel screws.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase.

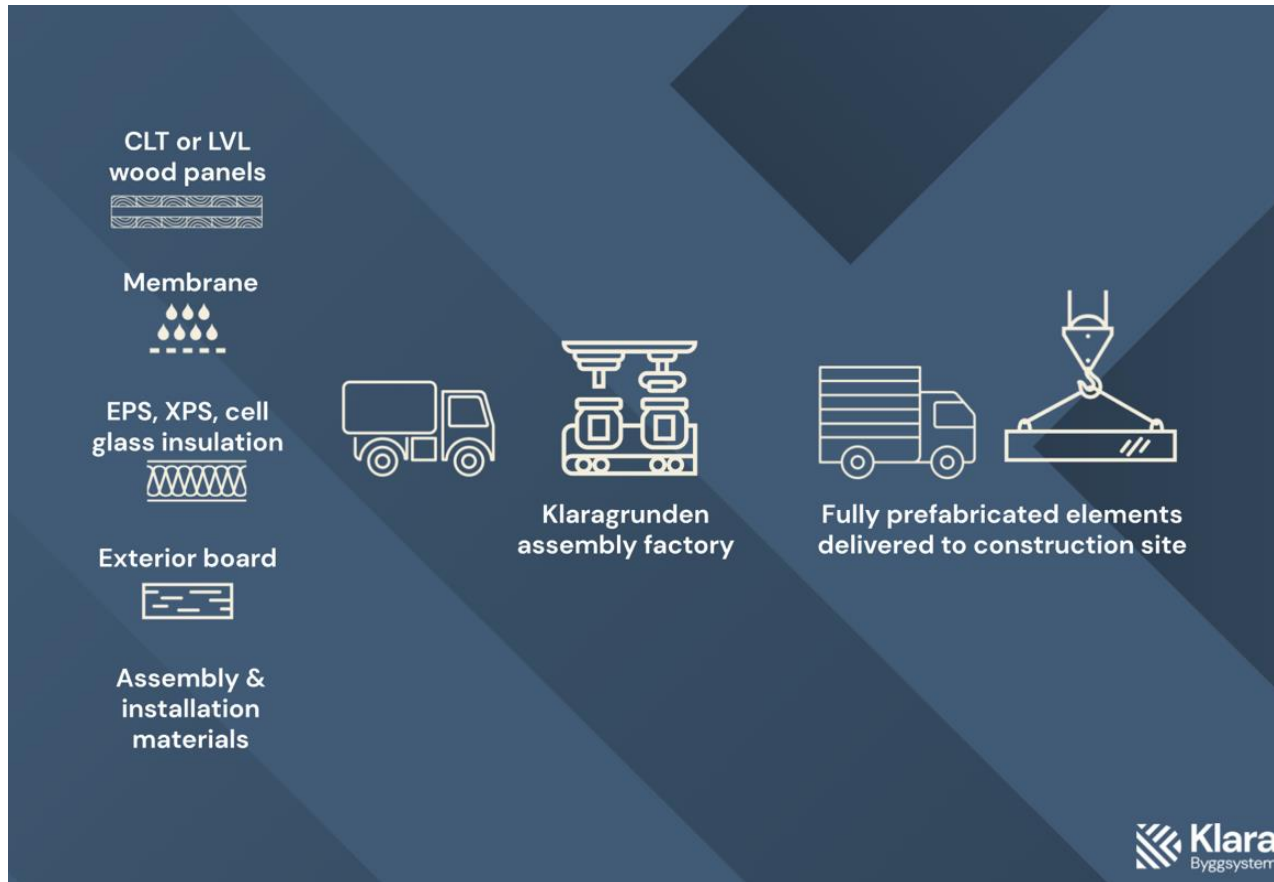
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The construction of the product is aimed at maximum circularity, it is as far as possible assembled with mechanical fastening and is therefore easy to de-install and disassemble. Wooden input materials are fully recycled to paper or particle boards. The field insulation is recycled and used as input material for new insulation by suppliers. The load bearing and edge insulation is currently not possible to recycle so for those materials incineration as waste is assumed.

A distance of 50 km from construction site to waste treatment facility is assumed.

MANUFACTURING PROCESS



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.

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 materials	No allocation
Ancillary materials	No allocation
Manufacturing energy and waste	No allocation

AVERAGES AND VARIABILITY

Type of average	No averaging
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	-

This EPD is product and factory specific and does not contain average calculations.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

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 ¹⁾	kg CO ₂ e	-9,14E0	1,62E0	7,56E-2	-7,44E0	5,01E-1	6,05E-1	MND	MND	MND	MND	MND	MND	MND	2E-1	2,54E-1	3,92E1	2,03E-1	-2,97E1
GWP – fossil	kg CO ₂ e	2,67E1	1,62E0	7,57E-2	2,84E1	5,06E-1	5,9E-1	MND	MND	MND	MND	MND	MND	MND	2E-1	2,54E-1	3,37E0	2,32E-2	-2,16E1
GWP – biogenic	kg CO ₂ e	-3,59E1	7,73E-4	-2,45E-4	-3,59E1	2,72E-4	1,44E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-8,05E0
GWP – LULUC	kg CO ₂ e	4,49E-2	8,78E-4	1,49E-4	4,59E-2	1,83E-4	3,22E-4	MND	MND	MND	MND	MND	MND	MND	1,51E-4	9,16E-5	1,3E-3	6,88E-6	-2,26E-2
Ozone depletion pot.	kg CFC-11e	5,88E-7	3,5E-7	6,23E-9	9,45E-7	1,15E-7	7,05E-8	MND	MND	MND	MND	MND	MND	MND	4,37E-8	5,77E-8	1,26E-7	9,54E-9	-2,13E-6
Acidification potential	mol H ⁺ e	9,62E-2	4,89E-3	2,2E-4	1,01E-1	1,45E-3	3,99E-3	MND	MND	MND	MND	MND	MND	MND	2,08E-3	7,28E-4	5,54E-3	2,2E-4	-1,26E-1
EP-freshwater ²⁾	kg Pe	8,09E-4	1,87E-5	1,35E-6	8,29E-4	4,3E-6	2,56E-5	MND	MND	MND	MND	MND	MND	MND	9,49E-7	2,16E-6	4,5E-5	2,8E-7	-9,66E-4
EP-marine	kg Ne	1,92E-2	9,31E-4	6,06E-5	2,02E-2	2,88E-4	1,3E-3	MND	MND	MND	MND	MND	MND	MND	9,16E-4	1,45E-4	1,43E-3	7,57E-5	-2,13E-2
EP-terrestrial	mol Ne	2,25E-1	1,05E-2	6,66E-4	2,36E-1	3,22E-3	1,41E-2	MND	MND	MND	MND	MND	MND	MND	1E-2	1,61E-3	1,57E-2	8,34E-4	-3,2E-1
POCP (“smog”) ³⁾	kg NMVOCe	8,56E-2	3,92E-3	2,13E-4	8,97E-2	1,23E-3	4,37E-3	MND	MND	MND	MND	MND	MND	MND	2,76E-3	6,18E-4	4,89E-3	2,42E-4	-1,04E-1
ADP-minerals & metals ⁴⁾	kg Sbe	5,01E-5	7,68E-5	9,37E-7	1,28E-4	1,39E-5	9,41E-6	MND	MND	MND	MND	MND	MND	MND	3,35E-7	7E-6	1,92E-5	2,12E-7	-3,69E-4
ADP-fossil resources	MJ	4,68E2	2,39E1	9,21E-1	4,93E2	7,64E0	7,48E0	MND	MND	MND	MND	MND	MND	MND	2,96E0	3,83E0	1,86E1	6,48E-1	-5,33E2
Water use ⁵⁾	m ³ e depr.	1,21E1	9,9E-2	1,8E-2	1,23E1	2,5E-2	1,63E-1	MND	MND	MND	MND	MND	MND	MND	8,18E-3	1,25E-2	3,65E-1	3E-2	-2,02E1

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 ⁶⁾	MJ	1,09E2	5E-1	1,28E-1	1,1E2	1,09E-1	5,78E-1	MND	MND	MND	MND	MND	MND	MND	1,31E-1	5,49E-2	1,38E0	5,24E-3	-1,45E1
Renew. PER as material	MJ	3,56E2	0E0	0E0	3,56E2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-3,53E2	-3,26E0	1,03E2
Total use of renew. PER	MJ	4,66E2	5E-1	1,28E-1	4,66E2	1,09E-1	5,78E-1	MND	MND	MND	MND	MND	MND	MND	1,31E-1	5,49E-2	-3,52E2	-3,25E0	8,9E1
Non-re. PER as energy	MJ	3,62E2	2,39E1	9,21E-1	3,87E2	7,64E0	7,48E0	MND	MND	MND	MND	MND	MND	MND	2,96E0	3,83E0	1,86E1	6,48E-1	-3,46E2
Non-re. PER as material	MJ	2,4E2	0E0	-9,56E0	2,3E2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-2,04E2	-2,6E1	-7,35E0
Total use of non-re. PER	MJ	6,02E2	2,39E1	-8,64E0	6,17E2	7,64E0	7,48E0	MND	MND	MND	MND	MND	MND	MND	2,96E0	3,83E0	-1,86E2	-2,53E1	-3,54E2
Secondary materials	kg	1,69E0	0E0	0E0	1,69E0	0E0	2,66E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	4E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m ³	2,62E-1	4,35E-3	2,68E-4	2,66E-1	1,32E-3	4,2E-3	MND	MND	MND	MND	MND	MND	MND	3,03E-4	6,62E-4	6E-3	7,09E-4	-8,27E-2

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	4,05E-2	3,35E-2	4,11E-3	7,81E-2	7,87E-3	1,13E-1	MND	MND	MND	MND	MND	MND	MND	3,11E-3	3,95E-3	0E0	6,04E-4	-9,47E-1
Non-hazardous waste	kg	1,54E0	1,51E0	1,05E-1	3,15E0	5,42E-1	1,22E0	MND	MND	MND	MND	MND	MND	MND	3,66E-2	2,72E-1	0E0	4,4E0	-3,17E1
Radioactive waste	kg	2,48E-3	1,59E-4	5,45E-6	2,64E-3	5,23E-5	3,56E-5	MND	MND	MND	MND	MND	MND	MND	2,25E-5	2,63E-5	0E0	4,29E-6	-8,92E-4

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	7,7E-3	0E0	0E0	7,7E-3	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	2,61E1	0E0	0E0
Materials for energy rec	kg	7,34E-2	0E0	0E0	7,34E-2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	3,3E-1	0E0	0E0	3,3E-1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,94E1	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO ₂ e	1,69E1	1,59E0	7,41E-2	1,86E1	5,01E-1	5,79E-1	MND	MND	MND	MND	MND	MND	MND	1,98E-1	2,51E-1	3,33E0	2,27E-2	-2,05E1
Ozone depletion Pot.	kg CFC ₁₁ e	6,94E-7	2,77E-7	5,81E-9	9,76E-7	9,15E-8	5,96E-8	MND	MND	MND	MND	MND	MND	MND	3,54E-8	4,59E-8	1,1E-7	7,56E-9	-1,92E-6
Acidification	kg SO ₂ e	5,46E-2	3,51E-3	1,4E-4	5,82E-2	1,02E-3	1,83E-3	MND	MND	MND	MND	MND	MND	MND	2,99E-4	5,12E-4	3,75E-3	9,17E-5	-9,56E-2
Eutrophication	kg PO ₄ ³ e	9,39E-3	8,33E-4	1,57E-4	1,04E-2	2,11E-4	1,07E-3	MND	MND	MND	MND	MND	MND	MND	5,58E-5	1,06E-4	3,85E-3	1,77E-5	-2,46E-2
POCP ("smog")	kg C ₂ H ₄ e	7,87E-2	2,1E-4	1,29E-5	7,89E-2	6,1E-5	2,15E-4	MND	MND	MND	MND	MND	MND	MND	3,04E-5	3,06E-5	2,93E-4	6,72E-6	-1,02E-2
ADP-elements	kg Sbe	5,01E-5	7,68E-5	9,37E-7	1,28E-4	1,39E-5	9,41E-6	MND	MND	MND	MND	MND	MND	MND	3,35E-7	7E-6	1,92E-5	2,12E-7	-3,69E-4
ADP-fossil	MJ	4,68E2	2,39E1	9,21E-1	4,93E2	7,64E0	7,48E0	MND	MND	MND	MND	MND	MND	MND	2,96E0	3,83E0	1,86E1	6,48E-1	-5,33E2

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 reference standard, 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 digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

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 reference standard.

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.

Neena Chandramathy, as an authorize verifier acting for EPD Hub Limited
22.06.2023

