ENVIRONMENTAL PRODUCT DECLARATION

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

Steel constructions

EAB

EPD HUB, HUB-0396

Publishing date 22 April 2023, last updated date 4 July 2023, valid until 22 April 2028

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	EAB
Address	Stålgatan 2, 333 33 Smålandsstenar
Contact details	info@eab.se
Website	www.eab.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 options, A4-A5, and modules C1-C4, D
EPD author	Linn Petersson, EAB.
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	N.C, 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	Steel constructions
Additional labels	-
Product reference	-
Place of production	Smålandsstenar, Sweden
Period for data	2021
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	Not relevant %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 kg
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	2,18E0
GWP-total, A1-A3 (kgCO2e)	2,18E0
Secondary material, inputs (%)	51.3
Secondary material, outputs (%)	99.3
Total energy use, A1-A3 (kWh)	7.42
Total water use, A1-A3 (m3e)	3,88E-2

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

EAB AB is a family-owned company, founded 1957, located in Smålandsstenar, Sweden. All design, production and development take place in our 57 600 m^2 premises. We have three main product areas: warehouse solutions, doors and steel buildings. EAB AB corporate group includes 8 subsidiaries located in Denmark, Finland, the Netherlands, North America, Norway, Czech Republic and Sweden. We have a total of 380 employees with a turnover of MDSEK 1.9. EAB is known for its high quality, commitment, customisation and expertise. Our way of working is always based on sustainability and long-term relationships - EAB Built to last.

PRODUCT DESCRIPTION

This EPD represents steel constructions produced at EAB in Smålandsstenar, Sweden. Steel constructions such as columns, beams, trusses and braces made of different steel components e.g., plates, structural hollow sections and roll formed sections. The finished constructions are always customized and contain a mix of different steel grades and handling technologies. The steel constructions are used in industrial, commercial, logistics properties, sports facilities, warehouses, etc. Further information can be found at www.eab.se.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	100	Europe
Minerals	-	-
Fossil materials	-	-
Bio-based materials	-	-

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

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 kg
Mass per declared unit	1 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	x	x	x	x	x		
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.

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 steel materials are blasted to wanted surface conditions using steel shots and cut to required shapes. Hydraulic oils, cutting emulsions and other lubrication oils are used during the process to reduce the wear of machines and to ensure stable cutting conditions. The final products are welded from the different steel components. The welding process consumes welding fillers as well as gases used as shielding. The products are painted and then packaged for shipping.

The manufacturing process requires electricity and fuels for the different equipment as well as heating (biogas). The steel waste produced at the plant is directed to recycling. The loss of material is considered.

Steel band is used as a packaging material for transporting the product from the factory gate to the construction site.

In this study allocation could not be avoided for raw materials, packaging and ancillary material, energy consumption and waste production as the information was only measured on factory or production process level. The inputs were allocated to studied product based on annual production volume (mass). The energy consumption has been allocated based on the production area and energy intensity of annual production of formed steel.

The values for 1 kilogram of structural steel are calculated by considering the total product weight per annual production. In the factory, several kinds of steel products are produced; since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total energy consumption and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 1 kg and the corresponding amount of product is used in the calculations. The proportion of recycled steel in the material varies between 2.9 - 98%.

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs.

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.

The transportation distance is defined according to the PCR. Average distance of transportation from production plant to building site is assumed as 175 km and the transportation method is assumed to be lorry. Vehicle capacity utilization volume factor is assumed to be 100% which means fully loaded transport. In reality, it may vary but as role of transportation emissions in total results is small, the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by the transportation company to serve the needs of other clients. Transportation does not cause losses as product are packaged properly.

Density of the product is 7850 kg/m³, however bulk density varies depending on product type and thickness. Therefore, the average loss due to the openings both in the product itself and between the nested products is assumed as 10%; accordingly, bulk density is calculated as an approximate 7000 kg/m³.

Installation consumes 10 kWh of energy for assembling 1 tonne of product. This means that 0.01 kWh is required to assemble 1 kilogram of steel beam. Further, steel for bolts and fasteners is included in the modelling.

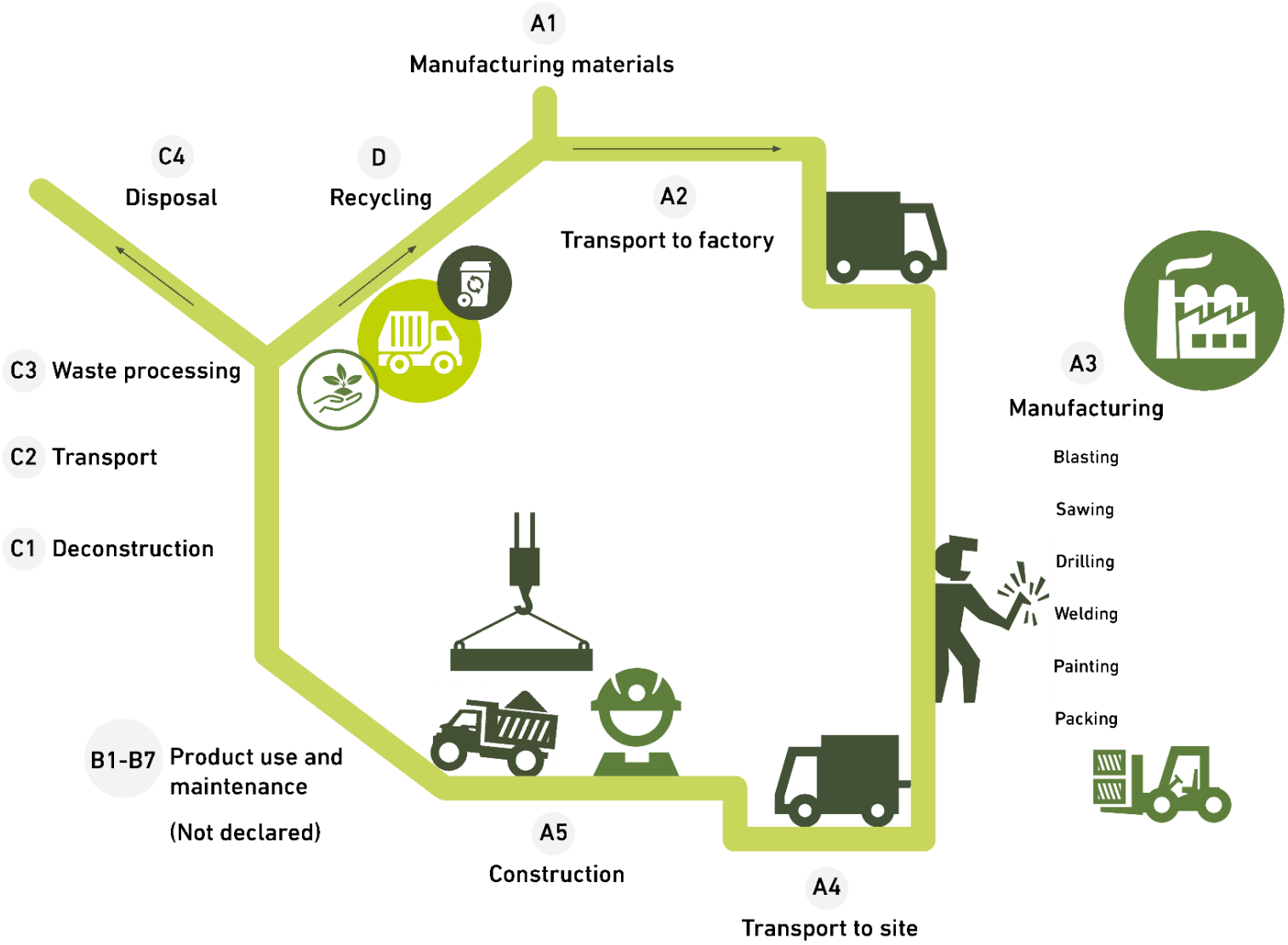
PRODUCT USE AND MAINTENANCE (B1-B7)

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)

Demolition and dismantling is assumed to consume 0,01 kWh/kg of product. The source of energy is diesel fuel used by construction machines (C1). It is assumed that 100% of the waste is collected and transported to the waste treatment center. Transportation distance to treatment is assumed as 50 km and the transportation method is assumed to be lorry (C2). Approximately 99% of steel is assumed to be recycled based on Raban Sibers dissertation, 2020 (C3). It is assumed that the remaining 1 % of steel is taken to landfill for final disposal (C4). Due to the recycling process, the end-of-life product is converted into recycled steel (D).

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	Allocated by mass or volume
Packaging materials	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

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 many constituents under 0,1% of product mass are excluded. These include some ancillary materials which are all present in the product only in very small amounts and have no serious impact on the emissions of the product. The total amount of paint is under 1% of product mass and are therefore excluded.

AVERAGES AND VARIABILITY

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

This is a single product EPD produced in a specific factory. No averaging is considered.

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_2e	2,13E0	4,42E-2	1,19E-2	2,18E0	1,58E-2	1,39E-2	MND	MND	MND	MND	MND	MND	MND	3,3E-3	4,56E-3	2,31E-2	5,29E-5	-9,84E-1
GWP – fossil	kg CO_2e	2,12E0	4,44E-2	1,08E-2	2,18E0	1,59E-2	1,35E-2	MND	MND	MND	MND	MND	MND	MND	3,3E-3	4,56E-3	2,45E-2	5,28E-5	-9,87E-1
GWP – biogenic	kg CO_2e	3,37E-3	-1,94E-4	1,1E-3	4,28E-3	1,16E-5	4,32E-4	MND	MND	MND	MND	MND	MND	MND	9,17E-7	3,31E-6	-1,4E-3	1,05E-7	3,23E-3
GWP – LULUC	kg CO_2e	1,21E-3	1,55E-5	1,12E-5	1,24E-3	4,79E-6	2,53E-5	MND	MND	MND	MND	MND	MND	MND	2,79E-7	1,37E-6	2,78E-5	1,57E-8	-1,93E-4
Ozone depletion pot.	kg $CFC_{-11}e$	1,48E-7	1,01E-8	9,2E-10	1,59E-7	3,74E-9	1,31E-9	MND	MND	MND	MND	MND	MND	MND	7,12E-10	1,07E-9	3,52E-9	2,18E-11	-3,18E-8
Acidification potential	mol H^+e	1,13E-2	2,18E-4	7,33E-5	1,16E-2	6,68E-5	7,51E-5	MND	MND	MND	MND	MND	MND	MND	3,45E-5	1,91E-5	2,97E-4	5,01E-7	-4,85E-3
EP-freshwater[2)]	kg Pe	2,56E-5	3,85E-7	7,2E-7	2,67E-5	1,29E-7	7,51E-7	MND	MND	MND	MND	MND	MND	MND	1,33E-8	3,71E-8	1,69E-6	6,38E-10	-5,92E-5
EP-marine	kg Ne	2,35E-3	6,63E-5	1,33E-5	2,43E-3	2,01E-5	1,92E-5	MND	MND	MND	MND	MND	MND	MND	1,52E-5	5,77E-6	6,56E-5	1,73E-7	-9,42E-4
EP-terrestrial	mol Ne	2,66E-2	7,32E-4	1,77E-4	2,75E-2	2,22E-4	2,09E-4	MND	MND	MND	MND	MND	MND	MND	1,67E-4	6,37E-5	7,6E-4	1,9E-6	-1,07E-2
POCP ("smog")[3)]	kg NMVOCe	1,05E-2	2,27E-4	5,12E-5	1,07E-2	7,15E-5	7,17E-5	MND	MND	MND	MND	MND	MND	MND	4,59E-5	2,05E-5	2,08E-4	5,52E-7	-5,11E-3
ADP-minerals & metals[4)]	kg Sbe	1,42E-5	8,34E-7	1,87E-7	1,52E-5	2,72E-7	2,76E-7	MND	MND	MND	MND	MND	MND	MND	5,03E-9	7,78E-8	1,36E-6	4,83E-10	-1,78E-5
ADP-fossil resources	MJ	2,34E1	6,74E-1	1,49E-1	2,42E1	2,47E-1	1,93E-1	MND	MND	MND	MND	MND	MND	MND	4,54E-2	7,09E-2	3,39E-1	1,48E-3	-8,1E0
Water use[5)]	m^3e depr.	2,42E0	2,63E-3	6,22E-3	2,43E0	9,21E-4	5,09E-3	MND	MND	MND	MND	MND	MND	MND	8,46E-5	2,64E-4	4,82E-3	6,83E-5	-4,62E-1

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	1,61E0	1,22E-2	3,43E-1	1,96E0	3,12E-3	2,87E-2	MND	MND	MND	MND	MND	MND	MND	2,45E-4	8,92E-4	5,33E-2	1,19E-5	-8,07E-1
Renew. PER as material	MJ	7,41E-6	0E0	-5,15E-7	6,9E-6	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-6,77E-6	-6,84E-8	0E0
Total use of renew. PER	MJ	1,61E0	1,22E-2	3,43E-1	1,96E0	3,12E-3	2,87E-2	MND	MND	MND	MND	MND	MND	MND	2,45E-4	8,92E-4	5,33E-2	1,19E-5	-8,07E-1
Non-re. PER as energy	MJ	2,39E1	6,74E-1	1,49E-1	2,48E1	2,47E-1	1,93E-1	MND	MND	MND	MND	MND	MND	MND	4,54E-2	7,09E-2	3,39E-1	1,48E-3	-8,1E0
Non-re. PER as material	MJ	4,75E-2	0E0	-3,26E-3	4,42E-2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-4,28E-2	-4,33E-4	0E0
Total use of non-re. PER	MJ	2,4E1	6,74E-1	1,46E-1	2,48E1	2,47E-1	1,93E-1	MND	MND	MND	MND	MND	MND	MND	4,54E-2	7,09E-2	2,97E-1	1,04E-3	-8,1E0
Secondary materials	kg	5,12E-1	0E0	5,36E-4	5,13E-1	0E0	7,89E-4	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	3,94E-1
Renew. secondary fuels	MJ	5,53E-3	0E0	0E0	5,53E-3	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	8,27E-5	0E0	0E0	8,27E-5	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	3,86E-2	1,38E-4	7,46E-5	3,88E-2	5,15E-5	1,27E-4	MND	MND	MND	MND	MND	MND	MND	4,01E-6	1,48E-5	1,39E-4	1,62E-6	-6,8E-3

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	2,83E-1	7,92E-4	1,43E-3	2,86E-1	2,41E-4	3,31E-3	MND	MND	MND	MND	MND	MND	MND	4,88E-5	6,89E-5	0E0	1,38E-6	-3,82E-1
Non-hazardous waste	kg	2,62E0	6,79E-2	3,59E-2	2,72E0	2,66E-2	3,58E-2	MND	MND	MND	MND	MND	MND	MND	5,22E-4	7,62E-3	0E0	1E-2	-3,22E0
Radioactive waste	kg	2,47E-4	4,58E-6	7,12E-7	2,52E-4	1,7E-6	1,06E-6	MND	MND	MND	MND	MND	MND	MND	3,18E-7	4,87E-7	0E0	9,77E-9	-1,51E-6

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	7,04E-6	0E0	0E0	7,04E-6	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	3,27E-3	0E0	8,15E-2	8,48E-2	0E0	4E-4	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,93E-1	0E0	0E0
Materials for energy rec	kg	4,14E-3	0E0	0E0	4,14E-3	0E0	0E0	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 – 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 CO2e	2,05E0	4,4E-2	1,06E-2	2,11E0	1,58E-2	1,32E-2	MND	MND	MND	MND	MND	MND	MND	3,27E-3	4,52E-3	2,41E-2	5,18E-5	-9,42E-1
Ozone depletion Pot.	kg CFC-11e	7,04E-8	8,03E-9	8,75E-10	7,93E-8	2,97E-9	1,25E-9	MND	MND	MND	MND	MND	MND	MND	5,63E-10	8,52E-10	2,99E-9	1,72E-11	-2,77E-8
Acidification	kg SO2e	7,01E-3	1,21E-4	5,3E-5	7,18E-3	3,24E-5	4,88E-5	MND	MND	MND	MND	MND	MND	MND	4,87E-6	9,27E-6	1,85E-4	2,09E-7	-4E-3
Eutrophication	kg PO43e	2,53E-3	2,48E-5	2,78E-5	2,58E-3	6,54E-6	3,08E-5	MND	MND	MND	MND	MND	MND	MND	8,57E-7	1,87E-6	7,54E-5	4,04E-8	-2,73E-3
POCP (“smog”)	kg C2H4e	8,66E-4	6,76E-6	4,71E-6	8,78E-4	2,05E-6	5,77E-6	MND	MND	MND	MND	MND	MND	MND	5,01E-7	5,88E-7	8,65E-6	1,53E-8	-6,48E-4
ADP-elements	kg Sbe	1,42E-5	8,34E-7	1,87E-7	1,52E-5	2,72E-7	2,76E-7	MND	MND	MND	MND	MND	MND	MND	5,03E-9	7,78E-8	1,36E-6	4,83E-10	-1,78E-5
ADP-fossil	MJ	2,34E1	6,74E-1	1,49E-1	2,42E1	2,47E-1	1,93E-1	MND	MND	MND	MND	MND	MND	MND	4,54E-2	7,09E-2	3,39E-1	1,48E-3	-8,1E0

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 authorized verifier acting for EPD Hub Limited
Updated 04.07.2023