ENVIRONMENTAL PRODUCT DECLARATION

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

Keystone

Created with One Click LCA

EPD HUB, HUB-0417

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GENERAL INFORMATION

MANUFACTURER

Manufacturer	Hedareds Sand & Betong AB
Address	Hestra 20, 517 92 Bollebygd
Contact details	hedared@heda.se
Website	www.heda.se

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 16757, 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	Mattias Gustafsson
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	H.N, 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	Keystone
Additional labels	-
Product reference	-
Place of production	Sweden
Period for data	2022
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 tonne
Declared unit mass	1000 kg
GWP-fossil, A1-A3 (kgCO2e)	100
GWP-total, A1-A3 (kgCO2e)	100
Secondary material, inputs (%)	1.05
Secondary material, outputs (%)	80.0
Total energy use, A1-A3 (kWh)	271
Total water use, A1-A3 (m3e)	5.57

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Hedareds Sand & Betong AB is a family-owned concrete manufacturing company that started in 1952 in Hedared Sweden. Today the production takes place in two factories located in Hedared and Bollebygd, and all aggregates used are taken from our own quarries nearby. Heda manufactures prefabricated concrete elements such as balconies, slabs and pillars for apartment, office or industrial buildings as well as block and foundation products.

PRODUCT DESCRIPTION

Keystone concrete blocks are used for the construction of walls and fences, both purely for decoration and for function. The blocks come in many different shapes and sizes. For comparisons between the different types, see the table at the end of this EPD.

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

PRODUCT RAW MATERIAL MAIN COMPOSITION

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

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

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

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 tonne
Mass per declared unit	1000 kg
Reference service life	50 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	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 manufacturing of a keystone block begins with the preparation of the casting mould. After the mould is assembled, concrete is poured into the mould and compressed to make sure that the concrete is packed. The mould is then removed, and the product is checked for flaws and imperfections. Once it has passed the quality checks, it's left to cure in a curing chamber.

Blocks that do not pass the quality checks are disposed and used as landfilling material.

The keystone blocks are loaded on to wooden pallets and covered with a plastic wrap for protection and moved to the storage yard. The pallets are then loaded on to trucks for delivery to the customer.

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 200 km and the transportation method is assumed to be lorry. Vehicle capacity utilization volume factor is assumed to be 80 %. These values may vary, but the impacts of the transportation emissions in the results are so small that the variety can be assumed to be negligible. Empty returns are considered as it is assumed that return trips are normally not used by the transportation company to serve the needs of other clients. Transportation does not cause losses as products are secured properly.

Installation of the keystone blocks do not require any machinery and can be entirely done by hand. Production loss at installation is assumed negligible as the keystone blocks are delivered ready made from the factory.

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)

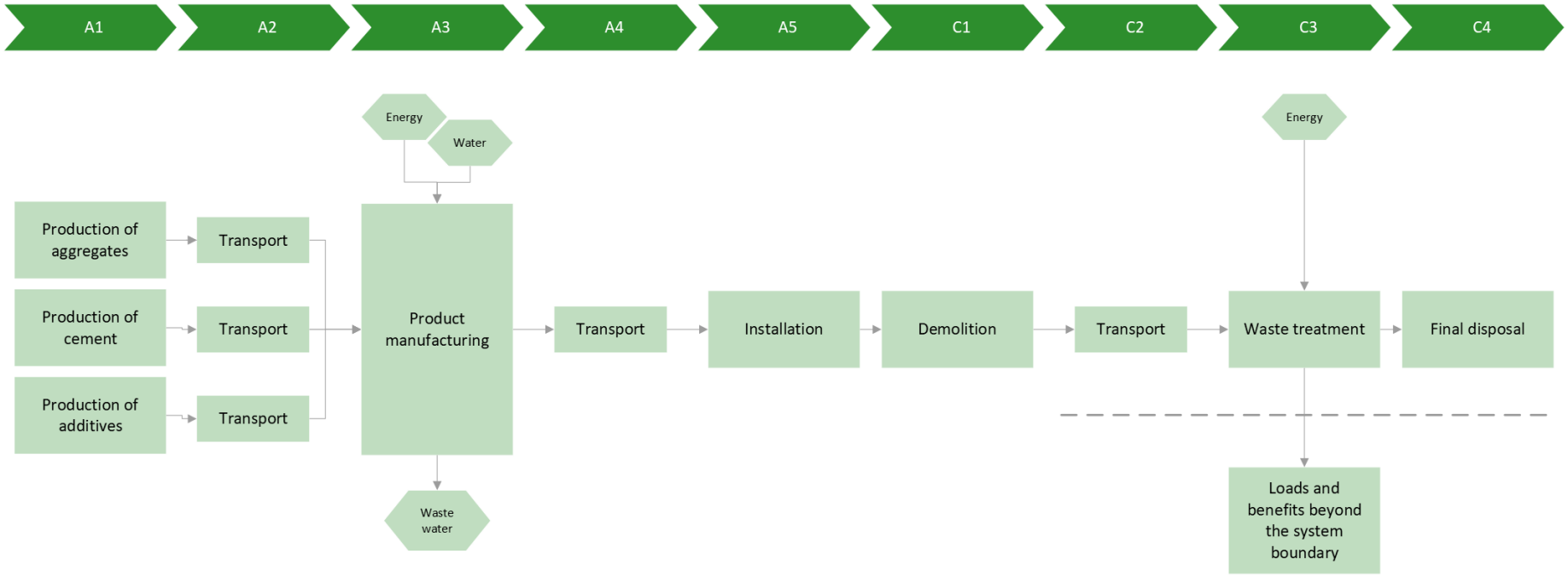
At the end-of-life, in the demolition phase no energy is assumed to be used as the keystone blocks can be disassembled entirely by hand and re-used elsewhere.

If the Keystone blocks are to be demolished, the energy consumed is 2 kWh/tonne for crushing the concrete. (IVL, 2015). The crushed concrete is delivered to the nearest construction waste treatment plant. It is estimated that there is no mass loss during the use of the product and therefore the end-of-life product is assumed to have the same mass as the declared product. Transportation distance to the closest waste treatment is estimated to 100 km and the transportation method is assumed to be lorry as it is the most common.

At the waste treatment plant, 80% of the concrete (Betoniteollisuus ry, 2020) is recycled. The process losses of the waste treatment plant are assumed to be negligible. The remaining 20% of concrete is assumed to be sent to a landfill.

Due to the recycling potential of concrete, it can be used as secondary raw material, which avoids the use of virgin raw materials. 80 % of concrete steel going to waste processing are converted into secondary raw materials after recycling.

MANUFACTURING PROCESS AND SYSTEM BOUNDARY



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	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

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_2e	8,64E1	1,19E1	1,53E0	9,98E1	1,73E1	3,05E-1	MND	MND	MND	MND	MND	MND	MND	6,6E-1	8,72E0	3,2E0	2,49E0	-4,07E0
GWP – fossil	kg CO_2e	8,63E1	1,18E1	2,35E0	1E2	1,74E1	1,82E-1	MND	MND	MND	MND	MND	MND	MND	6,59E-1	8,71E0	3,2E0	2,49E0	-4,12E0
GWP – biogenic	kg CO_2e	1,17E-1	5,23E-3	-8,71E-1	-7,49E-1	1,32E-2	1,23E-1	MND	MND	MND	MND	MND	MND	MND	1,83E-4	6,6E-3	8,9E-4	2,74E-3	5,23E-2
GWP – LULUC	kg CO_2e	1,37E-2	4,87E-3	4,96E-2	6,81E-2	5,47E-3	1,12E-4	MND	MND	MND	MND	MND	MND	MND	5,57E-5	2,74E-3	2,7E-4	7,42E-4	-4,06E-3
Ozone depletion pot.	kg CFC_{-11}e	2,57E-6	2,74E-6	4,3E-7	5,74E-6	4,28E-6	1,63E-8	MND	MND	MND	MND	MND	MND	MND	1,42E-7	2,14E-6	6,91E-7	7,36E-7	-3,34E-7
Acidification potential	mol H^+e	2,67E-1	1,51E-1	1,09E-2	4,28E-1	5,6E-2	5,33E-4	MND	MND	MND	MND	MND	MND	MND	6,9E-3	2,8E-2	3,35E-2	2,24E-2	-2,74E-2
EP-freshwater[2)]	kg Pe	1,84E-4	8,42E-5	1,26E-4	3,94E-4	1,48E-4	3,26E-6	MND	MND	MND	MND	MND	MND	MND	2,67E-6	7,39E-5	1,29E-5	2,49E-5	-1,31E-4
EP-marine	kg Ne	1,03E-1	3,68E-2	3,14E-3	1,42E-1	1,23E-2	1,38E-4	MND	MND	MND	MND	MND	MND	MND	3,05E-3	6,16E-3	1,48E-2	8,59E-3	-7,55E-3
EP-terrestrial	mol Ne	1,15E0	4,09E-1	2,57E-2	1,58E0	1,37E-1	1,52E-3	MND	MND	MND	MND	MND	MND	MND	3,34E-2	6,85E-2	1,62E-1	9,44E-2	-8,72E-2
POCP ("smog")[3)]	kg	2,82E-1	1,14E-1	8,91E-3	4,05E-1	5,38E-2	4,97E-4	MND	MND	MND	MND	MND	MND	MND	9,18E-3	2,69E-2	4,46E-2	2,67E-2	-2,6E-2
ADP-minerals & metals[4)]	kg Sbe	4,28E-4	1,69E-4	3,17E-5	6,28E-4	3,1E-4	3E-6	MND	MND	MND	MND	MND	MND	MND	1,01E-6	1,55E-4	4,89E-6	2,49E-5	-1,75E-4
ADP-fossil resources	MJ	2,7E2	1,79E2	1,27E2	5,77E2	2,83E2	1,94E0	MND	MND	MND	MND	MND	MND	MND	9,07E0	1,41E2	4,41E1	4,97E1	-6,89E1
Water use[5)]	m^3e depr.	8,69E3	5,78E-1	-4,68E0	8,69E3	1,05E0	3,52E-2	MND	MND	MND	MND	MND	MND	MND	1,69E-2	5,26E-1	8,22E-2	1,43E0	-5,02E1

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[8)]	MJ	4,26E1	1,95E0	4,54E1	8,99E1	3,67E0	9,59E-2	MND	MND	MND	MND	MND	MND	MND	4,91E-2	1,78E0	2,38E-1	4,73E-1	-3,2E0
Renew. PER as material	MJ	0E0	0E0	8,46E0	8,46E0	0E0	-8,48E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	4,26E1	1,95E0	5,39E1	9,84E1	3,67E0	-8,38E0	MND	MND	MND	MND	MND	MND	MND	4,91E-2	1,78E0	2,38E-1	4,73E-1	-3,2E0
Non-re. PER as energy	MJ	2,71E2	1,79E2	1,07E2	5,58E2	2,92E2	1,94E0	MND	MND	MND	MND	MND	MND	MND	9,07E0	1,41E2	4,41E1	4,97E1	-4,88E1
Non-re. PER as material	MJ	0E0	0E0	2,02E1	2,02E1	0E0	-2,02E1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-6,04E1
Total use of non-re. PER	MJ	2,71E2	1,79E2	1,27E2	5,78E2	2,92E2	-1,83E1	MND	MND	MND	MND	MND	MND	MND	9,07E0	1,41E2	4,41E1	4,97E1	-1,09E2
Secondary materials	kg	1,05E1	0E0	6,6E-3	1,05E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	4,13E-1
Renew. secondary fuels	MJ	5,58E1	0E0	0E0	5,58E1	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	2,71E2	0E0	0E0	2,71E2	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	5,14E0	3,16E-2	3,99E-1	5,57E0	6,08E-2	5,44E-4	MND	MND	MND	MND	MND	MND	MND	8,01E-4	2,94E-2	3,89E-3	3,52E-2	-1,13E0

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	2,58E-1	1,8E-1	1,63E-1	6E-1	2,84E-1	9,14E-3	MND	MND	MND	MND	MND	MND	MND	9,76E-3	1,37E-1	0E0	5,65E-2	-2,63E-1
Non-hazardous waste	kg	1,02E1	1,47E1	4,69E0	2,96E1	3,14E1	2,5E-1	MND	MND	MND	MND	MND	MND	MND	1,04E-1	1,52E1	0E0	2E2	-5,78E0
Radioactive waste	kg	1,17E-3	1,24E-3	1,26E-3	3,67E-3	2E-3	8,43E-6	MND	MND	MND	MND	MND	MND	MND	6,35E-5	9,71E-4	0E0	3,31E-4	-1,61E-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	1,34E-2	0E0	0E0	1,34E-2	0E0	4,23E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8E2	0E0	0E0
Materials for energy rec	kg	3,96E-2	0E0	0E0	3,96E-2	0E0	4,51E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Exported energy	MJ	2,14E-1	0E0	0E0	2,14E-1	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 CO_2e	8,76E1	1,17E1	2,3E0	1,02E2	1,78E1	1,78E-1	MND	MND	MND	MND	MND	MND	MND	6,54E-1	8,63E0	3,18E0	2,45E0	-3,95E0
Ozone depletion Pot.	kg CFC_{-11}e	2,17E-6	2,17E-6	6,49E-7	4,99E-6	3,51E-6	1,36E-8	MND	MND	MND	MND	MND	MND	MND	1,13E-7	1,7E-6	5,47E-7	5,84E-7	-2,76E-7
Acidification	kg SO_2e	1,71E-1	1,17E-1	8,82E-3	2,97E-1	3,82E-2	3,48E-4	MND	MND	MND	MND	MND	MND	MND	9,73E-4	1,85E-2	4,73E-3	8,15E-3	-1,49E-2
Eutrophication	kg PO_4^3e	3,67E-2	1,47E-2	4,44E-3	5,58E-2	7,71E-3	3,49E-4	MND	MND	MND	MND	MND	MND	MND	1,71E-4	3,74E-3	8,32E-4	1,74E-3	-4,62E-3
POCP (“smog”)	kg C_2H_4e	9,43E-3	3,54E-3	8,64E-4	1,38E-2	2,2E-3	3,03E-5	MND	MND	MND	MND	MND	MND	MND	1E-4	1,06E-3	4,87E-4	5,25E-4	-1,67E-3
ADP-elements	kg Sbe	4,28E-4	1,69E-4	3,17E-5	6,28E-4	3,2E-4	3E-6	MND	MND	MND	MND	MND	MND	MND	1,01E-6	1,55E-4	4,89E-6	2,49E-5	-1,75E-4
ADP-fossil	MJ	2,7E2	1,79E2	1,27E2	5,77E2	2,92E2	1,94E0	MND	MND	MND	MND	MND	MND	MND	9,07E0	1,41E2	4,41E1	4,97E1	-6,89E1

GLOBAL WARMING POTENTIAL (TOTAL) FOR EACH TYPE OF BLOCK – PER M²

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5
GWP – total[1)]	kg CO_2e	8,64E1	1,19E1	1,53E0	9,98E1	1,73E1	3,05E-1
GWP – Compac	kg CO_2e	3,14E1	4,32E0	8,20E-1	3,67E1	6,28E0	1,68E-2
GWP – Compac Cut Straigtht	kg CO_2e	3,14E1	4,32E0	8,20E-1	3,67E1	6,28E0	1,68E-2
GWP – Compac Cut	kg CO_2e	2,61E1	3,60E0	6,84E-1	3,06E1	5,23E0	1,40E-2
GWP – Compac Plus	kg CO_2e	2,80E1	3,86E0	7,33E-1	3,28E1	5,61E0	1,50E-2
GWP – Country Manor	kg CO_2e	3,96E1	5,45E0	1,04E0	4,63E1	7,92E0	2,12E-2
GWP – Garden Wall	kg CO_2e	3,04E1	4,19E0	7,96E-1	3,56E1	6,09E0	1,63E-2
GWP – Garden Wall	kg CO_2e	3,04E1	4,19E0	7,96E-1	3,56E1	6,09E0	1,63E-2
GWP – Country Manor	kg CO_2e	3,96E1	5,45E0	1,04E0	4,63E1	7,92E0	2,12E-2

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.

HaiHa Nguyen, as an authorized verifier acting for EPD Hub Limited
05.05.2023

VERIFIED ISO 14025