ENVIRONMENTAL PRODUCT DECLARATION

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

Hólabrú aggregate
Steypustöðin

EPD HUB, HUB-0170
Publishing date 04 November 2022, last updated date 04 November 2022, valid until 04 November

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Steypustöðin
Address	Malarhöfði 10, 110 Reykjavík
Contact details	kai@steypustodin.is
Website	https://steypustodin.is/

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 and D
EPD author	Freyr Ingólfsson, Verkis Consulting Engineers
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	S.B, 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	Hólabrú aggregate
Additional labels	-
Product reference	-
Place of production	Hólabrú quarry, Akranes, Iceland
Period for data	Data collection is based on calendar year 2021 data
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)	4.82
GWP-total, A1-A3 (kgCO2e)	4.88
Secondary material, inputs (%)	2.75E-4
Secondary material, outputs (%)	135.0
Total energy use, A1-A3 (kWh)	20.4
Total water use, A1-A3 (m3e)	0.0346

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Steypustöðins main operation is the production of ready mix concrete, where great emphasis is placed on quality issues and all additives and fillers used in the concrete are in accordance with the requirements of building regulations. The company owns and operates quarries where it produces aggregates used in concrete, road construction and other applications.

PRODUCT DESCRIPTION

Hólabrú quarry is an old gravel reef that was formed when sea levels were much higher than today. The raw material is collected by digging and ripping, then the material is either crushed or sieved and then sieved again into different sizes.
The Hólabrús aggregate are used in ready mix concrete products from Steypustöðin as well for road constructions.

Standard: ÍST EN 12620 + ÍST 76
Fine content: 1,5%
Harmful fines: Non existent
Loose bulk density: 1,641 Mg/cm3
Water absorption: 2,8 %
Alkali Reaction: Not active
Chloride content: C 0,0%
Flakiness index: FI 5
LA value: 17
Frost resistance: FEC 10
Humus: Non existent
Petrography:
58% - 1st class
38% - 2nd class
4% - 3rd class

Further information on the products can be found on the company webpage: https://steypustodin.is/flokkur/sandur_og_mol/

Further information can be found at https://steypustodin.is/.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0	-
Minerals	100	Iceland
Fossil materials	0	-
Bio-based materials	0	-

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 tonne
Mass per declared unit	1000 kg
Functional unit	N/A
Reference service life	N/A

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	MND	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 aggregate (natural stones) is retrieved by digging or ripping with excavators or diggers in Hólabrú quarry. Then it is processed and crushed followed by sorting into different sizes of aggregates by shakers and sieves with water washing. Hólabrú aggregate is about 57% of the total production processed at the Hólabrú quarry, with 43% of the production is dedicated for the production of Bakki aggregate.
No internal transportation.
No packing for the product is required as it delivered in bulk.
Wastes generated in the process are spent ancillary materials used the production of the aggregate. Waste is collected at the production site and transported to a recycling facility in 35 km distance from the production site. Wastewater goes to the sewage system.
Ancillary materials used in the manufacturing are iron materials (drill bits, tools, etc.), rubber parts (seals, conveyors, pullies, etc.) and lubricating oil for machinery. Energy sources are electricity from the national grid and diesel fuel for machinery and vehicles.
Material losses include fines generated during the processing of the aggregate.

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 35 km and the transportation method is assumed to be lorry. Vehicle capacity utilization volume factor is assumed to be 100 % which means full load. 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 loaded properly.

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 100% of the waste is assumed to be collected as separate construction waste.

About 50% of the aggregate is used in concrete and 50% is used in road construction.

At the waste treatment plant, waste that can be reused, recycled, or recovered for energy is separated and diverted for further use. This waste handling scenario used in

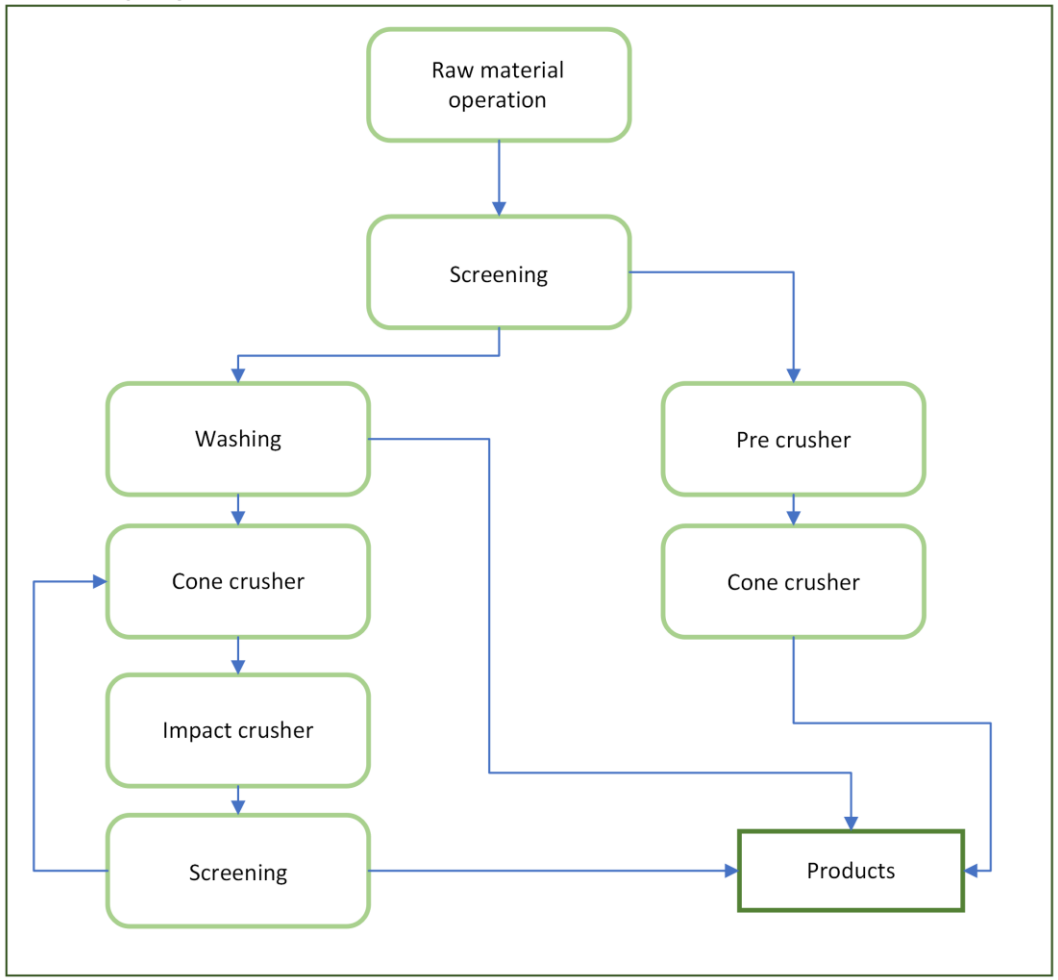
modules C and benefit in module D is a conservative assumption based on the current practice in Reykjavik, Iceland.

About 80% of concrete is recycled and 95% of aggregates used in road construction is reused. The process losses of the waste treatment plant are assumed to be negligible (C3). The remaining 20% of concrete and 5% road construction aggregates are assumed to be sent to the landfill (C4).

- Module C1: Amount of energy spent by the building machines used in demolition is assumed to be 0,01 kWh/kg of concrete element.
- Module C2: Transportation distance to the closest disposal area is estimated as 35 km and the transportation method is assumed as lorry which is the most common.
- Module D benefits and loads of gravel recycling are included and the recycled materials displace the need for virgin material production.

MANUFACTURING PROCESS

Hólabrú quarry



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	Not applicable
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	0E0	1,11E-3	4,88E0	4,88E0	3,15E0	8,06E-2	MND	MND	MND	MND	MND	MND	MND	3,3E0	4,51E0	4,21E0	1,7E0	-7,33E0
GWP – fossil	kg CO_2e	0E0	1,11E-3	4,82E0	4,82E0	3,18E0	8E-2	MND	MND	MND	MND	MND	MND	MND	3,3E0	4,51E0	4,18E0	1,69E0	-7,23E0
GWP – biogenic	kg CO_2e	0E0	7,79E-7	1,44E-2	1,44E-2	2,31E-3	1,67E-4	MND	MND	MND	MND	MND	MND	MND	9,17E-4	2,71E-3	2,62E-2	4,19E-3	-8,93E-2
GWP – LULUC	kg CO_2e	0E0	3,37E-7	4,32E-2	4,32E-2	9,57E-4	4,42E-4	MND	MND	MND	MND	MND	MND	MND	2,79E-4	1,51E-3	2,27E-3	5E-4	-9,38E-3
Ozone depletion pot.	kg $CFC_{-11}e$	0E0	2,6E-10	1,01E-6	1,01E-6	7,48E-7	1,76E-8	MND	MND	MND	MND	MND	MND	MND	7,12E-7	1,04E-6	8,83E-7	4,5E-7	-6,56E-7
Acidification potential	mol H^+e	0E0	4,66E-6	4,94E-2	4,94E-2	1,34E-2	6,27E-4	MND	MND	MND	MND	MND	MND	MND	3,45E-2	1,86E-2	3,73E-2	1,35E-2	-4,73E-2
EP-freshwater[2)]	kg Pe	0E0	9,21E-9	5,46E-5	5,46E-5	2,59E-5	8,05E-7	MND	MND	MND	MND	MND	MND	MND	1,33E-5	3,73E-5	9,84E-5	1,71E-5	-4,64E-4
EP-marine	kg Ne	0E0	1,4E-6	2,18E-2	2,18E-2	4,03E-3	2,58E-4	MND	MND	MND	MND	MND	MND	MND	1,52E-2	5,55E-3	1,44E-2	5,19E-3	-9,97E-3
EP-terrestrial	mol Ne	0E0	1,54E-5	2,34E-1	2,34E-1	4,45E-2	2,79E-3	MND	MND	MND	MND	MND	MND	MND	1,67E-1	6,13E-2	1,59E-1	5,56E-2	-1,31E-1
POCP ("smog")[3)]	kg NMVOCe	0E0	4,97E-6	6,47E-2	6,48E-2	1,43E-2	7,9E-4	MND	MND	MND	MND	MND	MND	MND	4,59E-2	1,91E-2	4,4E-2	1,58E-2	-3,32E-2
ADP-minerals & metals[4)]	kg Sbe	0E0	2E-8	3,8E-5	3,8E-5	5,43E-5	9,23E-7	MND	MND	MND	MND	MND	MND	MND	5,03E-6	1,06E-4	2,69E-5	1,53E-5	-7,98E-4
ADP-fossil resources	MJ	0E0	1,72E-2	6,61E1	6,61E1	4,95E1	1,16E0	MND	MND	MND	MND	MND	MND	MND	4,54E1	6,87E1	6,94E1	3,11E1	-1,04E2
Water use[5)]	m^3e depr.	0E0	6,52E-5	2,52E-1	2,52E-1	1,84E-1	4,36E-3	MND	MND	MND	MND	MND	MND	MND	8,46E-2	2,34E-1	1,01E0	9,93E-1	-1,29E1

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	0E0	9,94E-11	1,28E-6	1,28E-6	2,88E-7	1,57E-8	MND	MND	MND	MND	MND	MND	MND	9,14E-7	3,47E-7	2,4E-6	6,76E-7	-5,52E-7
Ionizing radiation[6)]	kBq U235e	0E0	7,52E-5	2,8E-1	2,8E-1	2,16E-1	4,96E-3	MND	MND	MND	MND	MND	MND	MND	1,94E-1	3E-1	3,5E-1	1,28E-1	-6,59E-1
Ecotoxicity (freshwater)	CTUe	0E0	1,33E-2	6,15E1	6,16E1	3,78E1	9,94E-1	MND	MND	MND	MND	MND	MND	MND	2,66E1	5,29E1	4,62E1	2,19E1	-1,26E2
Human toxicity, cancer	CTUh	0E0	3,48E-13	2,1E-9	2,1E-9	9,67E-10	3,06E-11	MND	MND	MND	MND	MND	MND	MND	9,53E-10	1,47E-9	1,71E-9	6,65E-10	-6,46E-9
Human tox. non-cancer	CTUh	0E0	1,57E-11	4,91E-8	4,92E-8	4,48E-8	9,4E-10	MND	MND	MND	MND	MND	MND	MND	2,35E-8	6,08E-8	4,18E-8	1,78E-8	-1,53E-7
SQP[7)]	-	0E0	2,57E-2	2,06E0	2,08E0	7,47E1	7,68E-1	MND	MND	MND	MND	MND	MND	MND	1,16E0	7,4E1	6,82E1	5,21E1	-7,17E1

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	0E0	2,2E-4	7,33E0	7,33E0	6,23E-1	7,95E-2	MND	MND	MND	MND	MND	MND	MND	2,45E-1	9,32E-1	3,13E0	3,39E-1	-8,85E0
Renew. PER as material	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	0E0	2,2E-4	7,33E0	7,33E0	6,23E-1	7,95E-2	MND	MND	MND	MND	MND	MND	MND	2,45E-1	9,32E-1	3,13E0	3,39E-1	-8,85E0
Non-re. PER as energy	MJ	0E0	1,72E-2	6,61E1	6,61E1	4,95E1	1,16E0	MND	MND	MND	MND	MND	MND	MND	4,54E1	6,87E1	6,94E1	3,11E1	-1,04E2
Non-re. PER as material	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	0E0	1,72E-2	6,61E1	6,61E1	4,95E1	1,16E0	MND	MND	MND	MND	MND	MND	MND	4,54E1	6,87E1	6,94E1	3,11E1	-1,04E2
Secondary materials	kg	0E0	0E0	2,75E-3	2,75E-3	0E0	2,75E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
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	0E0	3,59E-6	3,46E-2	3,46E-2	1,03E-2	4,49E-4	MND	MND	MND	MND	MND	MND	MND	4,01E-3	1,27E-2	2,73E-2	2,46E-2	-1,03E0

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	0E0	1,73E-5	1,05E-1	1,05E-1	4,81E-2	1,53E-3	MND	MND	MND	MND	MND	MND	MND	4,88E-2	6,87E-2	0E0	3,92E-2	-5,4E-1
Non-hazardous waste	kg	0E0	1,84E-3	1,45E0	1,45E0	5,32E0	6,77E-2	MND	MND	MND	MND	MND	MND	MND	5,22E-1	5,73E0	0E0	1,25E2	-2,21E1
Radioactive waste	kg	0E0	1,18E-7	4,52E-4	4,52E-4	3,4E-4	7,92E-6	MND	MND	MND	MND	MND	MND	MND	3,18E-4	4,71E-4	0E0	2,03E-4	-4,77E-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	4,75E2	0E0	0E0
Materials for recycling	kg	0E0	0E0	3,3E-3	3,3E-3	0E0	3,3E-5	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8,75E2	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	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 CO_2e	0E0	1,1E-3	4,83E0	4,83E0	3,15E0	7,98E-2	MND	MND	MND	MND	MND	MND	MND	3,27E0	4,47E0	4,13E0	1,61E0	-7,07E0
Ozone depletion Pot.	kg CFC_{-11}e	0E0	2,07E-10	8,02E-7	8,02E-7	5,94E-7	1,4E-8	MND	MND	MND	MND	MND	MND	MND	5,63E-7	8,25E-7	7,22E-7	3,57E-7	-5,98E-7
Acidification	kg SO_2e	0E0	2,28E-6	8,08E-3	8,08E-3	6,47E-3	1,46E-4	MND	MND	MND	MND	MND	MND	MND	4,87E-3	9,09E-3	5,64E-2	1,24E-2	-2,91E-2
Eutrophication	kg PO_4^3e	0E0	4,66E-7	2,05E-3	2,05E-3	1,31E-3	3,36E-5	MND	MND	MND	MND	MND	MND	MND	8,57E-4	1,86E-3	4,16E-3	8,81E-3	-1,56E-2
POCP (“smog”)	kg C_2H_4e	0E0	1,45E-7	7,9E-4	7,9E-4	4,1E-4	1,2E-5	MND	MND	MND	MND	MND	MND	MND	5,01E-4	5,9E-4	7,44E-4	3,6E-4	-2,38E-3
ADP-elements	kg Sbe	0E0	2E-8	3,8E-5	3,8E-5	5,43E-5	9,23E-7	MND	MND	MND	MND	MND	MND	MND	5,03E-6	1,06E-4	2,69E-5	1,53E-5	-7,98E-4
ADP-fossil	MJ	0E0	1,72E-2	6,61E1	6,61E1	4,95E1	1,16E0	MND	MND	MND	MND	MND	MND	MND	4,54E1	6,87E1	6,94E1	3,11E1	-1,04E2

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.

Sergio A. Ballén Zamora, as an authorized verifier acting for EPD Hub Limited
04.11.2022

VERIFIED ISO 14025