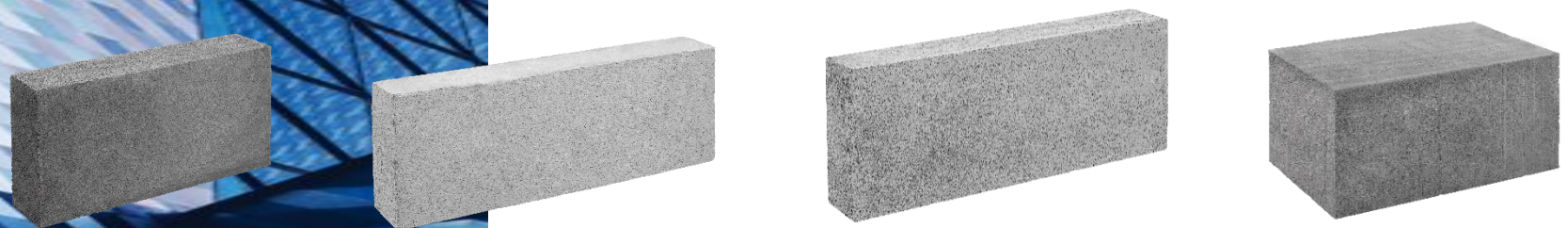
ENVIRONMENTAL PRODUCT DECLARATION

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

H+H Standard Grade Autoclaved Aerated Concrete Blocks
H+H UK Limited



EPD HUB, HUB-1545
Publishing date 6 June 2024, last updated on 6 June 2024, valid until 6 June 2029.

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	H+H UK Limited
Address	Celcon House, Ightham, Sevenoaks, Kent TN15 9HZ, UK.
Contact details	Info.uk@hplush.com
Website	https://www.hhcelcon.co.uk/

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 1.1, 5 Dec 2023
Sector	Construction product
Category of EPD	Third party verified EPD
Parent EPD number	-
Scope of the EPD	Cradle to gate with options, A4-B1, and modules C1-C4, D
EPD author	Graham Sargeant, H+H UK Limited
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal verification ☑ External verification
EPD verifier	Magaly González Vázquez, 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	H+H Standard Grade Autoclaved Aerated Concrete Blocks
Additional labels	Celcon Blocks, Celcon Plus Blocks, Celcon Foundation Blocks
Product reference	SRC, SGP & SFC
Place of production	Borough Green, Sevenoaks, Kent & Pollington, East Yorkshire, UK.
Period for data	01/01/2022 - 31/12/2022
Averaging in EPD	Multiple products and multiple factories
Variation in GWP-fossil for A1-A3	-1.8 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m^3 of concrete block
Declared unit mass	770.79 kg
GWP-total, A1-A3 ($kgCO_2e$)	1.63E+02
GWP-total, A1-C4* ($KgCO_2e$)	1.36E+02
Secondary material, inputs (%)	17.4
Secondary material, outputs (%)	74.3
Total energy use, A1-A3 (kWh)	416
Net fresh water use, A1-A3 (m^3)	0.84
GWP-fossil, A1-A3 ($kgCO_2e$)	1.88E+02

*Sum based on GWP – total results from CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF of the stages A1-A3, A4, A5, B1, C1-C4. D stage excluded from totals.

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

H+H UK Limited is an autoclaved aerated concrete (aircrete) manufacturer, operating three factories over two sites in Kent and East Yorkshire.

PRODUCT DESCRIPTION

The product covered in the EPD is 1m^3 of precast autoclaved aerated concrete (AAC) produced by H+H UK Limited at their three manufacturing plants in the UK. This product has an average gross dry density of 600kg/m^3 and a minimum strength of 3.6N/mm^2. Aerated concrete, commonly referred to as aircrete, is lightweight, fire resistant, thermally and acoustically insulative and is normally used for internal masonry.

As a result of the raw materials and manufacturing process, the cellular internal structure of the blocks enables a low density but retains good compressive strength. The concrete mix is essentially a very fine-grained mixture of cement, lime and pulverised fly ash (PFA)/sand with water. To this, finely powdered aluminium is added. The reaction between the constituent materials releases hydrogen gas which gives the product its aerated structure. The aeration process takes place in moulds and, once an initial set has occurred, the blocks are cut and loaded into autoclaves where they are steam cured. The blocks are then banded together and wrapped in plastic. Packs of blocks are often supplied with pallets to enable handling.

Further information can be found at https://www.hhcelcon.co.uk/.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	0.05	Europe
Minerals	99.95	Europe
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	2.88

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 m^3 of concrete block
Mass per declared unit	770.79 kg
Functional unit	1m^3 of precast autoclaved aerated concrete (AAC), average gross dry density of 600kg/m^3 and a minimum strength of 3.6N/mm^2, lightweight, fire resistant and normally used for internal masonry.
Reference service life	100 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	x	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.

Inbound transport distances for raw materials and packaging have been calculated using online tools to determine the road distance between the source location and the respective H+H UK manufacturing site. The associated emissions assume transport by HGV with Euro 5 engines.

In the manufacturing process, aggregate is slurried and mixed with binders and an aerator. This mix is then poured into lubricated moulds where it is left to rise and set. Once the desired height and stiffness has been achieved, the mixture is then transported to the next area where it is cut into individual blocks using steel wires. These blocks are then transported into autoclaves where they experience steam curing at elevated temperatures and pressures. Once out of the autoclaves, the blocks undergo quality control and are subsequently banded together and wrapped using plastic. Blocks are commonly sent out on pallets which have been accounted for at this stage.

The sources of energy utilised during manufacturing include natural gas for the generation of steam and electricity to power the machinery and supporting infrastructure.

Production losses considered in the LCA include losses prior to autoclaving, which are slurried and recycled back into the process and losses after the cure stage for items not passing quality control which are also recycled back into the process. Wastewater is considered in the form of trade effluent discharge and is allocated at a manufacturing level.

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.

Average transportation distance from the manufacturer to installation site is assumed at 80km in line with the default values for blockwork in the RICS WLCA standard (RICS, 2023). Transportation does not cause losses as products are packaged securely. Production loss at installation is assumed at 5% in line with studies on UK site wastage rates (Reusefully, 2023). Energy consumption for installation is assumed as 0.01kWh/kg or 10kWh/tonne. The source of energy is diesel fuel used by site machinery. The release of biogenic carbon dioxide from waste processing of wood pallets is also included.

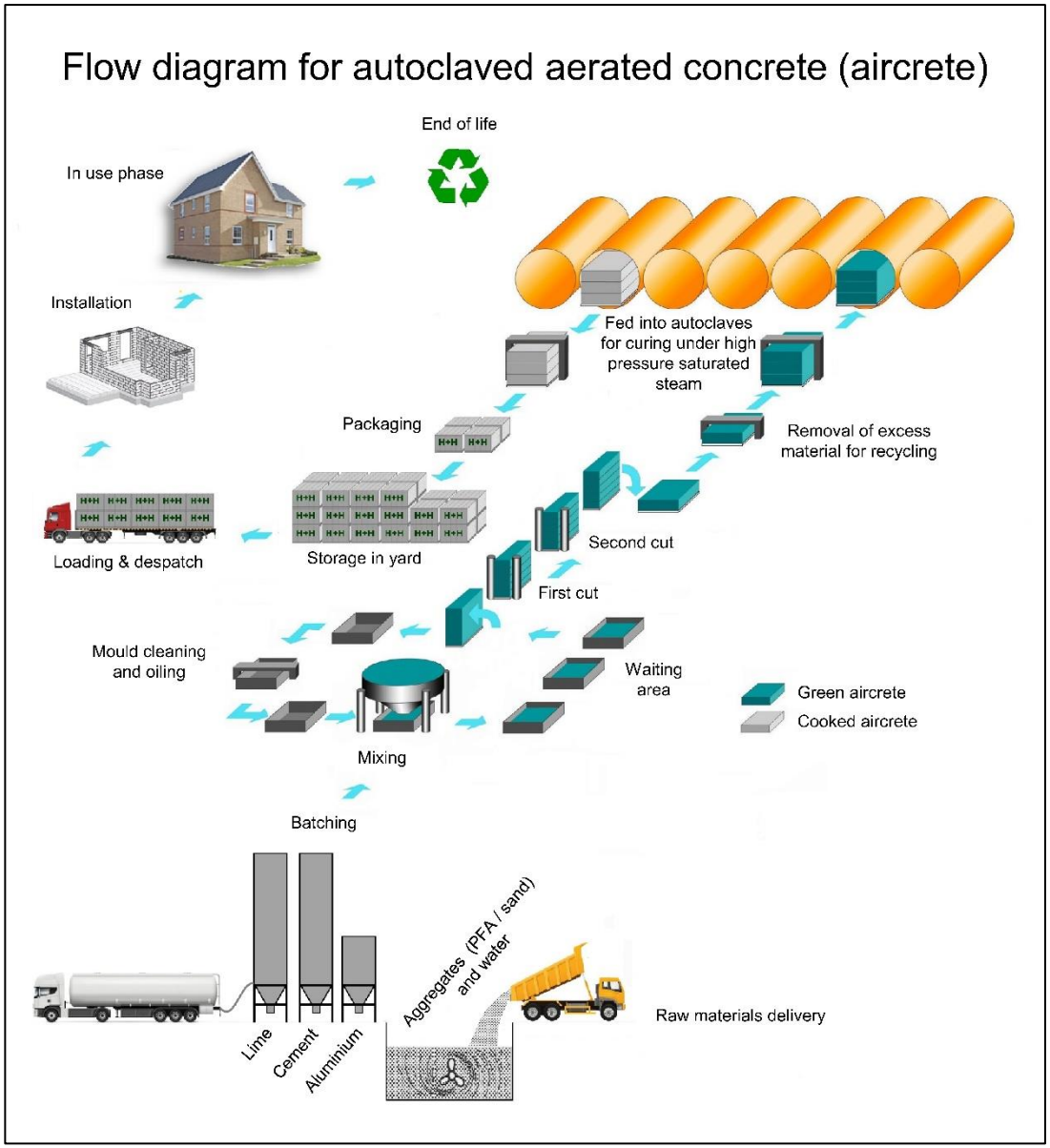
PRODUCT USE AND MAINTENANCE (B1-B7)

The products considered in the EPD require no operational energy or water and require no maintenance or repairs throughout the declared service life. Recarbonation is accounted for in the use phase as this is where the majority of carbon dioxide is absorbed (Walther, H). The level of carbonation is assumed to be 95% after 80 years - this same level of carbonation is applied to the reference service life of 100 years for a conservative estimate.
Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The end-of-life takes place in UK, and 100% of the waste is assumed to be collected as separate construction waste. Energy consumption in relation to demolition is assumed to be 10 kWh/tonne. The source of energy is diesel fuel used by site machinery. The dismantled concrete blocks are delivered to the nearest construction waste treatment plant with an assumed transport distance of 50km. The mass at end of life is assumed to be the sum of the raw materials, including the mortar used in installation minus any evaporation that has occurred as a result of the block reaching equilibrium moisture prior to demolition. At the waste treatment plant, waste that can be reused, recycled or recovered for energy is separated and diverted for further use. It can be assumed that 100% of the blocks are transported to a waste treatment plant, where the blocks are crushed and separated. It is assumed that 97.5% of block waste in the UK is recycled into a secondary raw material and 2.5% is ultimately sent to landfill (RICS, 2023). Benefits and loads considered beyond the system boundary include virgin raw material substitution and energy recovery from the product and packaging components, respectively.

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

AVERAGES AND VARIABILITY

Type of average	Multiple products and multiple factories
Averaging method	Representative product
Variation in GWP-fossil for A1-A3	-1.8 %

The product represented in this EPD is H+H Standard Grade Autoclaved Aerated Concrete Blocks. This EPD covers three factories across two manufacturing sites: Borough Green (Kent) and Pollington 1 & 2 (East Yorkshire). Standard grade product produced at Borough Green comprised the largest share of the total Standard Grade product produced in the reference period.

The product range covered in this EPD include:
H+H Standard Grade Blocks
H+H Standard Grade Plus Blocks
H+H Standard Grade Foundation Blocks

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. The EPD Generator uses Ecoinvent v3.8, Plastics Europe, Federal LCA Commons and One Click LCA databases 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	1.49E+02	4.51E+00	9.80E+00	1.63E+02	6.13E+00	3.81E+01	-8.24E+01	MND	MND	MND	MND	MND	MND	2.55E+00	2.82E+00	5.18E+00	7.91E-02	-4.14E+00
GWP – fossil	kg CO_2e	1.49E+02	4.51E+00	3.45E+01	1.88E+02	6.13E+00	1.34E+01	-8.24E+01	MND	MND	MND	MND	MND	MND	2.55E+00	2.82E+00	5.18E+00	7.90E-02	-4.15E+00
GWP – biogenic	kg CO_2e	0.00E+00	2.36E-05	-2.48E+01	-2.48E+01	0.00E+00	2.48E+01	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP – LULUC	kg CO_2e	9.18E-02	1.69E-03	2.82E-02	1.22E-01	2.26E-03	6.89E-03	0.00E+00	MND	MND	MND	MND	MND	MND	2.54E-04	1.04E-03	3.81E-03	7.46E-05	7.18E-03
Ozone depletion pot.	kg CFC_{-11}e	5.85E-06	1.04E-06	5.08E-06	1.20E-05	1.41E-06	1.43E-06	0.00E+00	MND	MND	MND	MND	MND	MND	5.45E-07	6.48E-07	1.06E-06	3.20E-08	-2.77E-07
Acidification potential	mol H^+e	3.13E-01	1.91E-02	7.77E-02	4.10E-01	2.59E-02	5.40E-02	0.00E+00	MND	MND	MND	MND	MND	MND	2.65E-02	1.19E-02	4.45E-02	7.43E-04	-2.62E-02
EP-freshwater[2)]	kg Pe	1.32E-03	3.58E-05	4.16E-04	1.77E-03	5.02E-05	1.08E-04	0.00E+00	MND	MND	MND	MND	MND	MND	8.45E-06	2.31E-05	1.27E-04	8.28E-07	-1.51E-04
EP-marine	kg Ne	7.31E-02	5.66E-03	2.29E-02	1.02E-01	7.71E-03	1.94E-02	0.00E+00	MND	MND	MND	MND	MND	MND	1.17E-02	3.54E-03	1.68E-02	2.57E-04	-4.12E-03
EP-terrestrial	mol Ne	8.51E-01	6.25E-02	2.53E-01	1.17E+00	8.51E-02	2.14E-01	0.00E+00	MND	MND	MND	MND	MND	MND	1.29E-01	3.91E-02	1.85E-01	2.83E-03	-5.81E-02
POCP ("smog")[3)]	kg NMVOCe	2.33E-01	1.98E-02	8.96E-02	3.42E-01	2.72E-02	6.05E-02	0.00E+00	MND	MND	MND	MND	MND	MND	3.54E-02	1.25E-02	5.15E-02	8.23E-04	-1.16E-02
ADP-minerals & metals[4)]	kg Sbe	3.60E-04	1.16E-05	6.50E-05	4.36E-04	1.44E-05	2.55E-05	0.00E+00	MND	MND	MND	MND	MND	MND	1.29E-06	6.60E-06	1.61E-05	1.82E-07	-4.09E-05
ADP-fossil resources	MJ	6.09E+02	6.75E+01	6.23E+02	1.30E+03	9.21E+01	1.18E+02	0.00E+00	MND	MND	MND	MND	MND	MND	3.43E+01	4.23E+01	8.78E+01	2.17E+00	-5.27E+01
Water use[5)]	m^3e depr.	1.23E+01	3.04E-01	5.69E+00	1.83E+01	4.12E-01	1.25E+00	0.00E+00	MND	MND	MND	MND	MND	MND	9.23E-02	1.89E-01	8.04E-01	6.87E-03	-8.48E+00

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) 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 experience with the indicator.

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	1.77E-06	4.92E-07	9.25E-07	3.18E-06	7.06E-07	1.03E-06	0.00E+00	MND	MND	MND	MND	MND	MND	7.11E-07	3.24E-07	5.32E-06	1.50E-08	5.94E-08
Ionizing radiation[6)]	kBq U235e	5.32E+00	3.28E-01	4.09E+00	9.74E+00	4.38E-01	7.42E-01	0.00E+00	MND	MND	MND	MND	MND	MND	1.58E-01	2.01E-01	8.39E-01	9.80E-03	-9.18E-01
Ecotoxicity (freshwater)	CTUe	1.04E+03	5.97E+01	1.99E+02	1.30E+03	8.28E+01	1.02E+02	0.00E+00	MND	MND	MND	MND	MND	MND	2.06E+01	3.80E+01	6.14E+01	1.41E+00	-6.51E+01
Human toxicity, cancer	CTUh	2.82E-08	1.54E-09	3.35E-08	6.32E-08	2.03E-09	4.48E-09	0.00E+00	MND	MND	MND	MND	MND	MND	7.91E-10	9.34E-10	2.67E-09	3.53E-11	-3.44E-09
Human tox. non-cancer	CTUh	1.15E-06	5.94E-08	1.70E-07	1.38E-06	8.20E-08	1.02E-07	0.00E+00	MND	MND	MND	MND	MND	MND	1.49E-08	3.76E-08	5.13E-08	9.24E-10	-5.93E-08
SQP[7)]	-	1.30E+02	7.16E+01	2.03E+03	2.23E+03	1.06E+02	1.44E+02	0.00E+00	MND	MND	MND	MND	MND	MND	4.46E+00	4.87E+01	8.58E+01	4.63E+00	1.28E+03

6) 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; 7) SQP = Land use related impacts/soil quality.

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	6.17E+01	8.03E-01	1.67E+02	2.29E+02	1.04E+00	1.19E+01	0.00E+00	MND	MND	MND	MND	MND	MND	1.96E-01	4.76E-01	4.58E+00	1.88E-02	1.52E+02
Renew. PER as material	MJ	0.00E+00	0.00E+00	2.17E+02	2.17E+02	0.00E+00	-2.17E+02	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ	6.17E+01	8.03E-01	3.84E+02	4.46E+02	1.04E+00	-2.05E+02	0.00E+00	MND	MND	MND	MND	MND	MND	1.96E-01	4.76E-01	4.58E+00	1.88E-02	1.52E+02
Non-re. PER as energy	MJ	6.09E+02	6.75E+01	5.86E+02	1.26E+03	9.21E+01	1.17E+02	0.00E+00	MND	MND	MND	MND	MND	MND	3.43E+01	4.23E+01	8.78E+01	2.17E+00	-5.74E+01
Non-re. PER as material	MJ	0.00E+00	0.00E+00	2.70E+01	2.70E+01	0.00E+00	-2.70E+01	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-re. PER	MJ	6.09E+02	6.75E+01	6.13E+02	1.29E+03	9.21E+01	8.96E+01	0.00E+00	MND	MND	MND	MND	MND	MND	3.43E+01	4.23E+01	8.78E+01	2.17E+00	-5.74E+01
Secondary materials	kg	1.34E+02	1.95E-02	9.58E-01	1.35E+02	2.56E-02	6.77E+00	0.00E+00	MND	MND	MND	MND	MND	MND	1.34E-02	1.17E-02	3.16E-02	4.55E-04	-1.77E-01
Renew. secondary fuels	MJ	1.05E-02	2.01E-04	7.33E+00	7.34E+00	2.58E-04	3.67E-01	0.00E+00	MND	MND	MND	MND	MND	MND	4.39E-05	1.18E-04	4.41E-04	1.19E-05	5.84E-04
Non-ren. secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m^3	6.93E-01	8.69E-03	1.36E-01	8.37E-01	1.19E-02	5.45E-02	0.00E+00	MND	MND	MND	MND	MND	MND	2.08E-03	5.48E-03	4.64E-02	2.37E-03	-2.11E-01

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	2.97E+00	8.68E-02	9.10E-01	3.96E+00	1.22E-01	2.61E-01	0.00E+00	MND	MND	MND	MND	MND	MND	4.59E-02	5.61E-02	1.86E-01	0.00E+00	-3.79E-01
Non-hazardous waste	kg	5.72E+01	1.44E+00	1.19E+01	7.06E+01	2.01E+00	6.02E+01	0.00E+00	MND	MND	MND	MND	MND	MND	3.23E-01	9.21E-01	1.07E+02	1.50E+01	-1.16E+01
Radioactive waste	kg	3.53E-03	4.54E-04	1.53E-03	5.52E-03	6.16E-04	5.90E-04	0.00E+00	MND	MND	MND	MND	MND	MND	2.42E-04	2.83E-04	5.94E-04	0.00E+00	-2.75E-04

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	0.00E+00	0.00E+00	1.41E+01	1.41E+01	0.00E+00	7.07E-01	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E+00	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	5.85E+02	0.00E+00	0.00E+00
Materials for energy rec	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.23E+00	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.07E+01	0.00E+00	MND	MND	MND	MND	MND	MND	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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	1.48E+02	4.46E+00	3.39E+01	1.86E+02	6.07E+00	1.34E+01	-8.24E+01	MND	MND	MND	MND	MND	MND	2.52E+00	2.79E+00	5.12E+00	7.74E-02	-4.05E+00
Ozone depletion Pot.	kg CFC_{-11}e	4.67E-06	8.22E-07	4.39E-06	9.88E-06	1.12E-06	1.15E-06	0.00E+00	MND	MND	MND	MND	MND	MND	4.32E-07	5.13E-07	8.45E-07	2.53E-08	-2.32E-07
Acidification	kg SO_2e	2.48E-01	1.48E-02	6.01E-02	3.23E-01	2.02E-02	4.04E-02	0.00E+00	MND	MND	MND	MND	MND	MND	1.89E-02	9.26E-03	3.30E-02	5.61E-04	-2.09E-02
Eutrophication	kg PO_4^3e	6.82E-02	3.36E-03	2.08E-02	9.23E-02	4.59E-03	1.84E-02	0.00E+00	MND	MND	MND	MND	MND	MND	4.38E-03	2.11E-03	1.06E-02	1.21E-04	-8.76E-03
POCP (“smog”)	kg C_2H_4e	1.53E-02	5.83E-04	5.16E-03	2.10E-02	7.87E-04	1.70E-03	0.00E+00	MND	MND	MND	MND	MND	MND	4.14E-04	3.62E-04	9.78E-04	2.35E-05	-7.86E-04
ADP-elements	kg Sbe	1.68E-04	1.13E-05	6.42E-05	2.43E-04	1.39E-05	1.57E-05	0.00E+00	MND	MND	MND	MND	MND	MND	1.27E-06	6.39E-06	1.59E-05	1.79E-07	-4.05E-05
ADP-fossil	MJ	6.09E+02	6.75E+01	6.23E+02	1.30E+03	9.21E+01	1.18E+02	0.00E+00	MND	MND	MND	MND	MND	MND	3.43E+01	4.23E+01	8.77E+01	2.17E+00	-5.25E+01

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[9)]	kg CO_2e	1.49E+02	4.51E+00	3.45E+01	1.88E+02	6.13E+00	1.34E+01	-8.24E+01	MND	MND	MND	MND	MND	MND	2.55E+00	2.82E+00	5.18E+00	7.90E-02	-4.15E+00

9) 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). In addition, the characterisation factors for the flows - CH4 fossil, CH4 biogenic and Dinitrogen monoxide - were updated in line with the guidance of IES PCR 1.2.5 Annex 1. This indicator is identical to the GWP-total of EN 15804:2012+A2:2019 except that the characterization factor for biogenic CO2 is set to zero.

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

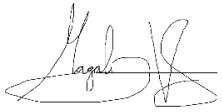
I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried 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.

Magaly González Vázquez, as an authorized verifier acting for EPD Hub Limited
06.06.2024



VERIFIED ISO 14025