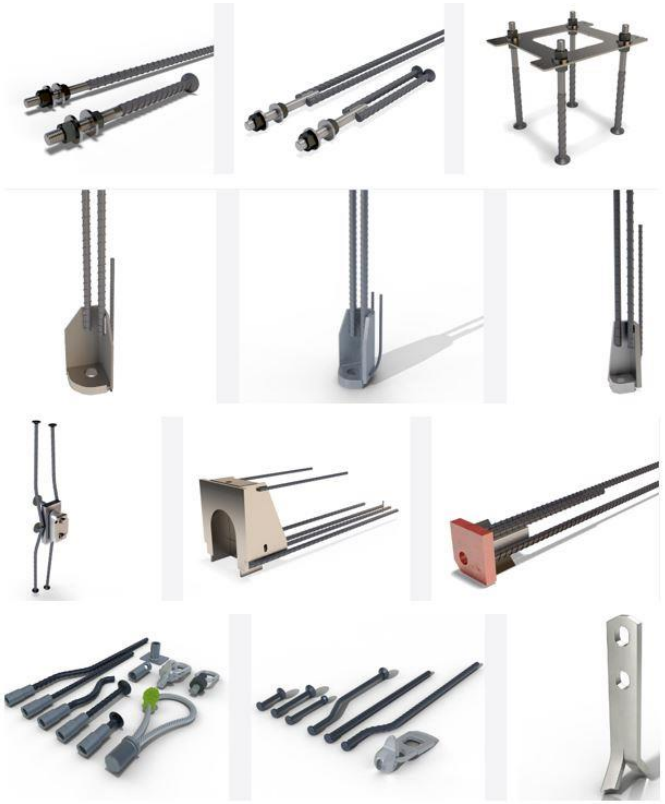
ENVIRONMENTAL PRODUCT DECLARATION

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

Connecting Parts for precast & cast in-situ concrete
Peikko Gulf LLC



EPD HUB, HUB-0358
Publishing date 24 March 2023, last updated date 24 March 2023, valid until 24 March 2028

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Peikko Gulf LLC
Address	Plot 259-270 Al Hamra Industrial Zone, P.O box: 86031 Ras Al Khaimah, UAE
Contact details	jaakko.yrjola@peikko.com
Website	www.peikko.com

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	ISO 21930:2017 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Sister EPD, Parent EPD: HUB-0004
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Patience Wanjala, Peikko Group
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	Connecting Parts
Place of production	Ras Al Khaimah, UAE
Period for data	2022
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	0.37 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 Kg of Connecting parts
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO2e)	2,43E0
GWP-total, A1-A3 (kgCO2e)	2,4E0
Secondary material, inputs (%)	28.3
Secondary material, outputs (%)	0.0
Total energy use, A1-A3 (kWh)	7.61
Total water use, A1-A3 (m3e)	0.021

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Peikko Group Corporation is a leading global supplier of slim floor structures, wind energy applications, and connection technology for precast and cast-in-situ construction. Peikkos innovative solutions offer a faster, safer, and more sustainable way to design and build. Peikko has sales offices in over 30 countries in Asia-Pacific, Europe, Africa, the Middle East, and North America, with manufacturing operations in 12 countries. Peikko is a family-owned and managed company that employs about 2,000 professionals. Peikko was founded in 1965 and is headquartered in Lahti, Finland. Pre-casters, builders, constructors, developers, flooring specialists, machine manufacturers, power plant designers, architects, and structural designers – can all enjoy and take advantage of Peikko's solutions.

PRODUCT DESCRIPTION

This EPD represents connecting parts for precast and cast In-situ Concrete produced at Peikko facility in Ras Al Khaimah, UAE.
Connecting parts are precast and cast-in-situ concrete connections, which include a wide range of components. They include HPM
PPM, HPKM, BOLDA, PEC, KL, COPRA, WELDA, UKT, KKT, KS, BECO, MODIX, RBC, PBH, PETRA, SUMO, PSB, PSB plus, TERAJOINT, OPTIMA JOINT, WAVE JOINT, RR, KK, JENKA , ARMATA among others. Generally they are used to connect different building components such as foundations, columns, beams, slabs, walls, floors, balcony and a wide range of connections. Some products are used for reinforcement, lifting and transportation, and floor joints.
More product information including technical specifications are found from Peikkos webpages https://www.peikko.com/products/precast-products/ and https://www.peikko.com/products/reinforcement-systems/

Further information can be found at www.peikko.com.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	99.86	Gulf
Minerals	-	-
Fossil materials	0.14	Gulf
Bio-based materials	-	-

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0.0
Biogenic carbon content in packaging, kg C	0.0019

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1 Kg of Connecting parts
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.

A1

The environmental impacts of raw material supply (A1) include emissions generated when raw materials are taken from nature, transported to industrial units for processing and processed, along with waste handling from the various production processes. The primary raw materials are steel plate, rebars and welding filler metal. Rebars have 98% recycled content while steel plate and welding filler are 100% virgin. All major upstream processes are taken into consideration, including infrastructure. Loss of raw material and energy transmission losses are also taken into account. This stage includes all the aforementioned for the raw materials which end up in the final product (i.e. steel, welding filler and packaging) as well as the electricity and heat production which are consumed during the manufacturing at the plant.

A2

The considered transportation impacts (A2) include exhaust emissions resulting from the transport of all raw materials from steel millers and other suppliers to Ras Al Khaimah, UAE, as well as the environmental impacts of production of the used diesel. The manufacturing, maintenance and disposal of the vehicles as well as tire and road wear during transportation have also been considered. The transportation distances and methods were provided by Peikko Gulf.

A3

The environmental impacts considered for the production stage (A3) cover the manufacturing of the production materials (welding gases and blasting steel shots) and fuels used by machines. Also handling of waste formed in the production processes at the production plant is covered. The environmental impacts of this stage have been calculated using the most recent data in regard to what applied in the factory. The study considers the losses of main raw materials occurring during the manufacturing process.

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.

A4

Connecting parts transportation is taking place from Ras Al Khaimah, UAE to Gulf area. An average distance of 500 km is assumed, and the

transportation method is assumed to be a lorry with fill rate assumed as 100%. Transportation does not cause losses as products are packaged properly.

A5
In the installation scenario, only the wood packaging is taken into account. Wood packaging used for transportation of products to client are accounted for in A5. It is assumed that the wood is incinerated at the nearest municipal incineration plant for energy recovery after ten uses. The distance to recycling plant and incineration is assumed as 50km and the transportation method assumed to be lorry. This is an average distance which considers the fact that the distance from the customer to recycling and landfill facilities is not very long.

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)

End of life stage includes deconstruction/demolition (C1), transport to waste processing (C2), waste processing for reuse, recovery and/or recycling (C3) and disposal (C4).

C1
Demolition is assumed to take 0.01 kWh/kg of element. It is assumed that 100% of waste is collected.

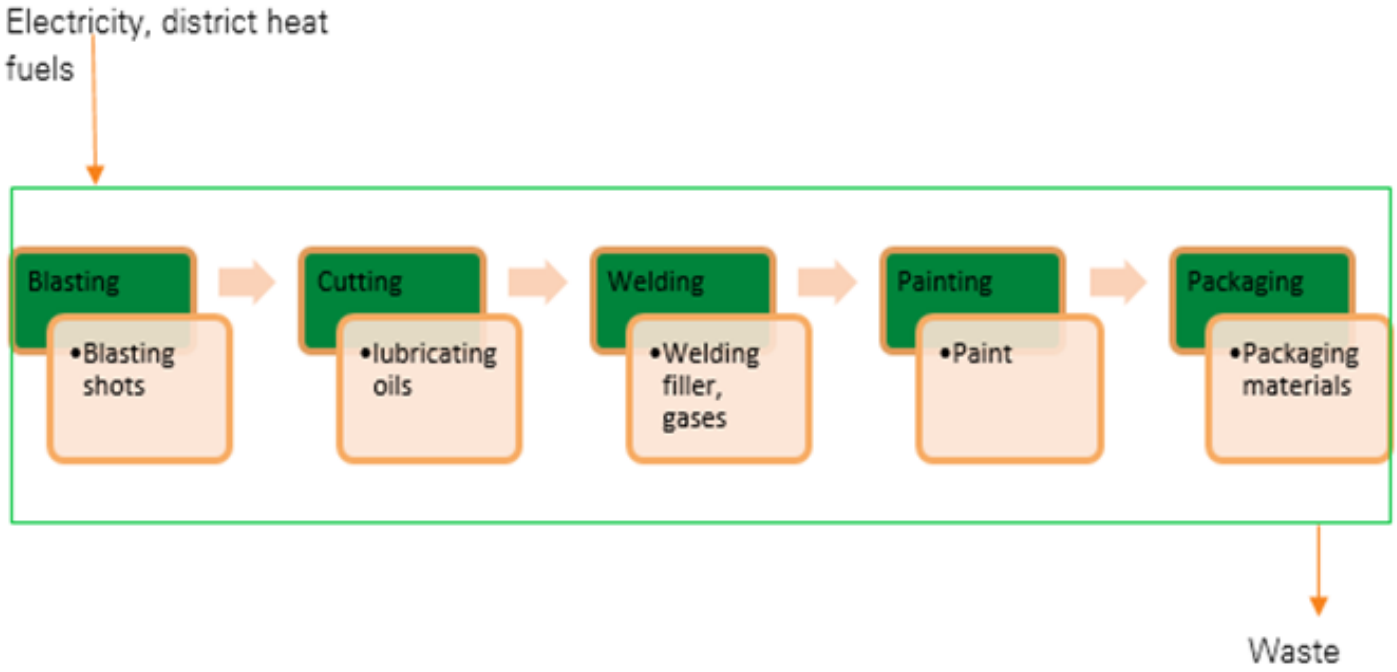
C2
Distance for transportation to treatment is assumed as 50 km and the transportation method is assumed to be lorry. This is an average distance which considers the fact that the distance from the customer (construction site) to recycling and landfill facilities is not very long, as customers are assumed to be located in capital regions.

C3
95% of steel is assumed to be recycled based on World Steel Association, 2020.

C4
It is assumed that 5% of steel is taken to landfill for final disposal.

D
Due to the recycling process the end-of-life product is converted into a 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	Partly allocated by mass/volume and partly by revenue
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
Averaging method	Averaged by shares of total mass
Variation in GWP-fossil for A1-A3	0.37 %

Connecting parts are a range of standard and custom-made products. Their orders contain different steel grades and in different quantities, i.e., some products may contain more steel plates and less rebar or vice versa. Therefore, typical order cannot be defined and for this reason this assessment studies the average material composition for this product group. The effect of different material variances on the results of the connecting parts were studied. Impacts which do not vary more than ±50% of the calculated GWP-fossil values in A1-A3 have been considered to be of reasonable accuracy. The variances were tested incrementally to see which compositions fall inside the provided range. The materials with the largest impacts have been taken into consideration as the remaining materials have only a negligible effect on the impact categories. However, to incorporate the variance of these minor materials a conservative approach has been taken and the variance has been kept smaller, up to 10 %.

The main materials in the average composition are steel plate 33%, and rebar, 66.7%, which contribute a total of 99.7% of the final product. The production of these materials contributes over 90% of the GWP impacts of the connecting parts. Due to impacts of the rebar being higher than of steel plate, the impacts of the product increases as the share of the rebar in the product increases. The steel plate can vary between 28 – 38 weight %, and rebar 62 - 72 weight % so that the total weight % of these three materials is always about 99 %. The remaining share consists of welding fillers and paint for which the weight % can vary inside the 1 % weight and therefore considered negligible.

The results are only valid for this average composition.

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	2,17E0	0E0	2,38E-1	2,4E0	6,89E-2	5,14E-3	MND	MND	MND	MND	MND	MND	MND	3,31E-3	4,5E-3	5,32E-2	1,85E-4	0E0
GWP – fossil	kg CO_2e	2,16E0	2,12E-2	2,43E-1	2,43E0	6,96E-2	6,58E-5	MND	MND	MND	MND	MND	MND	MND	3,31E-3	4,5E-3	5,47E-2	-1,03E-1	-1,79E-1
GWP – biogenic	kg CO_2e	1,82E-3	0E0	-5,08E-3	-3,26E-3	0E0	5,08E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,48E-3	-7,81E-5	1,24E-2
GWP – LULUC	kg CO_2e	1,48E-3	8,24E-6	1E-4	1,58E-3	2,53E-5	1,13E-7	MND	MND	MND	MND	MND	MND	MND	3,3E-7	1,75E-6	5,44E-6	2,49E-7	3,16E-4
Ozone depletion pot.	kg CFC_{-11}e	1,04E-7	4,98E-9	1,27E-8	1,21E-7	1,66E-8	1,97E-12	MND	MND	MND	MND	MND	MND	MND	7,07E-10	1,06E-9	1,17E-8	1,07E-10	-2,02E-9
Acidification potential	mol H^+e	8,55E-3	6,9E-5	4,58E-4	9,07E-3	2,26E-4	3,22E-7	MND	MND	MND	MND	MND	MND	MND	3,44E-5	1,46E-5	-1,5E-2	2,48E-6	-3,34E-4
EP-freshwater[2)]	kg Pe	9,22E-5	1,8E-7	3,05E-6	9,54E-5	5,9E-7	3,07E-9	MND	MND	MND	MND	MND	MND	MND	1,1E-8	3,81E-8	1,81E-7	2,76E-9	4,6E-6
EP-marine	kg Ne	1,87E-3	1,52E-5	1,11E-4	1,99E-3	4,96E-5	5,78E-8	MND	MND	MND	MND	MND	MND	MND	1,52E-5	3,22E-6	2,51E-4	8,57E-7	1,09E-4
EP-terrestrial	mol Ne	2,05E-2	1,68E-4	1,27E-3	2,19E-2	5,51E-4	6,41E-7	MND	MND	MND	MND	MND	MND	MND	1,67E-4	3,57E-5	2,76E-3	9,43E-6	-1,59E-3
POCP ("smog")[3)]	kg NMVOCe	9,97E-3	6,51E-5	3,47E-4	1,04E-2	2,14E-4	1,74E-7	MND	MND	MND	MND	MND	MND	MND	4,59E-5	1,38E-5	7,58E-4	2,74E-6	-1,3E-3
ADP-minerals & metals[4)]	kg Sbe	8,07E-6	5,18E-8	4,54E-7	8,58E-6	5,18E-7	9,37E-11	MND	MND	MND	MND	MND	MND	MND	1,68E-9	1,1E-8	2,77E-8	6,05E-10	8,45E-7
ADP-fossil resources	MJ	2,2E1	3,32E-1	3,93E0	2,62E1	1,1E0	7,87E-4	MND	MND	MND	MND	MND	MND	MND	4,45E-2	7,04E-2	7,36E-1	7,22E-3	-9,56E-1
Water use[5)]	m^3e depr.	9,41E-1	1,48E-3	7,42E-2	1,02E0	4,65E-3	1,5E-5	MND	MND	MND	MND	MND	MND	MND	1,2E-4	3,14E-4	1,98E-3	2,29E-5	1,49E-1

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	1,65E-7	2,41E-9	2,99E-9	1,71E-7	7,32E-9	2,77E-12	MND	MND	MND	MND	MND	MND	MND	9,22E-10	5,11E-10	1,52E-8	4,99E-11	-2,37E-9
Ionizing radiation[6)]	kBq U235e	7,08E-2	1,59E-3	8,14E-3	8,06E-2	5,13E-3	6,44E-6	MND	MND	MND	MND	MND	MND	MND	2,05E-4	3,37E-4	3,38E-3	3,27E-5	1,99E-2
Ecotoxicity (freshwater)	CTUe	6,23E1	2,95E-1	1,53E0	6,42E1	9,35E-1	1,31E-3	MND	MND	MND	MND	MND	MND	MND	2,68E-2	6,27E-2	4,42E-1	4,71E-3	-1,76E0
Human toxicity, cancer	CTUh	1,32E-8	7,23E-12	3,87E-11	1,33E-8	2,31E-11	2,47E-14	MND	MND	MND	MND	MND	MND	MND	1,03E-12	1,53E-12	1,69E-11	1,18E-13	3,89E-9
Human tox. non-cancer	CTUh	5,01E-8	2,84E-10	9,75E-10	5,14E-8	9,5E-10	6,37E-13	MND	MND	MND	MND	MND	MND	MND	1,94E-11	6,03E-11	3,2E-10	3,08E-12	2,28E-8
SQP[7)]	-	5,88E0	3,81E-1	9,31E-1	7,19E0	1,4E0	1,29E-4	MND	MND	MND	MND	MND	MND	MND	5,79E-3	8,1E-2	9,56E-2	1,54E-2	-1,15E-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	1,09E0	3,74E-3	1,29E-1	1,23E0	1,29E-2	8,45E-5	MND	MND	MND	MND	MND	MND	MND	2,54E-4	7,93E-4	4,2E-3	6,27E-5	1,28E-1
Renew. PER as material	MJ	0E0	0E0	4,49E-2	4,49E-2	0E0	-4,49E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	5,88E-2
Total use of renew. PER	MJ	1,09E0	3,74E-3	1,74E-1	1,27E0	1,29E-2	-4,48E-2	MND	MND	MND	MND	MND	MND	MND	2,54E-4	7,93E-4	4,2E-3	6,27E-5	1,87E-1
Non-re. PER as energy	MJ	2,19E1	3,32E-1	3,89E0	2,62E1	1,1E0	7,87E-4	MND	MND	MND	MND	MND	MND	MND	4,45E-2	7,05E-2	7,36E-1	7,22E-3	-9,56E-1
Non-re. PER as material	MJ	1,92E-2	0E0	3,3E-3	2,25E-2	0E0	-2,97E-3	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-1,83E-2	-9,62E-4	0E0
Total use of non-re. PER	MJ	2,2E1	3,32E-1	3,89E0	2,62E1	1,1E0	-2,18E-3	MND	MND	MND	MND	MND	MND	MND	4,45E-2	7,05E-2	7,17E-1	6,26E-3	-9,56E-1
Secondary materials	kg	2,82E-1	9,21E-5	3,76E-4	2,83E-1	2,04E-4	2,76E-7	MND	MND	MND	MND	MND	MND	MND	1,74E-5	1,95E-5	2,88E-4	1,52E-6	1,94E-1
Renew. secondary fuels	MJ	1,3E-4	9,31E-7	1,19E-3	1,32E-3	2,05E-6	5,22E-10	MND	MND	MND	MND	MND	MND	MND	5,7E-8	1,97E-7	9,41E-7	3,96E-8	1,37E-5
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	1,84E-2	4,28E-5	2,63E-3	0.021	1,72E-4	3,79E-7	MND	MND	MND	MND	MND	MND	MND	2,7E-6	9,09E-6	4,47E-5	7,9E-6	-7,27E-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	5,25E-1	4,37E-4	5,89E-3	5,31E-1	1,33E-3	6,05E-6	MND	MND	MND	MND	MND	MND	MND	5,96E-5	9,28E-5	9,84E-4	0E0	1,32E-2
Non-hazardous waste	kg	3,48E0	7,18E-3	1,3E-1	3,62E0	5,55E-2	1,29E-4	MND	MND	MND	MND	MND	MND	MND	4,19E-4	1,52E-3	6,92E-3	5E-2	-2,16E-1
Radioactive waste	kg	3,81E-5	2,24E-6	2,69E-6	4,3E-5	7,48E-6	1,85E-9	MND	MND	MND	MND	MND	MND	MND	3,13E-7	4,75E-7	5,18E-6	0E0	5,72E-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	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	9,5E-1	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	3,1E-3	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	2,07E0	2,1E-2	2,39E-1	2,33E0	6,89E-2	6,42E-5	MND	MND	MND	MND	MND	MND	MND	3,27E-3	4,45E-3	5,41E-2	2,58E-4	-1,58E-1
Ozone depletion Pot.	kg CFC_{-11}e	1,05E-7	3,95E-9	1,09E-8	1,19E-7	1,32E-8	1,64E-12	MND	MND	MND	MND	MND	MND	MND	5,6E-10	8,38E-10	9,25E-9	8,43E-11	-6,78E-9
Acidification	kg SO_2e	6,91E-3	5,6E-5	3,63E-4	7,33E-3	1,72E-4	2,67E-7	MND	MND	MND	MND	MND	MND	MND	2,45E-5	1,19E-5	4,05E-4	1,87E-6	-2,36E-4
Eutrophication	kg PO_4^3e	3,77E-3	1,22E-5	1,36E-4	3,92E-3	3,68E-5	1,08E-7	MND	MND	MND	MND	MND	MND	MND	5,69E-6	2,6E-6	9,39E-5	4,03E-7	-1,52E-4
POCP (“smog”)	kg C_2H_4e	1,03E-3	2,58E-6	2,16E-5	1,05E-3	8,48E-6	1,1E-8	MND	MND	MND	MND	MND	MND	MND	5,36E-7	5,47E-7	8,86E-6	7,84E-8	-1,94E-4
ADP-elements	kg Sbe	7,9E-6	5,03E-8	4,52E-7	8,4E-6	5,15E-7	9,27E-11	MND	MND	MND	MND	MND	MND	MND	1,65E-9	1,06E-8	2,73E-8	5,96E-10	8,34E-7
ADP-fossil	MJ	2,2E1	3,32E-1	3,93E0	2,62E1	1,1E0	7,87E-4	MND	MND	MND	MND	MND	MND	MND	4,45E-2	7,04E-2	7,36E-1	7,22E-3	-9,56E-1

ENVIRONMENTAL IMPACTS – TRACI 2.1. / 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	2,07E0	2,1E-2	2,37E-1	2,33E0	6,89E-2	6,33E-5	MND	MND	MND	MND	MND	MND	MND	3,29E-3	4,45E-3	5,43E-2	2,58E-4	-1,63E-1
Ozone Depletion	kg CFC_{-11}e	1,04E-7	3,94E-9	1,09E-8	1,19E-7	1,46E-8	1,59E-12	MND	MND	MND	MND	MND	MND	MND	5,6E-10	8,37E-10	9,25E-9	8,43E-11	-6,83E-9
Acidification	kg SO_2e	3,88E-1	3,13E-3	2,08E-2	4,12E-1	6,99E-3	1,47E-5	MND	MND	MND	MND	MND	MND	MND	1,78E-3	6,64E-4	2,94E-2	1,21E-4	-1,68E-2
Eutrophication	kg Ne	4,47E-4	7,74E-6	1,67E-5	4,71E-4	2,77E-5	8,56E-9	MND	MND	MND	MND	MND	MND	MND	2,59E-6	1,64E-6	4,27E-5	2,26E-7	3,48E-4
POCP (“smog”)	kg O_3e	4,98E-3	3,92E-5	2,79E-4	5,3E-3	1,1E-3	1,48E-7	MND	MND	MND	MND	MND	MND	MND	3,93E-5	8,34E-6	6,49E-4	2,22E-6	-4,69E-4
ADP-fossil	MJ	1,25E0	4,54E-2	5,45E-1	1,84E0	1,53E-1	4,64E-5	MND	MND	MND	MND	MND	MND	MND	6,35E-3	9,64E-3	1,05E-1	1,01E-3	5,19E-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
23.03.2023