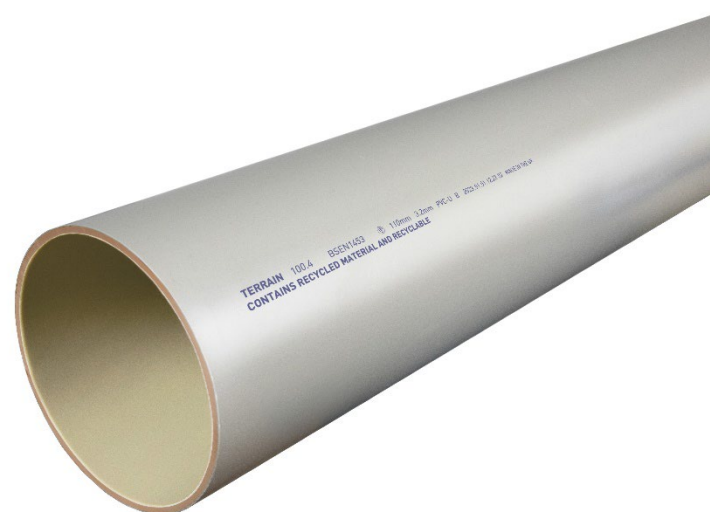


ENVIRONMENTAL PRODUCT DECLARATION

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

Terrain PVC Soil and Waste Pipe 110mm Grey

Polypipe Building Services



EPD HUB, HUB-0351

Publishing date 17 March 2023, last updated on 17 March 2023, valid until 17 March 2028

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Polypipe Building Services
Address	Polypipe Building Services, College Road, New Hythe Business Park, Aylesford, Kent ME20 7PJ
Contact details	commercialenquiries@polypipe.com
Website	www.polypipe.com/commercial-building-services

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 modules C1-C4, D
EPD author	Alex Ashton, Chris Goodwin, Steve Bamforth, Richard True, Dylan Stoppard, Nigel Delo
EPD verification	Independent verification of this EPD and data, according to ISO 14025: <input type="checkbox"/> Internal certification <input checked="" type="checkbox"/> External verification
EPD verifier	Elma Avdyli, EPD Hub

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	Terrain PVC Soil and Waste Pipe
Place of production	United Kingdom
Period for data	2022
Averaging in EPD	No averaging
Variation in GWP-fossil for A1-A3	0%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1 m of pipe of 110 mm diameter (grey)
Declared unit mass	1.74 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	2.01E0
GWP-total, A1-A3 (kgCO ₂ e)	2.02E0
Secondary material, inputs (%)	64.9
Secondary material, outputs (%)	0.0
Total energy use, A1-A3 (kWh)	8.7
Total water use, A1-A3 (m ³ e)	0.0112

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Polypipe Building Services is a UK manufacturer of plastic piping systems for water management and supply systems, servicing the commercial and industrial sectors of the UK construction Industry. Part of the Genuit Group we aim to;

Help create a better built environment by developing and producing sustainable solutions to the key challenges in water, climate, and ventilation management.

Polypipe Building Services are specialists in providing engineered above ground drainage and supply systems, leveraging offsite fabrication to design and deliver solutions to mechanical and public health engineers, M&E contractors as well as local authorities. Polypipe Building Services houses the well known industry leading brand Terrain and has been delivering systems to commercial, multiple occupancy residential, healthcare, education, and leisure projects for over 60 years.

PRODUCT DESCRIPTION

Having pioneered the development of solvent-welded systems, Terrain soil and waste products represent the industry benchmark for quality, installation flexibility and product innovation backed by the highest levels of customer service.

Terrain drainage systems include an extensive range of soil and waste products for multioccupancy residential, hotels, hospitals, schools and public sector developments, all built on the strength of the Terrain brand.

Systems include solvent-welded and push-fit options for both soil and waste drainage; overflow and trap systems; and a comprehensive range of adaptors and accessories.

Further information can be found at www.polypipe.com/commercial-building-services.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	-	-
Fossil materials	100	-
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	1m of pipe of 110mm diameter
Mass per declared unit	1.74 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 SCALING

Terrain PVC Soil and Waste Pipe (mm)	Scaling Factor (multiple of)	Weight (kg)	A1-A3 GWP Fossil (kg/CO ₂ e)
110	1	1.74	1.28
160	1.45	2.49	1.85

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 product is manufactured from up to 65% of recycled post-consumer Polyvinyl Chloride supplied by a number of different manufacturers. The virgin PVC polymer is mixed with recyclate and other raw material inputs. The material is then extruded into 3 and 4 metre lengths. The product is then placed onto a timber frame and secured with plastic strapping. Electricity consumed is split between renewable energy via wind turbines (32% supported by a Renewable Energy Guarantee of Origin - REGO) and 68% by an onsite Combined Heat and Energy Plant - CHP. . Production

scrap is reprocessed on site and put back into the process. Head waste that cannot be reprocessed on site is sent to local waste processing (A3).

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 transport distance is defined by the product category rules (PCRs). The average transport distance to builders merchants 319 km and 40 km from builders merchants to site of installation. This was calculated using a comprehensive sample of product shipped throughout 2022. This could vary dependent on location of builders merchants and installation. All vehicles used are to Euro 5 standard and use HVO biodiesel. There are no losses associated with transport because the product is wrapped and secured effectively. Volume capacity utilisation is assumed to be one for the packaged products.

The installation of the declared unit requires the use of forklift truck to take the product from the vehicle on to site ready for installation. Cleaning fluid and solvent cement are used to prepare and weld during the installation process. We have allowed for 2% waste during installation as in reality there will be some offcuts of pipe on site when cutting to exact lengths. At Polypipe Building Services we offer a collection and recovery service of product and packaging through our distribution channel of all plastic waste which can then be recycled and reused at our Aylesford site. However, we realise that not everyone will use this and therefore the reality is that some of our product and packaging will become part of the general site waste.

PRODUCT USE AND MAINTENANCE (B1-B7)

The use phase of this product has been analysed and found to be immaterial to the overall carbon impact of the declared unit, this is due to the product application. This assumption is in alignment with the product category rules (PCRs). Air, soil, and water impacts during the use phase have not been studied.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

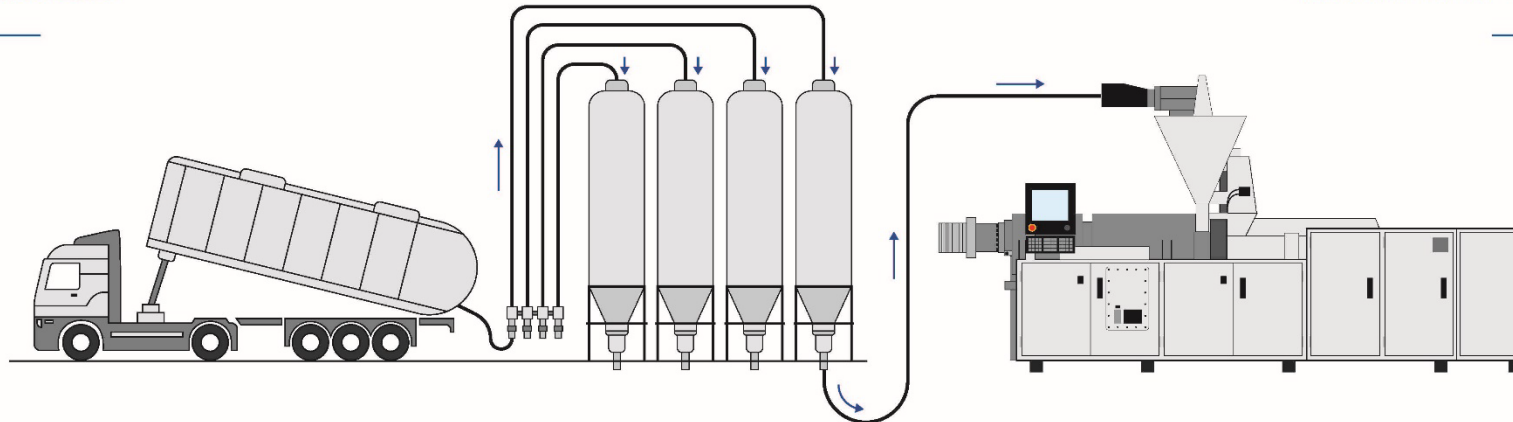
As part of the deconstruction process it is assumed that diesel powered equipment would be used to transport the product around the site. This would vary dependent on deconstruction methodology. A conservative approach was taken regarding the product end of life. Following current building practices, it was assumed the product will be sent to landfill.

Benefits outside of this system boundary are assumed to be net carbon gains as a result of a comprehensive pallet reuse program.

MANUFACTURING PROCESS

Extrusion Line

MANUFACTURING PROCESS

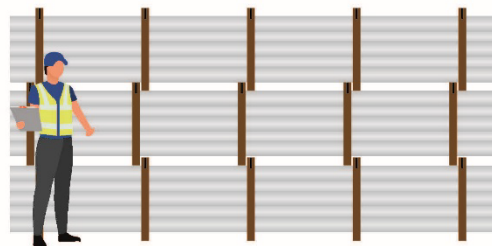


Step 1

Raw material is delivered to our factory on a tanker and deposited into our silos.

Step 2

Raw material is fed from the silo into the hopper where the material is passed through a screw and barrel and extruded through a die and calibration before cooling.



Step 3

Once produced, the pipes are palletised, strapped and then stored on site.



Step 4

The product is then loaded onto a lorry and dispatched.

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	No allocation
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	0%

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 ₂ e	1.99E0	4.81E-2	-2E-2	2.02E0	8.5E-2	1.51E-1	MND	MND	MND	MND	MND	MND	MND	9.16E-4	6.33E-3	0E0	2.52E-1	0E0
GWP – fossil	kg CO ₂ e	1.9E0	4.8E-2	5.82E-2	2.01E0	8.65E-2	6.95E-2	MND	MND	MND	MND	MND	MND	MND	9.16E-4	6.33E-3	0E0	2.52E-1	-1.62E-3
GWP – biogenic	kg CO ₂ e	8.65E-2	2.47E-5	-7.82E-2	8.34E-3	-2.17E-2	8.23E-2	MND	MND	MND	MND	MND	MND	MND	2.55E-7	4.59E-6	0E0	1.94E-4	7.81E-3
GWP – LULUC	kg CO ₂ e	1.71E-3	1.78E-5	4.62E-5	1.78E-3	5.49E-5	5.05E-5	MND	MND	MND	MND	MND	MND	MND	7.74E-8	1.9E-6	0E0	9.64E-6	-2.4E-6
Ozone depletion pot.	kg CFC ₁₁ e	6.72E-7	1.09E-8	7.69E-9	6.91E-7	1.43E-8	1.67E-8	MND	MND	MND	MND	MND	MND	MND	1.98E-10	1.49E-9	0E0	5.57E-9	-1.01E-10
Acidification potential	mol H ⁺ e	7.72E-3	5.07E-4	1.14E-4	8.35E-3	1.9E-3	3.19E-4	MND	MND	MND	MND	MND	MND	MND	9.58E-6	2.66E-5	0E0	1.57E-4	-7.6E-6
EP-freshwater ²⁾	kg Pe	8.61E-5	3.49E-7	7.54E-7	8.72E-5	1.08E-5	2.54E-6	MND	MND	MND	MND	MND	MND	MND	3.7E-9	5.15E-8	0E0	3.38E-7	-4.8E-8
EP-marine	kg Ne	1.43E-3	1.35E-4	3.04E-5	1.59E-3	1.52E-3	8.92E-5	MND	MND	MND	MND	MND	MND	MND	4.23E-6	8.01E-6	0E0	9.61E-5	-1.82E-6
EP-terrestrial	mol Ne	1.51E-2	1.49E-3	3.39E-4	1.69E-2	8.63E-3	7.96E-4	MND	MND	MND	MND	MND	MND	MND	4.64E-5	8.84E-5	0E0	5.78E-4	-2.05E-5
POCP (“smog”) ³⁾	kg NMVOCe	4.91E-3	4.18E-4	1.29E-4	5.46E-3	1.12E-3	2.31E-4	MND	MND	MND	MND	MND	MND	MND	1.28E-5	2.84E-5	0E0	2.21E-4	-6.01E-6
ADP-minerals & metals ⁴⁾	kg Sbe	4.04E-5	7.09E-7	2.55E-7	4.14E-5	4.71E-6	1.27E-6	MND	MND	MND	MND	MND	MND	MND	1.4E-9	1.08E-7	0E0	1.94E-7	-1.33E-8
ADP-fossil resources	MJ	3.75E1	7.18E-1	9.63E-1	3.92E1	1.04E0	1.48E0	MND	MND	MND	MND	MND	MND	MND	1.26E-2	9.84E-2	0E0	4.27E-1	-4.07E-2
Water use ⁵⁾	m ³ e depr.	1.79E0	2.42E-3	2.78E-3	1.8E0	1.75E-2	4.67E-2	MND	MND	MND	MND	MND	MND	MND	2.35E-5	3.66E-4	0E0	1.89E-2	1.55E-3

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	6.25E-8	3.7E-9	1.79E-9	6.8E-8	1.54E-8	2.99E-9	MND	MND	MND	MND	MND	MND	MND	2.54E-10	5.72E-10	0E0	2.97E-9	-6.55E-11
Ionizing radiation ⁶⁾	kBq U235e	1.19E-1	3.13E-3	9.13E-4	1.23E-1	4.67E-3	3.69E-3	MND	MND	MND	MND	MND	MND	MND	5.4E-5	4.3E-4	0E0	1.67E-3	-8.66E-5
Ecotoxicity (freshwater)	CTUe	3.18E1	5.28E-1	3.57E-1	3.27E1	2.14E0	1.18E0	MND	MND	MND	MND	MND	MND	MND	7.39E-3	7.52E-2	0E0	4.44E-1	-1.8E-2
Human toxicity, cancer	CTUh	1.32E-9	1.7E-11	3.97E-11	1.37E-9	1.27E-10	4.79E-11	MND	MND	MND	MND	MND	MND	MND	2.65E-13	1.92E-12	0E0	1.19E-11	-6.26E-13
Human tox. non-cancer	CTUh	3.59E-8	5.94E-10	3.9E-10	3.69E-8	6.68E-9	1.19E-9	MND	MND	MND	MND	MND	MND	MND	6.52E-12	8.91E-11	0E0	2.95E-10	-6.68E-11
SQP ⁷⁾	-	3.71E0	8.81E-1	6.13E-2	4.65E0	2.5E0	2.53E-1	MND	MND	MND	MND	MND	MND	MND	3.23E-4	1.49E-1	0E0	1.5E0	-6.29E-3

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
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Renew. PER as energy ⁸⁾	MJ	2.62E0	8.18E-3	2.88E-1	2.91E0	1.37E0	1.03E-1	MND	MND	MND	MND	MND	MND	MND	6.82E-5	1.24E-3	0E0	7.55E-3	-1.51E-3
Renew. PER as material	MJ	0E0	0E0	7.52E-1	7.52E-1	0E0	-7.45E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	7.59E-1
Total use of renew. PER	MJ	2.62E0	8.18E-3	1.04E0	3.67E0	1.37E0	-6.42E-1	MND	MND	MND	MND	MND	MND	MND	6.82E-5	1.24E-3	0E0	7.55E-3	7.57E-1
Non-re. PER as energy	MJ	2.67E1	7.18E-1	9.52E-1	2.84E1	1.04E0	1.26E0	MND	MND	MND	MND	MND	MND	MND	1.26E-2	9.84E-2	0E0	4.27E-1	-2.95E-2
Non-re. PER as material	MJ	3.4E1	0E0	-3.43E-2	3.4E1	0E0	-5.22E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	-3.35E1	0E0
Total use of non-re. PER	MJ	6.07E1	7.18E-1	9.18E-1	6.24E1	1.04E0	1.21E0	MND	MND	MND	MND	MND	MND	MND	1.26E-2	9.84E-2	0E0	-3.31E1	-2.95E-2
Secondary materials	kg	1.13E0	0E0	0E0	1.13E0	0E0	2.26E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-4.75E-2
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	1.07E-2	1.33E-4	4.19E-4	0.0112	5.3E-3	4.19E-4	MND	MND	MND	MND	MND	MND	MND	1.11E-6	2.05E-5	0E0	4.78E-4	-3.46E-4

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	1.08E-1	7.13E-4	9.96E-4	1.1E-1	4.28E-3	3.39E-3	MND	MND	MND	MND	MND	MND	MND	1.36E-5	9.56E-5	0E0	7.78E-4	-3.97E-5
Non-hazardous waste	kg	4.02E0	6.43E-2	2.5E-2	4.11E0	1.96E-1	1.2E-1	MND	MND	MND	MND	MND	MND	MND	1.45E-4	1.06E-2	0E0	1.7E0	-2.41E-3
Radioactive waste	kg	1.01E-4	4.95E-6	1.11E-6	1.07E-4	5.58E-6	3.6E-6	MND	MND	MND	MND	MND	MND	MND	8.82E-8	6.75E-7	0E0	2.54E-6	-7.09E-8

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	9.7E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	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 ₂ e	1.85E0	4.77E-2	5.67E-2	1.95E0	8.5E-2	6.75E-2	MND	MND	MND	MND	MND	MND	MND	9.09E-4	6.27E-3	0E0	1.78E-1	-1.56E-3
Ozone depletion Pot.	kg CFC ₁₁ e	1.02E-6	8.68E-9	5.87E-9	1.03E-6	1.37E-8	2.31E-8	MND	MND	MND	MND	MND	MND	MND	1.57E-10	1.18E-9	0E0	4.44E-9	-8.67E-11
Acidification	kg SO ₂ e	6.25E-3	3.56E-4	8.53E-5	6.7E-3	1.13E-3	2.37E-4	MND	MND	MND	MND	MND	MND	MND	1.35E-6	1.29E-5	0E0	1.7E-4	-5.77E-6
Eutrophication	kg PO ₄ ³ e	3.64E-3	4.68E-5	2.66E-5	3.72E-3	7.97E-4	1.24E-4	MND	MND	MND	MND	MND	MND	MND	2.38E-7	2.6E-6	0E0	8.87E-3	-8.62E-7
POCP ("smog")	kg C ₂ H ₄ e	3.92E-4	1.2E-5	8.31E-6	4.12E-4	1.47E-5	1.47E-5	MND	MND	MND	MND	MND	MND	MND	1.39E-7	8.16E-7	0E0	3.71E-5	-4.5E-7
ADP-elements	kg Sbe	4.04E-5	7.09E-7	2.55E-7	4.14E-5	4.71E-6	1.27E-6	MND	MND	MND	MND	MND	MND	MND	1.4E-9	1.08E-7	0E0	1.94E-7	-1.33E-8
ADP-fossil	MJ	3.75E1	7.18E-1	9.63E-1	3.92E1	1.04E0	1.48E0	MND	MND	MND	MND	MND	MND	MND	1.26E-2	9.84E-2	0E0	4.27E-1	-4.07E-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
17.03.2023

