ENVIRONMENTAL PRODUCT DECLARATION

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

Ceramic Wall Tiles
Johnson Tiles

EPD HUB, HUB-0063
Publishing date 19 June 2022, last updated date 19 June 2022, valid until 19 June 2027

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Johnson Tiles
Address	Harewood Street, Tunstall, Stoke-on-Trent, ST6 5JZ
Contact details	smassey@johnson-tiles.com
Website	https://www.johnson-tiles.com/

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 EN 17160 Product category rules for ceramic tiles
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	Sophie Massey, Johnson Tiles
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	N.C 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	Ceramic Wall Tiles
Additional labels	-
Product reference	-
Place of production	Tunstall, Stoke-on-Trent, United Kingdom
Period for data	01 October 2020 - 30 September 2021
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	-16, +19 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1m2
Declared unit mass	13.91 kg
GWP-fossil, A1-A3 (kgCO2e)	8.36
GWP-total, A1-A3 (kgCO2e)	8.47
Secondary material, inputs (%)	1.17
Secondary material, outputs (%)	0
Total energy use, A1-A3 (kWh)	5.44E1
Total water use, A1-A3 (m3e)	7.4E-2

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Johnson Tiles has been designing and making ceramic tiles since 1901, proudly staying true to Johnson Tiles' roots in the Potteries' heartland of Stoke-on-Trent. To strengthen our portfolio of sustainable, British-made products, our design team searches the world sourcing complementary collections of porcelain and ceramic floor and wall tiles. Our comprehensive range has been used for interior design projects in homes, schools, universities, hotels, hospitals, commercial developments and leisure facilities across the world.

PRODUCT DESCRIPTION

The ceramic tiles included in this study are those belonging to the BIII water absorption group in accordance with EN ISO 10545-3 with water absorption 10 - 20%
Glazed tiles included in this EPD are small to medium format ceramic tiles. The product sizes that lie within the scope of the study have a thickness between 6.5 mm and 10 mm, with an average weight of 13.91 kg/m2.

Ceramic tile is commonly used in commercial, institutional and residential interior applications such as kitchens and bathrooms.

No substances included in the Candidate List of Substances of Very High Concern for authorisation under the REACH Regulations are present in the ceramic tiles manufactured by Johnson Tiles.
Water Absorption - 15% - 17%
Frost resistance - not suitable
Chemical resistance - Class A-B (better)
Stain resistance - Class 3 (better)
Fire rating - Class A1 Non Combustable
UV Colour Resistance - unaffected by light

Satisfies European standard EN 14411 and ISO 13006, according to criteria ISO 10545 - International Organization for Standardization Specifications for Ceramic Tile.
Ceramic tiles produced range from 100x100mm - 600x300mm with thicknesses between 6.5mm and 10mm
More information can be found on the company website at https://www.johnson-tiles.com
Further information can be found at https://www.johnson-tiles.com/.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	100	UK, Spain
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	0.019234

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1m2
Mass per declared unit	13.91 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. Raw materials include the extraction and pre-treatment processes before production. The raw materials are clay, Kaolin, Sand and Limestone.
A2. Transport includes the delivery of raw materials to the plant.
A3. Manufacturing stages include production of granules from the milling and spray drying process, pressing, drying, glazing, firing and packaging. The manufacturing process required electricity and fuels for the different equipment, as well as heating and firing. The product is finally packaged in cardboard and sent to the installation site on a wooden pallet.

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. Transport includes transportation of ceramic tiles to the construction site. Johnson Tiles transports tiles by road haulage to our UK customers.

The transportation distance is defined according to the PCR. Average distance of transportation from production plant to building site is assumed as 100 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 is packaged properly. Also, volume capacity utilisation factor is assumed to be 100 % for the nested packaged products.

A5. Installation of the product stage includes adhesive mortar usage in the construction site in addition to packaging waste transportation and disposal.
For 1 m2 ceramic tile installation; 3.2 kg mortar and 0.7 L water usage assumed. The installation losses assumed to be 10% as industry standard.

PRODUCT USE AND MAINTENANCE (B1-B7)

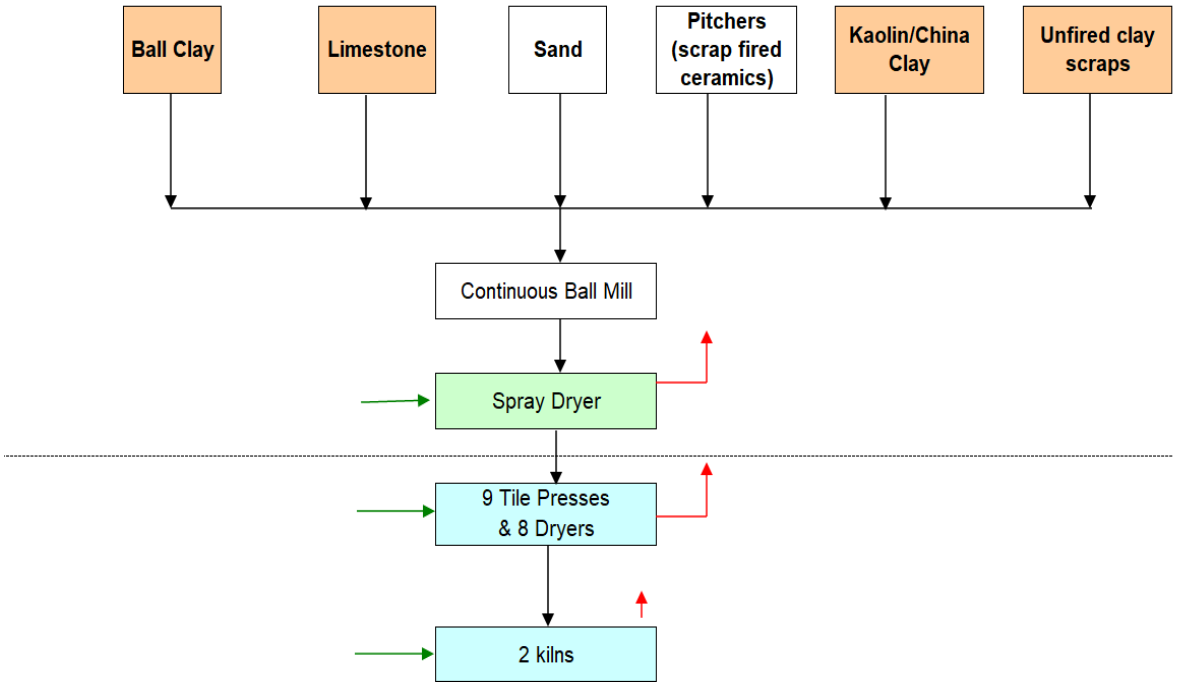
This EPD does not cover the use phase.
Air, soil, and water impacts during the use phase have not been studied.

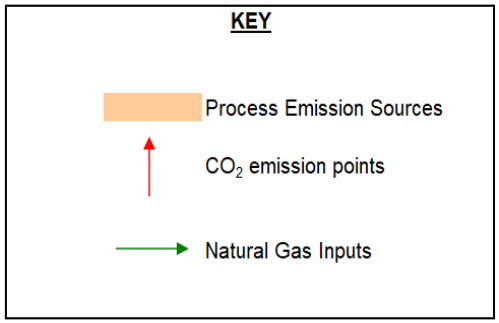
PRODUCT END OF LIFE (C1-C4, D)

C1. De-construction and demolition at the end of service life is usually conducted by a selected removal of the tiles using manual tools. The environmental impacts that are generated are very low and therefore can be neglected.
C2. Transport for waste includes the transportation of the discarded tiles and adhesive mortar to landfill. Average distance from waste container to final destination is assumed as 25km.
C3. No waste processing is assumed in this report.
C4. All products are considered to be sent to landfill in the end of life period, while the flow is not included in Module D for benefits. The benefits and loads of recycling of packaging waste are included in Module D.

MANUFACTURING PROCESS

PROCESS FLOW DIAGRAM





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.

All inputs and outputs are included in the calculation. Data gaps are filled by conservative assumptions with average or generic data, as described above.
There is no neglected unit process more than 1% of total mass and energy flows. The total neglected input and output flows are also not exceeded 5% of energy usage or mass as indicated in the PCR.
This LCA study includes the provision of all materials, transportation, energy and emission flows, usage considerations and end of life processing of product. The entire life cycle is covered from cradle to grave, including all industrial processes from raw material acquisition and pre-processing, production, product distribution and installation, use and maintenance, and end-of-life management.
The production of capital goods, used paint on packaging cardboards, infrastructure, carrying of product to the storage are in manufacturing site, production of manufacturing equipment and personnel-related activities are not included in this LCA study as indicated in the PCR.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. In this study, as per the reference standard, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g., mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

In this study allocation could not be avoided for raw materials, packaging, ancillary material, energy consumption and waste production as the information was only measured on factory or production process level. The inputs were allocated to studied product based on annual production volume (m2).

The values for 1 m2 of ceramic tile are calculated by considering the total product meterage per annual production. In the factory, ceramic wall tiles of different sizes are produced. Since the production processes of these products are similar, the annual production percentages are taken into consideration for allocation. According to the ratio of the annual production of the declared product to the total annual production at the factory, the annual total raw materials, energy consumption, packaging materials and the generated waste per the declared product are allocated. Subsequently, the product output fixed to 1 m2 and the corresponding amount of product is used in the calculations.

All estimations and assumptions regarding the cut off criteria and the allocation are declared in the part “Cut-off Criteria” except the estimations/assumptions below:

- Module A5: Recommended installation is assumed to be applied with mortar and water. According to the prepared EPDs for mortar products, RSL of mortar is expected to be equal to the building’s service life.
- Module C2: Since there is no follow up procedure, transportation distance to the closest disposal area is estimated as 25 km and common transportation type and fuel are used in the calculation.
- Module C4: Since there is no follow up procedure, worst case scenario is assumed for waste disposal.

Allocation used in environmental data sources is aligned with the above.

AVERAGES AND VARIABILITY

The EPD covers ceramic tiles manufactured at a single factory using the same raw materials ranging in size from 150x150mm to 600x300mm, and the results are representative of a weighted average m2 of product. The variability was calculated by creating two LCA models based on the average model and changing their constituent flows to a minimum case and a maximum case in terms of material and energy consumption. The variation does not exceed +/- 50%.

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	kg CO_2e	1.45E0	6.55E-1	6.37E0	8.47E0	1.3E-1	5.42E0	MND	MND	MND	MND	MND	MND	MND	0E0	3.91E-2	0E0	1.83E-1	-8.05E-3
GWP – fossil	kg CO_2e	1.44E0	6.55E-1	6.26E0	8.36E0	1.31E-1	5.31E0	MND	MND	MND	MND	MND	MND	MND	0E0	3.91E-2	0E0	1.81E-1	-2.31E-2
GWP – biogenic	kg CO_2e	7.18E-3	3.28E-4	1.03E-1	1.1E-1	9.5E-5	1.09E-1	MND	MND	MND	MND	MND	MND	MND	0E0	2.84E-5	0E0	1.47E-3	1.51E-2
GWP – LULUC	kg CO_2e	1.66E-3	2.21E-4	3.84E-3	5.72E-3	3.94E-5	4.27E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1.18E-5	0E0	8.7E-5	-2.62E-5
Ozone depletion pot.	kg $CFC_{-11}e$	3.4E-7	1.47E-7	9.19E-7	1.41E-6	3.08E-8	5.71E-7	MND	MND	MND	MND	MND	MND	MND	0E0	9.19E-9	0E0	5.62E-8	-4.94E-10
Acidification potential	mol H^+e	1.13E-2	2.07E-3	1.48E-2	2.81E-2	5.49E-4	3.2E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1.64E-4	0E0	1.55E-3	-1.03E-4
EP-freshwater[3)]	kg Pe	8.71E-5	5.3E-6	1.64E-4	2.57E-4	1.06E-6	2.05E-4	MND	MND	MND	MND	MND	MND	MND	0E0	3.18E-7	0E0	3.17E-6	-7.4E-7
EP-marine	kg Ne	1.73E-3	4.34E-4	4.22E-3	6.38E-3	1.66E-4	5.33E-3	MND	MND	MND	MND	MND	MND	MND	0E0	4.95E-5	0E0	5.24E-4	-1.82E-5
EP-terrestrial	mol Ne	1.96E-2	4.83E-3	5.96E-2	8.41E-2	1.83E-3	5.95E-2	MND	MND	MND	MND	MND	MND	MND	0E0	5.46E-4	0E0	5.77E-3	-2.04E-4
POCP (“smog”)	kg NMVOCe	5.41E-3	1.76E-3	1.33E-2	2.05E-2	5.88E-4	1.9E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1.76E-4	0E0	1.67E-3	-1.03E-4
ADP-minerals & metals	kg Sbe	2.6E-3	1.62E-5	9.77E-6	2.62E-3	2.23E-6	8.06E-4	MND	MND	MND	MND	MND	MND	MND	0E0	6.67E-7	0E0	1.95E-6	-2.02E-7
ADP-fossil resources	MJ	1.94E1	9.76E0	9.99E1	1.29E2	2.03E0	7.63E1	MND	MND	MND	MND	MND	MND	MND	0E0	6.08E-1	0E0	4.26E0	-7.4E-1
Water use[2)]	m^3e depr.	9.6E-1	3.11E-2	4.73E-1	1.46E0	7.57E-3	2.79E0	MND	MND	MND	MND	MND	MND	MND	0E0	2.26E-3	0E0	1.91E-1	-1.99E-2

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	MJ	1.97E0	1.32E-1	6.49E1	6.7E1	2.56E-2	1.06E1	MND	MND	MND	MND	MND	MND	MND	0E0	7.65E-3	0E0	7.03E-2	-8.63E-2
Renew. PER as material	MJ	0E0	0E0	9.49E-1	9.49E-1	0E0	9.49E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-8.68E-2
Total use of renew. PER	MJ	1.97E0	1.32E-1	6.59E1	6.8E1	2.56E-2	1.07E1	MND	MND	MND	MND	MND	MND	MND	0E0	7.65E-3	0E0	7.03E-2	-1.73E-1
Non-re. PER as energy	MJ	1.94E1	9.76E0	9.96E1	1.29E2	2.03E0	7.62E1	MND	MND	MND	MND	MND	MND	MND	0E0	6.08E-1	0E0	4.26E0	-2.76E-1
Non-re. PER as material	MJ	0E0	0E0	2.25E-1	2.25E-1	0E0	2.25E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	-4.64E-1
Total use of non-re. PER	MJ	1.94E1	9.76E0	9.99E1	1.29E2	2.03E0	7.63E1	MND	MND	MND	MND	MND	MND	MND	0E0	6.08E-1	0E0	4.26E0	-7.4E-1
Secondary materials	kg	9.55E-2	0E0	6.74E-2	1.63E-1	0E0	4.79E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	9.57E-3
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	4.98E-2	1.62E-3	2.26E-2	7.4E-2	4.24E-4	6.74E-2	MND	MND	MND	MND	MND	MND	MND	0E0	1.27E-4	0E0	4.81E-3	-7.62E-5

6) 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	1.27E-1	1.02E-2	4.82E-2	1.86E-1	1.98E-3	6.25E-1	MND	MND	MND	MND	MND	MND	MND	0E0	5.91E-4	0E0	7.47E-3	-1.03E-3
Non-hazardous waste	kg	4.17E0	6.45E-1	1.1E0	5.92E0	2.19E-1	9.69E0	MND	MND	MND	MND	MND	MND	MND	0E0	6.53E-2	0E0	1.72E1	-2.53E-2
Radioactive waste	kg	6.38E-5	6.67E-5	8.22E-5	2.13E-4	1.4E-5	1.58E-4	MND	MND	MND	MND	MND	MND	MND	0E0	4.17E-6	0E0	2.56E-5	-3.72E-7

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	2.07E-1	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_2e	1.42E0	6.49E-1	6.1E0	8.18E0	1.3E-1	5.15E0	MND	MND	MND	MND	MND	MND	MND	0E0	3.87E-2	0E0	1.78E-1	-2.12E-2
Ozone depletion Pot.	kg $CFC_{-11}e$	4.85E-7	1.17E-7	6.92E-7	1.29E-6	2.44E-8	6.01E-7	MND	MND	MND	MND	MND	MND	MND	0E0	7.3E-9	0E0	4.48E-8	-4.87E-10
Acidification	kg SO_2e	1.01E-2	1.48E-3	1.04E-2	2.2E-2	2.66E-4	2.86E-2	MND	MND	MND	MND	MND	MND	MND	0E0	7.95E-5	0E0	1.23E-2	-8.91E-5
Eutrophication	kg PO_4^3e	3.1E-3	2.9E-4	2.83E-3	6.22E-3	5.38E-5	8.39E-3	MND	MND	MND	MND	MND	MND	MND	0E0	1.61E-5	0E0	2.51E-4	-1.95E-5
POCP (“smog”)	kg C_2H_4e	3.9E-4	9.11E-5	5.52E-4	1.03E-3	1.69E-5	2.25E-3	MND	MND	MND	MND	MND	MND	MND	0E0	5.04E-6	0E0	4.64E-5	-1.33E-5
ADP-elements	kg Sbe	2.6E-3	1.62E-5	9.77E-6	2.62E-3	2.23E-6	8.06E-4	MND	MND	MND	MND	MND	MND	MND	0E0	6.67E-7	0E0	1.95E-6	-2.02E-7
ADP-fossil	MJ	1.94E1	9.76E0	9.99E1	1.29E2	2.03E0	7.63E1	MND	MND	MND	MND	MND	MND	MND	0E0	6.08E-1	0E0	4.26E0	-7.4E-1

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.

Neena Chandramathy as an authorized verifier acting for EPD Hub Limited
19.06.2022

EPD Hub
VERIFIED ISO 14025