ENVIRONMENTAL PRODUCT DECLARATION

Marley Concrete tiles

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

Concrete Roof Tiles

Marley Ltd

EPD HUB, HUB-0860
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Created with one-click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	Marley Ltd
Address	Marley Limited, Litchfield Road, Burton-on-Trent, Staffordshire DE14 3HD, England, UK
Contact details	epd@marley.co.uk
Website	www.marley.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 1.0, 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-B1, and modules C1-C4, D
EPD author	C Griffiths, S Nicholson, B Puljer - Marley
EPD verification	Independent verification of this EPD and data, according to ISO 14025:
	☐ Internal certification ☑ External verification
EPD verifier	Elma Avdyli, 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 com- pared in a building context.

PRODUCT

Product name	Concrete Roof Tiles
Additional labels	Modern, Duo Modern, Edgemere, Duo Edgemere, Riven Edgemere, Ludlow Major, Double Roman, Mendip, Wessex, Ash- more, Ludlow Plus, Anglia & Plain Tiles
Product reference	N/A
Place of production	Burton, Beenham and Glasgow
Period for data	2022
Averaging in EPD	Multiple products and multiple factories
Variation in GWP-fossil for A1-A3 VP-025-C	-3.8% & 2.1%

ENVIRONMENTAL DATA SUMMARY

Declared unit	1m²
Declared unit mass	50 kg
GWP-fossil, A1-A3 (kgCO2e)	9,10E+00
GWP-total, A1-A3 (kgCO2e)	6,84E+00
Secondary material, inputs (%)	0.02
Secondary material, outputs (%)	93.0
Total energy use, A1-A3 (kWh)	16.5
Total water use, A1-A3 (m3e)	3,14E-01

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Marley is a UK leader in the manufacture and supply of pitched roof systems to the construction market and offers the most comprehensive pitched roofing system on the market. Its product offering includes concrete and clay roof tiles, roof fittings, timber battens, roof-integrated solar panels and roofing accessories. This complete roof solution offers an effective roofing system, which is designed and tested to work together – all supported by a 15-year roof system warranty.

PRODUCT DESCRIPTION

Concrete tiles are CE / UKCA Marked as being manufactured according to BS EN 490, when tested to BS EN 491, meeting the requirements for mechanical resistance (transverse strength), water impermeability, dimensions, structural / fixing and durability (freeze / thaw). Other factors which must be satisfied to achieve the standard include external fire performance. Test methods and minimum criteria are detailed in the standard.

The nominated size for the product specified in this document is meter squared of roof tiles laid, based on large format tiles @ 10 tiles per m^2. A conversion factor for medium format and small format tiles is listed in the document.

Further information can be found at www.marley.co.uk.

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	N/A	N/A
Minerals	100	EU
Fossil materials	N/A	N/A
Bio-based materials	N/A	N/A

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate	
Biogenic carbon content in product, kg	-
Biogenic carbon content in packaging, kg	0.63

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	$1m^2$
Mass per declared unit	50 kg
Functional unit	$1m^2$ of installed concrete roof tiles with useful service life of 60 years
Reference service life	60 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

MANUFACTURING AND PACKAGING (A1-A3, see table below)

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.

Marley concrete roof tiles are typically made from aggregates (sand + re-cycled), cement (OPC + limestone), colour pigments and Water. The aggregate cement ratio will vary from product to product within a specified range. The aggregate used is graded to precise specifications, with large particles for strength and finer sand for a smooth finish. Re-cycled aggregates are being more widely used, and are blended together with the finer sands to ensure the correct grading is achieved. Cement (OPC) is also being supplemented with limestone. The sand and cement are first dry-mixed in the mixer, with the colour pigments and the water then added.

The wet concrete is then extruded onto an aluminium pallet mould, which has been treated with a light coating of oil to prevent the tile sticking to it. The shape and design of the pallet mould determines the profile of the tile. The tile is then cut to the right length by a flying knife, which also inserts a nail hole, if required, at this stage.

The wet tiles are then elevated into loaders onto a drying rack. Once the rack is full, it moves automatically into the curing process. The curing process is in two steps a cold cure and a hot cure. When the drying racks leave the drying chamber, the tiles are moved from the racks into the unloader and onto a convey- or belt.

The tiles are then separated from the aluminium pallet mould. The conveyor passes through a booth where the tiles are sprayed with water based paint or acrylic (for streaked or granulated tiles) to enhance their colour. Each tile is individually inspected at this stage. Any water lost during manufacture is recycled - collected and reintroduced to the mix. Material waste during manufacture is negligible.

The tiles travel on a conveyor to the final stage of manufacturing. Here they are collected into bundles of varying size
- depending on the product and then made up into pallets and shrink-wrapped. The profile, date, quantity and manufacturing site are applied onto the packaging. They are then transported to the yard for quality checking and stacking, to await delivery to customer.

TRANSPORT AND INSTALLATION (A4-A5 see table below)

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.

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

PRODUCT LIFE CYCLE

A4 (see table on previous page)

During the time period measured, manufacture of concrete tiles took place at three different sites within the UK: Burton, Been- ham and Glasgow. Transport to site or yard is undertaken by articulated lorries with Euro 6 engines. We have calculated that the average journey undertaken by these products from manufacturing site to installation site during the time period allocated was 120km.

A5 (see table on previous page)

In the UK, installation of roof tiles is a manual process. Tiles are secured to wooden battens on the roof using nails.

PRODUCT USE AND MAINTENANCE (B1-B7 see table on previous page)

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 see table on previous page)

C1: In the UK, removal of roof tiles is a manual process.

C2:It is assumed that 7% of product is transported 50km to a waste processing site to be landfilled, and 93% of product is reused. This is evidenced on UK Governments Statistics on Construction Waste website: 7. Recovery rate from non-hazard- ous construction and demolition (C&D) waste - Table 8: England, 2010–2020:

www.gov.uk/government/statistics/uk-waste-data/uk-statistics- on-waste#recovery-rate-from-non-hazardous-construction-and- demolition-cd-waste

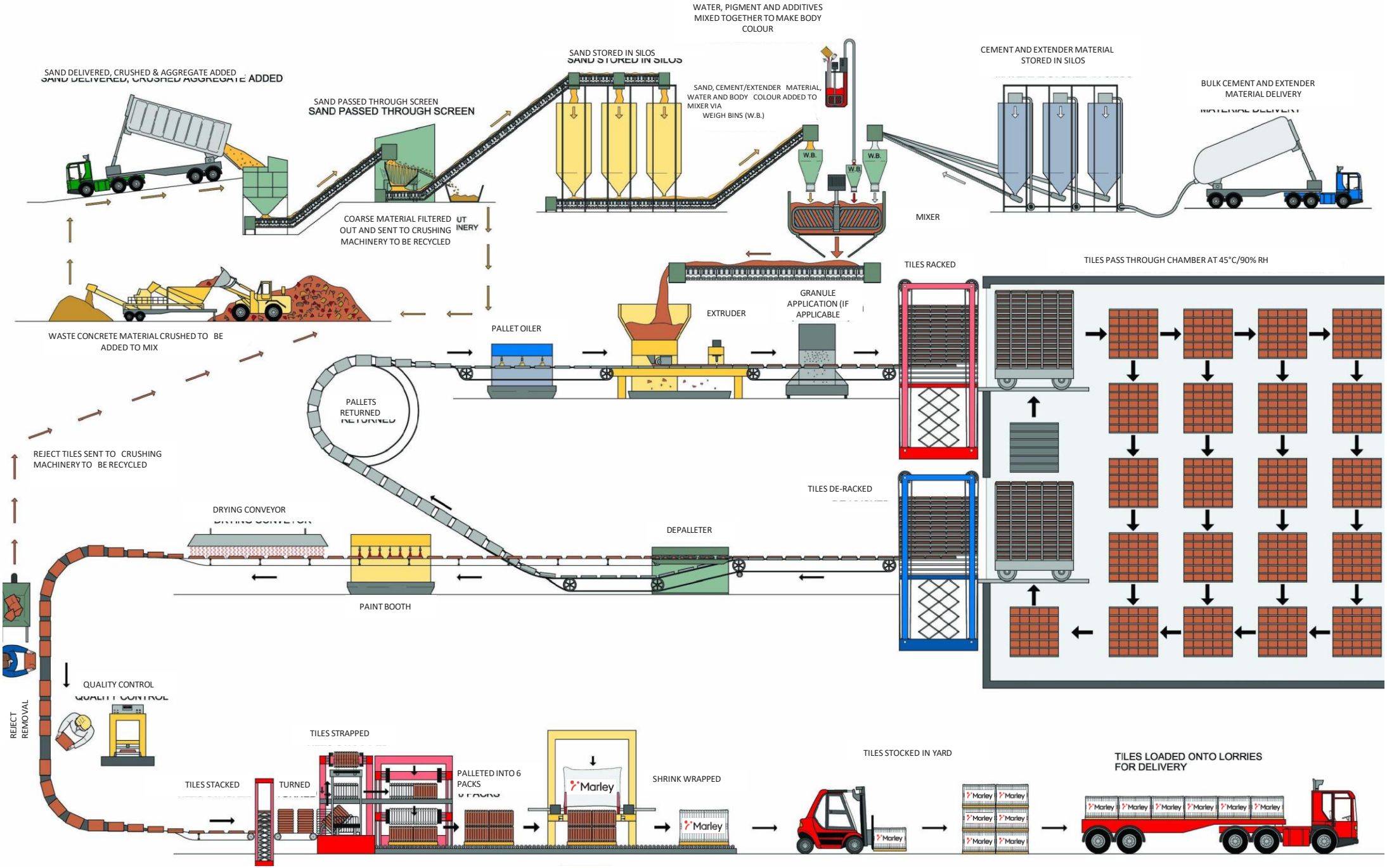
C3: All material (whether used on site or treated at a waste processing facility) will be crushed. 93% will be reused on site as infill; 7% will be transported to landfill.

C4: It is assumed that 7% of material will go to landfill.

D: Due to the recycling potential of concrete, it can be used as secondary raw material, which avoids the use of virgin raw materials. The 93% of concrete going to waste processing is converted into secondary raw materials after recycling. The benefit of recycled concrete claimed in module D has excluded the amount of secondary material input. In addition, incineration of the strapping and packaging generates energy.

D: Incineration of the strapping and packaging generates energy. Concrete reused at end-of-life prevents virgin aggregate being used.

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	Not applicable
Ancillary materials	Not applicable
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY	
Type of average	Multiple products and multiple factories
Averaging method	Not applicable
Variation in GWP-fossil for A1-A3	-3.8% & 2.1%

Primary data represents the three Marley sites at which concrete roof tiles are manufactured. All products covered by this EPD use the same mix design with minor differences in pigmentation. The only material difference is that some of these products are sold in different sizes (small, medium and large).

The data was used to calculate average impacts for the product. The variability of the primary data or the emissions between the manufacturing sites did not amount to more than 10 % for the relevant data. The primary data was averaged by calculating a weighted average of the site's consumption of raw materials and energy, and production of wastes. The share of production volume per each site was used in the weighting to ensure maximum validity.

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 CO2e	7,84E+00	5,31E-01	-1,53E+00	6,84E+00	5,30E-01	2,50E+00	-4,51E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,38E-01	1,86E-01	1,85E-02	-8,93E-01
GWP – fossil	kg CO2e	7,84E+00	5,31E-01	7,34E-01	9,10E+00	5,30E-01	2,36E-01	-4,51E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,37E-01	1,86E-01	1,84E-02	-8,87E-01
GWP – biogenic	kg CO2e	2,66E--04	1,88E-04	-2,27E+00	-2,27E+00	4,01E-04	2,26E+00	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	1,80E-04	5,18E-05	3,65E-05	-4,66E-03
GWP – LULUC	kg CO2e	1,25E-03	2,20E-04	1,71E-03	3,18E-03	1,66E-04	5,84E-06	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	7,46E-05	1,57E-05	5,47E-06	-1,59E-03
Ozone depletion pot.	kg CFC-11e	2,81E-07	1,17E-07	6,33E-08	4,62E-07	1,30E-07	3,13E-09	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	5,83E-08	4,02E-08	7,59E-09	-7,51E-08
Acidification potential	mol H+e	1,98E-02	4,96E-03	3,77E-03	2,86E-02	1,70E-03	2,48E-04	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	7,63E-04	1,95E-03	1,75E-04	-7,15E-03
EP-freshwater[2]	kg Pe	9,20E-05	4,44E-06	3,62E-05	1,33E-04	4,50E-06	3,05E-07	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,02E-06	7,52E-07	2,23E-07	-5,18E-05
EP-marine	kg Ne	5,41E-03	1,21E-03	8,95E-04	7,52E-03	3,74E-04	1,22E-04	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	1,68E-04	8,59E-04	6,02E-05	-1,07E-03
EP-terrestrial	mol Ne	6,35E-02	1,35E-02	9,92E-03	8,69E-02	4,16E-03	1,20E-03	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	1,87E-03	9,43E-03	6,63E-04	-1,34E-02
POCP ("smog")[3]	kg NMVOCe	1,60E-02	3,84E-03	3,77E-03	2,36E-02	1,64E-03	3,04E-04	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	7,33E-04	2,59E-03	1,93E-04	-3,52E-03
ADP-minerals & metals4	kg Sbe	3,23E-05	1,03E-05	9,04E-06	5,16E-05	9,43E-06	3,58E-07	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	4,23E-06	2,84E-07	1,68E-07	-4,31E-05
ADP-fossil resources	MJ	3,20E+01	7,81E+00	1,36E+01	5,34E+01	8,60E+00	2,75E-01	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	3,86E+00	2,56E+00	5,15E-01	-1,30E+01
Water use[5]	m^3e depr.	7,82E-01	2,79E-02	2,66E-01	1,08E+00	3,20E-02	-1,15E-02	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	1,43E-02	4,78E-03	2,38E-02	-7,44E-01

[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.

ENVIRONMENTAL IMPACT DATA

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	1,28E-07	3,51E-08	5,97E-08	2,23E-07	4,65E-08	2,74E-09	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,08E-08	2,36E-07	3,40E-09	-6,93E-08
Ionizing radiation[6]	kBq U235e	1,45E-01	3,32E-02	3,76E-02	2,16E-01	3,76E-02	7,36E-04	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	1,69E-02	1,10E-02	2,11E-03	-1,11E-01
Ecotoxicity (freshwater)	CTUe	6,11E+01	6,15E+00	1,54E+01	8,27E+01	6,57E+00	4,07E-01	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,95E+00	1,50E+00	3,25E-01	-2,02E+01
Human toxicity, cancer	CTUh	1,13E-09	1,96E-10	1,17E-09	2,50E-09	1,66E-10	5,53E-11	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	7,42E-11	5,38E-11	7,70E-12	-5,15E-10
Human tox. non-cancer	CTUh	5,62E-08	6,35E-09	1,16E-08	7,41E-08	7,50E-09	2,96E-09	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	3,36E-09	1,33E-09	2,38E-10	-1,36E-08
SQP[7]	-	1,07E+02	7,47E+00	2,06E+00	1,17E+02	1,30E+01	2,43E-01	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	5,82E+00	6,57E-02	8,76E-01	-4,34E+00

[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.

ENVIRONMENTAL IMPACT DATA

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	1,93E+00	8,42E-02	6,30E+00	8,31E+00	1,08E-01	5,22E-03	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	4,85E-02	1,39E-02	4,17E-03	-2,81E+00
Renew. PER as material	MJ	0,00E+00	0,00E+00	2,21E+01	2,21E+01	0,00E+00	-2,21E+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 renew. PER	MJ	1,93E+00	8,42E-02	2,84E+01	3,04E+01	1,08E-01	-2,21E+01	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	4,85E-02	1,39E-02	4,17E-03	-2,81E+00
Non-re. PER as energy	MJ	3,20E+01	7,81E+00	1,14E+01	5,12E+01	8,60E+00	2,75E-01	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	3,86E+00	2,56E+00	5,15E-01	-1,30E+01
Non-re. PER as material	MJ	0,00E+00	0,00E+00	2,25E+00	2,25E+00	0,00E+00	-2,25E+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
Total use of non-re. PER	MJ	3,20E+01	7,81E+00	1,36E+01	5,34E+01	8,60E+00	-1,97E+00	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	3,86E+00	2,56E+00	5,15E-01	-1,30E+01
Secondary materials	kg	1,08E-02	0,00E+00	1,03E-01	1,14E-01	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
Renew. 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
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	3,09E-01	1,36E-03	3,39E-03	3,14E-01	1,79E-03	3,77E-04	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	8,02E-04	2,26E-04	5,64E-04	-5,63E-02

[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	1,23E-01	9,28E-03	4,65E-02	1,79E-01	8,35E-03	7,66E-03	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	3,74E-03	0,00E+00	4,81E-04	-7,46E-02
Non-hazardous waste	kg	4,00E+00	6,01E-01	1,35E+00	5,95E+00	9,24E-01	1,29E+00	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	4,14E-01	0,00E+00	3,50E+00	-2,10E+00
Radioactive waste	kg	1,67E-04	5,28E-05	3,56E-05	2,56E-04	5,91E-05	1,09E-06	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,65E-05	0,00E+00	3,41E-06	-6,67E-05

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	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	4,65E+01	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	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
Materials for energy rec	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,21E+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	1,47E+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 IMPACT DATA

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 CO2e	7,79E+00	5,26E-01	7,16E-01	9,03E+00	5,25E-01	2,33E-01	-4,51E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,35E-01	1,85E-01	1,81E-02	-8,63E-01
Ozone depletion Pot.	kg CFC-11e	2,37E-07	9,31E-08	5,69E-08	3,87E-07	1,03E-07	2,57E-09	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	4,63E-08	3,18E-08	6,01E-09	-7,10E-08
Acidification	kg SO2e	1,40E-02	3,75E-03	2,90E-03	2,07E-02	1,13E-03	1,67E-04	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	5,04E-04	2,75E-04	7,29E-05	-5,61E-03
Eutrophication	kg PO43e	4,21E-03	5,13E-04	1,29E-03	6,01E-03	2,27E-04	4,74E-04	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	1,02E-04	4,84E-05	1,41E-05	-1,65E-03
POCP (“smog”)	kg C2H4e	5,15E-04	1,26E-04	2,68E-04	9,08E-04	6,48E-05	4,90E-06	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	2,90E-05	2,83E-05	5,35E-06	-2,93E-04
ADP-elements	kg Sbe	3,23E-05	1,03E-05	9,04E-06	5,16E-05	9,43E-06	3,58E-07	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	4,23E-06	2,84E-07	1,68E-07	-4,31E-05
ADP-fossil	MJ	3,20E+01	7,81E+00	1,36E+01	5,34E+01	8,60E+00	2,75E-01	0,00E+00	MND	MND	MND	MND	MND	MND	0,00E+00	3,86E+00	2,56E+00	5,15E-01	-1,30E+01

CONVERSION TABLE FOR ALTERNATIVE TILE SIZES

This EPD is calculated for small format (plain) concrete tiles per m2 using 60 tiles as a covering capacity. The correlation between the material and energy inputs to calculate A1-A3 data is linear. Therefore, to calculate A1-A3 values for a different size tiles, apply the
percentages in the table below to the A1-A3 number shown within this document.

Description	Weight per m^2 - kg	Tiles per m^2	A1-A3			B1 kg CO2e
			Conversion Factor	kg CO2e - Fossil	kg CO2e total	
Small format	73.8	60	48%	13.4316	10.09584	-6.6748
Medium format	47	16.5	-6%	8.554	6.4296	-4.2394
Large format	50	10	0	9.10	6.84	-4.51

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 compliance 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

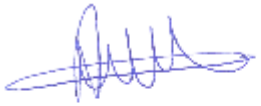
I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried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

Elma Avdyli, as an authorized verifier acting for EPD Hub Limited
13.06.2024



Tell me more

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