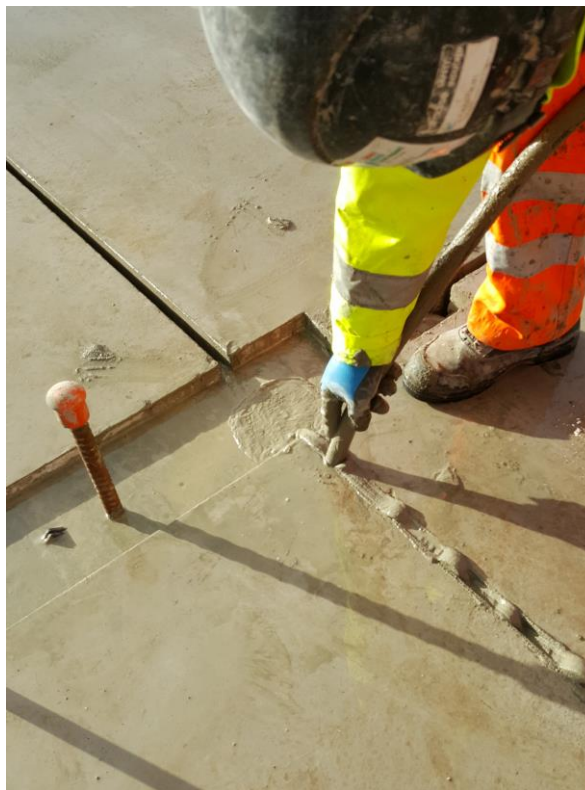


ENVIRONMENTAL PRODUCT DECLARATION

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

Average EPD for Grout Products
FOSROC INTERNATIONAL LIMITED



EPD HUB, HUB-0821

Publishing date 3rd November 2023, last updated date 3rd November 2023, valid until 3rd November 2028

GENERAL INFORMATION

MANUFACTURER

Manufacturer	FOSROC INTERNATIONAL LTD
Address	Drayton Manor Business Park, Coleshill Road, Tamworth, Staffordshire, B78 3XN, United Kingdom
Contact details	enquiryuk@fosroc.com
Website	https://www.fosroc.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
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	Kris Atkins (Ocker Environmental Ltd)
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 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	Average EPD for Grout Products
Additional labels	Includes Products: Conbextra BB, Conbextra BB92, Conbextra GP, Conbextra HF, Conbextra TS, Conbextra UW, Conbextra BM, Conbextra PM, Conbextra TA, Conbextra VG
Product reference	various
Place of production	Drayton Manor Business Park, Coleshill Road, Tamworth, Staffs. B783XN
Period for data	2021
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	+20 / -24 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1kg of Grout Product dry mix
Declared unit mass	1 kg
GWP-fossil, A1-A3 (kgCO ₂ e)	0.447
GWP-total, A1-A3 (kgCO ₂ e)	0.407
Secondary material, inputs (%)	0.0564
Secondary material, outputs (%)	79.7
Total energy use, A1-A3 (kWh)	0.721
Total water use, A1-A3 (m ³ e)	0.00561

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

Fosroc is a leading international manufacturer and supplier of high performance chemicals for the construction industry, with a particular focus on concrete repair materials, machinery grouts, concrete admixtures, waterproofing materials, joint sealants and protective coatings.

PRODUCT DESCRIPTION

Fosroc Conbextra non-shrink cementitious grouts are supplied as ready to use dry powders. The addition of a controlled amount of clean water produces free-flowing grout for filling various gap thicknesses. Their low water requirement ensures high early strength and long-term durability. Depending on the grade selected, Conbextra grouts provide the best solution for high precision grouting of machinery and station baseplates, between pre-cast concrete panels, bridge bearings and wind turbine foundations.

Typical Composition: approx. 40% hydraulic binder, 4% supplementary cementitious materials, 50% silica materials, 6% stone, 0.1% additives
Further information can be found at <https://www.fosroc.com/>

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	-	-
Minerals	100	UK, Europe and Global
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 0.04721

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit 1kg of Grout Product dry mix

Mass per declared unit 1 kg

Functional unit

Reference service life

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.

These Grout products are manufactured at the Fosroc powder plant in Tamworth, UK, following the same basic process of production outlined below.

Raw materials are conveyed from silo storage into weighing hoppers and then into a mixing stage, where small charge additives are incorporated, prior to sifting and bagging of the product. The first mix of each production run is sent for quality assurance, to ensure weighing / mixing process is acceptable, before subsequent mixes are sent for packing. Product bags are filled and packed by palletiser robot for dispatch.

Production losses during manufacturing are 1.8%. The inert waste is sent for processing as recycled aggregate. Additional transport is considered in A2, relevant to ancillary fuel and packaging transport to site.

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.

Transport comprises manufacturing site to vendor (average 160km, by HGV) and from vendor to site (average 40km by LDV). Materials are prepared by addition of clean water at a rate given on the relevant product Technical data Sheet and mixed in a forced action mixer for 3 - 5 minutes. The materials are then poured or pumped into place. Installation wastes are limited to packaging and product wastage from site use (average 5% by mass). Transport of construction waste is average 50km from construction site to waste treatment site.

PRODUCT USE AND MAINTENANCE (B1-B7)

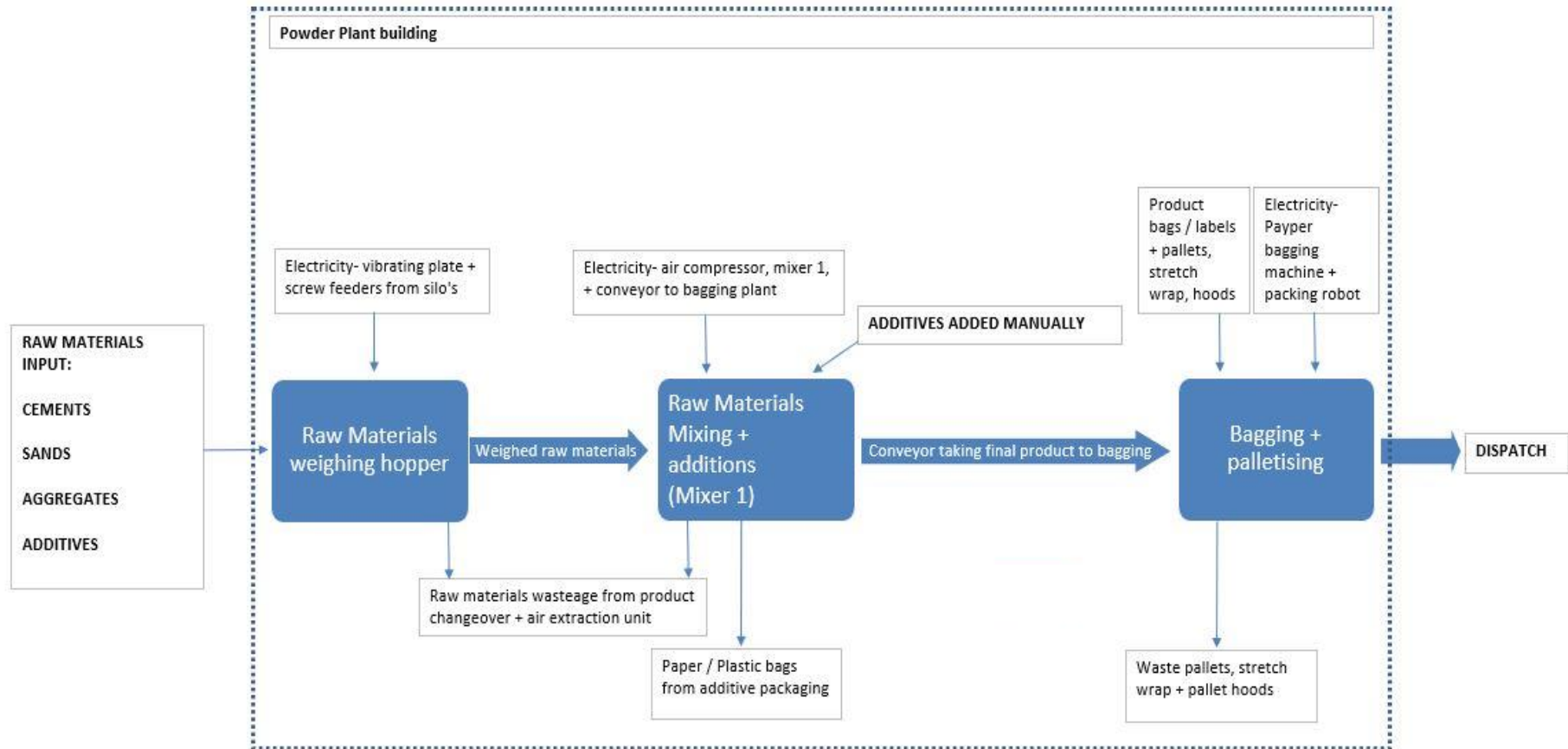
This EPD does not cover the use phase.

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

PRODUCT END OF LIFE (C1-C4, D)

At the end of its service life, the Grout product is embedded within the concrete structure it was used to fill. The demolition process therefore is common to the demolition of the concrete structure, whereby common industry practice is to crush concrete waste for reuse as inert aggregate fill within the demolition site or off-site. Typical industry recovery rates assumed: 80% by mass reused as inert aggregate; 20% disposal to inert landfill. Transport of waste is average 50km from demolition site to waste treatment site.

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	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	No allocation

AVERAGES AND VARIABILITY

Type of average	Multiple products
Averaging method	Averaged by shares of total mass
Variation in GWP-fossil for A1-A3	+20 / -24 %

This EPD applies to the following Grout Products:

- Conbextra BB
- Conbextra BB92
- Conbextra GP (taken to be the representative product)
- Conbextra HF
- Conbextra TS
- Conbextra UW (the maximum GWP product within the group)
- Conbextra BM (the minimum GWP product within the group)
- Conbextra PM
- Conbextra TA
- Conbextra VG

The base case (representative) product Conbextra GP, was selected as highly typical due to its typical raw material composition and typical GWP (fossil) content within the group, as well as being a product with high production and sales volumes. For this base case product, within units A1 - A3, 93% of GWP fossil impacts are associated with the raw materials, therefore this has been the main comparator for this average.

The Grout products are all manufactured by Fosroc at their powder plant facility in the Drayton Manor Business Park site, using a common process. The products all share an equivalent purpose (grouting of void space in concrete substrate). Products in this group have very similar raw material composition- a balance of hydraulic binders (cements), supplementary cementitious materials, silica mineral materials, stone + additives.

The variance against the base case GWP fossil is shown below:

MAX GWP (fossil) value: 0.461 kg CO₂e / kg

MIN GWP (fossil) value: 0.290 kg CO₂e / kg

Base Case Product GWP (fossil) value: 0.409 kg CO₂e

Variance from base case product (max +/- 50%) :

+20.4% max

-24.1% min

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	4,22E-01	1,07E-02	-2,60E-02	4,07E-01	9,16E-02	8,67E-02	MND	MND	MND	MND	MND	MND	MND	3,79E-03	5,22E-03	3,68E-03	1,21E-03	1,20E-02
GWP – fossil	kg CO ₂ e	4,15E-01	1,07E-02	2,12E-02	4,47E-01	9,13E-02	4,15E-02	MND	MND	MND	MND	MND	MND	MND	3,78E-03	5,22E-03	3,68E-03	1,21E-03	-2,98E-02
GWP – biogenic	kg CO ₂ e	6,85E-03	7,56E-06	-4,72E-02	-4,04E-02	1,69E-04	4,52E-02	MND	MND	MND	MND	MND	MND	MND	1,05E-06	3,79E-06	1,02E-06	2,40E-06	4,19E-02
GWP – LULUC	kg CO ₂ e	7,42E-05	3,30E-06	3,48E-05	1,12E-04	5,16E-05	1,12E-05	MND	MND	MND	MND	MND	MND	MND	3,20E-07	1,57E-06	3,11E-07	3,59E-07	-2,50E-05
Ozone depletion pot.	kg CFC-11e	1,56E-08	2,51E-09	1,77E-09	1,98E-08	1,96E-08	2,22E-09	MND	MND	MND	MND	MND	MND	MND	8,17E-10	1,23E-09	7,94E-10	4,98E-10	-2,92E-09
Acidification potential	mol H ⁺ e	1,13E-03	4,39E-05	9,47E-05	1,26E-03	4,83E-04	9,74E-05	MND	MND	MND	MND	MND	MND	MND	3,96E-05	2,19E-05	3,84E-05	1,15E-05	-3,02E-04
EP-freshwater ²⁾	kg Pe	5,78E-06	8,76E-08	6,99E-07	6,56E-06	1,47E-06	4,87E-07	MND	MND	MND	MND	MND	MND	MND	1,53E-08	4,24E-08	1,49E-08	1,46E-08	-1,94E-06
EP-marine	kg Ne	2,81E-04	1,29E-05	2,14E-05	3,15E-04	1,39E-04	2,51E-05	MND	MND	MND	MND	MND	MND	MND	1,75E-05	6,60E-06	1,70E-05	3,95E-06	-3,89E-05
EP-terrestrial	mol Ne	3,28E-03	1,42E-04	2,43E-04	3,67E-03	1,56E-03	2,88E-04	MND	MND	MND	MND	MND	MND	MND	1,92E-04	7,29E-05	1,86E-04	4,35E-05	-4,74E-04
POCP (“smog”) ³⁾	kg NMVOCe	8,41E-04	4,61E-05	9,34E-05	9,81E-04	5,13E-04	8,15E-05	MND	MND	MND	MND	MND	MND	MND	5,27E-05	2,34E-05	5,12E-05	1,26E-05	-1,28E-04
ADP-minerals & metals ⁴⁾	kg Sbe	2,22E-06	1,95E-07	2,29E-07	2,64E-06	2,00E-06	2,44E-07	MND	MND	MND	MND	MND	MND	MND	5,78E-09	8,90E-08	5,61E-09	1,10E-08	-8,73E-07
ADP-fossil resources	MJ	1,84E+00	1,66E-01	5,41E-01	2,55E+00	1,38E+00	2,49E-01	MND	MND	MND	MND	MND	MND	MND	5,21E-02	8,11E-02	5,06E-02	3,38E-02	-5,48E-01
Water use ⁵⁾	m ³ e depr.	2,41E-02	6,10E-04	1,84E-02	4,31E-02	6,97E-03	5,70E-03	MND	MND	MND	MND	MND	MND	MND	9,71E-05	3,02E-04	9,43E-05	1,56E-03	-1,60E-02

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.

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	1,13E-01	2,12E-03	1,47E-01	2,61E-01	3,34E-02	2,28E-02	MND	MND	MND	MND	MND	MND	MND	2,82E-04	1,02E-03	2,74E-04	2,73E-04	-1,20E-01
Renew. PER as material	MJ	4,96E-04	0,00E+00	4,56E-01	4,56E-01	0,00E+00	-4,33E-01	MND	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	1,13E-01	2,12E-03	6,02E-01	7,17E-01	3,34E-02	-4,10E-01	MND	MND	MND	MND	MND	MND	MND	2,82E-04	1,02E-03	2,74E-04	2,73E-04	-1,20E-01
Non-re. PER as energy	MJ	1,82E+00	1,66E-01	3,46E-01	2,34E+00	1,38E+00	2,38E-01	MND	MND	MND	MND	MND	MND	MND	5,21E-02	8,11E-02	5,06E-02	3,38E-02	-5,48E-01
Non-re. PER as material	MJ	3,54E-02	0,00E+00	1,95E-01	2,30E-01	0,00E+00	-1,84E-01	MND	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	1,86E+00	1,66E-01	5,41E-01	2,57E+00	1,38E+00	5,43E-02	MND	MND	MND	MND	MND	MND	MND	5,21E-02	8,11E-02	5,06E-02	3,38E-02	-5,48E-01
Secondary materials	kg	5,64E-04	0,00E+00	2,38E-05	5,88E-04	0,00E+00	2,94E-05	MND	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	MND	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	MND	MND	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	5,46E-03	3,40E-05	1,13E-04	5,61E-03	2,49E-04	4,81E-04	MND	MND	MND	MND	MND	MND	MND	MND	4,60E-06	1,69E-05	4,47E-06	3,70E-05	-1,16E-03

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	7,23E-03	1,63E-04	1,05E-03	8,44E-03	2,30E-03	7,69E-04	MND	MND	MND	MND	MND	MND	MND	5,60E-05	7,89E-05	0,00E+00	3,15E-05	-3,05E-03
Non-hazardous waste	kg	2,33E-01	1,72E-02	3,08E-02	2,81E-01	1,23E-01	2,76E-02	MND	MND	MND	MND	MND	MND	MND	5,99E-04	8,72E-03	0,00E+00	2,30E-01	-4,16E-02
Radioactive waste	kg	9,43E-06	1,14E-06	1,54E-06	1,21E-05	9,24E-06	1,46E-06	MND	MND	MND	MND	MND	MND	MND	3,65E-07	5,57E-07	0,00E+00	2,24E-07	-2,61E-06

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	1,86E-02	1,86E-02	0,00E+00	9,32E-04	MND	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	2,04E-06	0,00E+00	3,30E-04	3,32E-04	0,00E+00	1,66E-05	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	9,18E-01	0,00E+00	0,00E+00
Materials for energy rec	kg	4,59E-06	0,00E+00	0,00E+00	4,59E-06	0,00E+00	2,39E-02	MND	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	0,00E+00	MND	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 ₂ e	4,11E-01	1,06E-02	2,03E-02	4,42E-01	9,05E-02	4,11E-02	MND	MND	MND	MND	MND	MND	MND	3,76E-03	5,17E-03	3,65E-03	1,19E-03	-2,88E-02
Ozone depletion Pot.	kg CFC ₁₁ e	1,34E-08	2,00E-09	1,67E-09	1,70E-08	1,57E-08	1,91E-09	MND	MND	MND	MND	MND	MND	MND	6,47E-10	9,75E-10	6,28E-10	3,95E-10	-2,69E-09
Acidification	kg SO ₂ e	8,48E-04	2,22E-05	7,40E-05	9,44E-04	3,63E-04	7,35E-05	MND	MND	MND	MND	MND	MND	MND	5,59E-06	1,06E-05	5,43E-06	4,78E-06	-2,53E-04
Eutrophication	kg PO ₄ ³ e	2,40E-04	4,45E-06	2,28E-05	2,67E-04	9,75E-05	2,19E-05	MND	MND	MND	MND	MND	MND	MND	9,84E-07	2,14E-06	9,56E-07	9,26E-07	-5,70E-05
POCP ("smog")	kg C ₂ H ₄ e	3,19E-05	1,38E-06	5,96E-06	3,92E-05	3,07E-05	3,82E-06	MND	MND	MND	MND	MND	MND	MND	5,75E-07	6,73E-07	5,59E-07	3,51E-07	-1,17E-05
ADP-elements	kg Sbe	2,22E-06	1,95E-07	2,29E-07	2,64E-06	2,00E-06	2,44E-07	MND	MND	MND	MND	MND	MND	MND	5,78E-09	8,90E-08	5,61E-09	1,10E-08	-8,73E-07
ADP-fossil	MJ	1,84E+00	1,66E-01	5,41E-01	2,55E+00	1,38E+00	2,49E-01	MND	MND	MND	MND	MND	MND	MND	5,21E-02	8,11E-02	5,06E-02	3,38E-02	-5,48E-01

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.

Elma Avdyli as an authorized verifier acting for EPD Hub Limited
03.11.2023

