Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

POLYMER CONCRETE DRAINAGE CHANNEL

From ***ULMA ARCHITECTURAL SOLUTIONS***

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General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): PCR 2019:14 Construction products (EN 15804:A2) Version 1.24
PCR review was conducted by: PCR review was conducted by: The Technical Committee of the International EPD®System. See www.environdec.com/TCfor a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Independent third-party verification of the declaration and data, according to ISO 14025:2006: ☒ External ☐ Internal Covering ☐ EPD process certification ☒ EPD verification
Third party verifier: Elisabet Amat, GREENIZE Accredited by: The International EPD© System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD: **ULMA Architectural Solutions Scoop.**
Description of the organisation:

ULMA ARCHITECTURAL SOLUTIONS forms part of the **ULMA GROUP**, one of the largest business groups in the north of Spain.

ULMA ARCHITECTURAL SOLUTIONS' specialization in prefabricated building systems has allowed the development of a wide range of solutions aimed primarily at three segments:

VENTILATED FACADES This system can be used both in new buildings and in restorations, offering a customized solution for each one.

ARCHITECTURAL PRECAST products, covering an extensive range of standard solutions with a complete offering of resources as window sills, copings, slab faces, street furniture, etc. Besides it also covers customized solutions, very appropriate for restoration.

DRAINAGE SYSTEMS. It offers a complete range of drainage solutions and also for electrical conduits and beaconage. Drainage channels are designed and fabricated in accordance with standard EN-1433.

Name and location of production site(s):
ULMA Architectural Solutions
Zubillaga, 89, 20569 Oñati,
Gipuzkoa (Spain) www.ulmaarchitectural.com

Contact:
Joseba Marcos
Email: jmarcos@ulmaarchitectural.com
More information: www.ulmaarchitectural.com

Product information

Product name: The analysed products are surface linear drainage channels.

Product description: This EPD covers the life-cycle analysis of the linear surface drainage channels. Linear drains are rectilinear polymer concrete forms that allow water to be collected and guided to the point of discharge, preventing flooding.

A full range of drainages is available for various applications: pedestrian and vehicle use or for heavy-duty areas such as ports, docks and airports. The product range is:

- Domestic drainage: Self, Mini, Urban, Sport.
- Technical drainage: MultiV+
- Civil drainage: Civil – S, Civil – F, KompaqDrain

The drainage channels are made of polymer concrete. This is a high quality material composed of a select combination of aggregates. The polymer concrete is ideal for the evacuation of fluids. The

polymeric nature of this material allows smooth surfaces with very low friction on prefabricated elements, thereby facilitating the rapid run-off of fluids and also offering a water absorption index which is virtually non-existent. The mechanical properties of the material allows for the design of light and durable products.

The drainage channels are manufactured according to Standard EN 1433 Drainage channels for vehicular and pedestrian areas - Classification, design and testing requirements, marking and evaluation of conformity.

Example of surface linear drainage channels

The technical characteristics of the product are the following:

CARACTERISTIC	STANDARD	VALUE
Flexural strength	EN 1433	≥ 22 MPa
Compressive strength	EN 1433	≥ 90 MPa

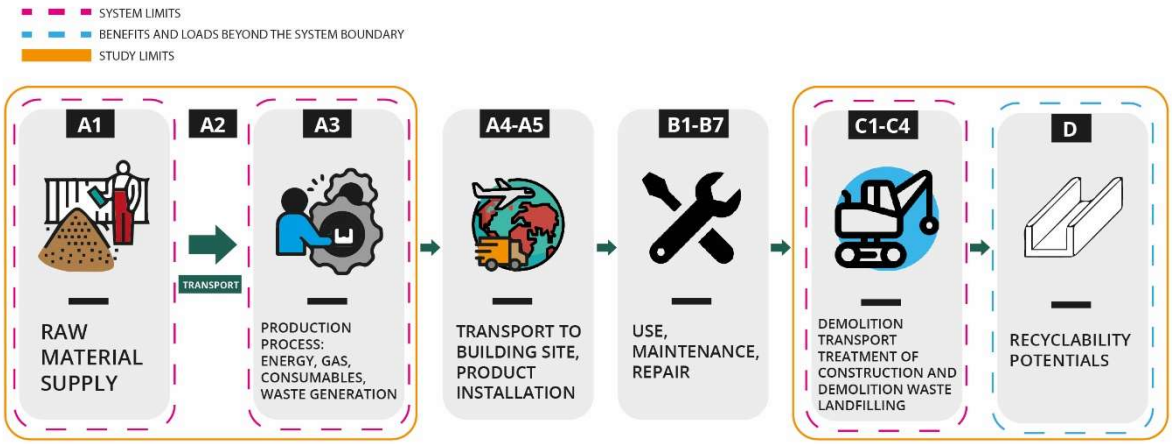
UN CPC code: CPC 375, Articles of concrete, cement and plaster.

LCA information

Declared unit: The declared unit is the baseline reference for which all information is collected. In this study, the declared unit is **"1 kg of drainage"**.
Reference service life: Not relevant for this EPD.
Geographical scope: The geographical scope of this EPD is global.
Time representativeness: The data collection from factory (primary data) and electricity mix are from 2021/01/01 to 2021/12/31. In this study, no datasets older than 10 years were used.
Database(s) and LCA software used: All the data used to model the process and obtain the Life Cycle Inventory are specific data and have been obtained by measurements made during the period from 2021/01/01 to 2021/12/31. They are representative of the different processes implemented during the manufacturing process. The data has been measured directly at the company's own premises. In addition, the most complete and highest quality European life cycle inventory database, Ecoinvent 3.8, has been used, as this database contains the most extensive and updated information and its scope coincides with the geographical, technological and temporal area of the project. The LCA was modelled with Simapro 9.3.0.3.

Description of system boundaries: According to the standard UNE-EN 15804_2012+A2_2020 (MARCH 2020) and PCR 2019:14 CONSTRUCTION PRODUCTS (version 1.24) the system boundary is cradle to gate with modules C1–C4 and module D (A1–A3 + C + D). The life cycle stages A4-A5, B1-B7 were excluded from the LCA study.

System diagram:



Manufacturing process:
The manufacture of the linear drainage channel consists on the homogeneous mixture of the aggregates, additives and resin. By addition of catalyst, the hardening reaction of the mixture is initiated. The moulds are directly filled with the mixture in its liquid stage and the final products is extracted from the mould once the mixture has hardened.

Author of the Life Cycle Assessment:
IK ingeniería
Av. Cervantes 51,Edif. 10, panta 5, dpto.
48970 Basauri, Bizkaia (Spain)

Data quality

The environmental impact of the linear drainages has been calculated. It is based on the international standards established for the development of environmental product declarations, such as ISO 14025 for the preparation of the environmental product declaration, ISO 14040 and ISO 14044 for the preparation of the life cycle analysis, UNE-EN 15804:2012+A2:2020 (MARCH 2020) and the Product Category Rules PCR - "2019:14 Construction products " (Version 1.24).

Data has been collected from 2021/01/01 to 2021/01/31 and is representative of that year. Data for raw material supply, transport to fabrication plant and production (A1-A3) is based on specific consumption data for the factory at Oñati. Generic background datasets were used for the downstream processes. SimaPro v9.3.0.3. software was used to prepare the life cycle analysis together with the Ecoinvent 3.8 database. Characterization factors from EN15804: 2012 + A2:2019. The geographical coverage is global. Technological coverage is typical or average.

Assumptions

The modularity principle, as well as the polluter-payer principle have been followed. The following assumptions have been made in this EPD:

- ✓ It does not include the manufacturing processes of the capital goods or spare parts and/or maintenance with a life of more than three years.
- ✓ The environmental impact of infrastructure for general management, office, and headquarters operations is not included.
- ✓ The impact caused by people (common activities, travel for work...) will not be considered.
- ✓ It does not include the consumption of natural gas for sanitary hot water from showers and heating system for the comfort of people.
- ✓ The processes associated with fuel production are intrinsically included in the indicators in ECOINVENT's database used in carrying out the LCA.
- ✓ The environmental impact of external transport has been calculated using lorries from the ECOINVENT 3.8 database, EURO 5. These lorries have been selected to reflect the most realistic scenario possible.

Cut-off rules

The standard ISO 14025 and the PCR -"2019:14 CONSTRUCTION PRODUCTS" indicate that the life cycle inventory data should include a minimum of 95% of the total inputs (materials and energy) for each stage. This cut-off rule does not apply for hazardous materials and substances. No such cut-off criteria have been taken into account in this study.

Allocation

Where necessary, such us waste generation and energy consumption, an allocation based in mass has been used.

Greenhous gas emission from the use of electricity in the manufacturing phase

Specific electricity mix, medium voltage (direct emissions and losses in grid) electricity is considered for the manufacturing process.

Electricity mix	Amount	Units
Specific electricity mix	3,48E-01	Kg CO2-eqv/kWh

LCA Scenarios and additional technical information

Dismantling/demolition (module C1):
Since they are not products with a structural use, the energy consumption of this phase is considered not relevant.

Transport (module C2):
With a collection rate of 100%, the transports are carried out by lorry (EURO 5) over 50 km.

Waste processing (modules C3 and C4):
A recycling ratio of 88 % is considered in accordance with the recovery rate of construction and demolition waste statistics, published by Eurostat and the sorting impact is considered. The remaining 12% is considered to be landfilled. These percentages are representative of the areas where the product is marketed.

Recyclability potentials (module D):
Module D contains credits from the recycling of surface linear drainage in module C3. The surface linear drainage is recycled as aggregate of construction and demolition waste origin, for use in substitution of virgin raw aggregates. The loads of recycling process and the benefits of substitution of virgin raw aggregates have been considered.

LCA Scenarios for end of life

Processes	Per Declared unit	
Collection process specified by type	1,00E+00	Kg collected separatelly
	0,00E+00	Kg collected with mixed construction waste
Recovery system specified by type	0,00E+00	Kg for reuse
	8,80E-01	Kg for recycling
	0,00E+00	Kg for energy recovery
Disposal specified by type	1,20E-01	Kg for final disposal
Assumptions for scenario transportation	Lorry 16-32 metric ton, EURO5 Consumption: 0,03kg/km Distance:50 km	

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	**X**	**X**	**X**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**X**	**X**	**X**	**X**	**X**
Geography	**EU**	**EU**	**EU**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**ND**	**GLO**	**GLO**	**GLO**	**GLO**	**GLO**
Specific data	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ND: Not declared

Content information

Product components	Per 1 kg		
	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Calcium Carbonate	1,91E-01	0,00%	0,00%
Sand and gravel	7,17E-01	0,00%	0,00%
Resins	9,07E-02	0,00%	0,00%
Additives	2,09E-03	0,00%	0,00%
TOTAL	1,00 E+00	0,00%	0,00%
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	
Wood	5,15E-02	5,15%	
Cardboard	1,33E-04	0,01%	
Plastic	2,42E-03	0,24%	
Labels and others	5,65E-05	0,01%	
TOTAL	5,41E-02	5,41%	

Packaging: The product is transported to the construction site packed with plastic film and carboard, in pallets.

No substances included in the Candidate List of Substances of Very High Concern for authorization under REACH Regulations are present in the analyzed linear drainages manufactured by Ulma Architectural Solutions, either above the threshold for registration with the European Chemicals Agency or above 0,1% (wt/wt).

Environmental Information

Potential environmental impact – mandatory indicators according to EN 15804:

Results per declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	6,83E-01	0,00E+00	8,31E-03	1,56E-03	6,30E-04	-2,68E-03
GWP-biogenic	kg CO_2 eq.	-5,80E-02	0,00E+00	7,47E-06	4,08E-05	6,84E-07	-1,25E-04
GWP-luluc	kg CO_2 eq.	5,89E-04	0,00E+00	3,26E-06	3,11E-06	5,95E-07	-1,68E-06
GWP-total	kg CO_2 eq.	6,26E-01	0,00E+00	8,32E-03	1,60E-03	6,32E-04	-2,81E-03
ODP	kg CFC 11 eq.	8,50E-08	0,00E+00	1,92E-09	1,17E-10	2,55E-10	-3,82E-10
AP	mol H^+ eq.	2,78E-03	0,00E+00	3,37E-05	9,93E-06	5,93E-06	-2,45E-05
EP-freshwater	kg PO_4^{3-} eq.	4,39E-05	0,00E+00	1,79E-07	4,32E-07	2,03E-08	-1,54E-07
EP-freshwater	kg P eq.	1,43E-05	0,00E+00	5,82E-08	1,41E-07	6,61E-09	-5,01E-08
EP-marine	kg N eq.	4,77E-04	0,00E+00	1,01E-05	2,02E-06	2,05E-06	-7,15E-06
EP-terrestrial	mol N eq.	5,29E-03	0,00E+00	1,11E-04	2,27E-05	2,26E-05	-9,84E-05
POCP	kg NMVOC eq.	2,67E-03	0,00E+00	3,40E-05	6,31E-06	6,57E-06	-2,23E-05
ADP-minerals&metals*	kg Sb eq.	7,07E-06	0,00E+00	2,89E-08	1,31E-08	1,44E-09	-4,27E-08
ADP-fossil*	MJ	1,16E+01	0,00E+00	1,26E-01	3,10E-02	1,76E-02	-4,24E-02
WDP	m^3 deprive	4,63E-01	0,00E+00	3,76E-04	3,33E-04	7,93E-04	-7,46E-04
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

** Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.*

Potential environmental impact – additional mandatory and voluntary indicators

Results per declared unit						
Indicator	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	6,73E-01	0,00E+00	8,29E-03	1,57E-03	6,26E-04	-2,69E-03

Use of resources

Results per declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	9,14E-01	0,00E+00	1,77E-03	5,55E-03	1,50E-04	-1,44E-02
PERM	MJ	9,80E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,89E+00	0,00E+00	1,77E-03	5,55E-03	1,50E-04	-1,44E-02
PENRE	MJ	9,15E+00	0,00E+00	1,26E-01	3,09E-02	1,76E-02	-4,24E-02
PENRM	MJ.	2,49E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,16E+01	0,00E+00	1,26E-01	3,09E-02	1,76E-02	-4,24E-02
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m^3	1,16E-02	0,00E+00	1,40E-05	2,38E-05	1,89E-05	-3,10E-04

[1] The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Waste production

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	1,64E-05	0,00E+00	3,28E-07	3,14E-08	2,66E-08	-1,81E-07
Non-hazardous waste disposed	kg	1,32E-01	0,00E+00	6,47E-03	1,15E-04	1,20E-01	-6,35E-04
Radioactive waste disposed	kg	2,61E-05	0,00E+00	8,49E-07	2,23E-07	1,15E-07	-3,26E-07

Output flows

Results per functional or declared unit							
Indicator	**Unit**	**A1-A3**	**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
Material for recycling	kg	7,73E-03	0,00E+00	0,00E+00	8,80E-01	0,00E+00	0,00E+00
Materials for energy recovery	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

Information on biogenic carbon content

Results per declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in packaging	kg C	2,24E-02

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Additional information

The technical datasheet and the safety datasheet can be found in the following webpage:

https://www.ulmaarchitectural.com/en/drainage-channels/documentation

Information related to Sector EPD

This is an individual EPD®

Differences versus previous versions

This is the first version of the EPD®.

References

- General Programme Instruction of the International EPD®System. Version 4.0.
- ISO 14020:2000 Environmental labels and declarations-General principles.
- ISO 14025:2010 Environmental labels and declarations-Type III Environmental Declarations-Principles and procedures.
- ISO 14040:2006 Environmental Management-Life Cycle Assessment-Principles and framework.
- ISO 14044:2006 Environmental Management-Life Cycle Assessment-Requirements and guidelines.
- PCR 2019:14 Construction products (EN 15804: A2) version 1.24
- EN 15804:2012+A2:2019 Sustainability of construction works-Environmental Product Declarations-Core rules for the product category of construction products

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