ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804 + A1 Owner of the Declaration – Etex Ireland Ltd;
Etex UK Ltd

Declaration number: EPDIE 20-21
ECO Platform EPD no: 1163
Issue date 23rd March 2020
Valid to 23rd March 2025

EPD Programme - EPD Ireland
Programme Operator - Irish Green Building Council
www.epdireland.org

Cedral Fibre Cement Slates

inspiring ways of living

1. General information

PROGRAMME OPERATOR	OWNER OF DECLARATION
Irish Green Building Council, 19 Mountjoy Square, Dublin D01 E8P5	Etex Ireland Ltd; Etex UK Ltd
DECLARATION NUMBER	**PRODUCTION SITE**
EPDIE-20-21	Athy, Co. Kildare, Ireland
ECO PLATFORM NO.	**DECLARED UNIT**
1163	1 m^2 of installed coated fibre cement slates (20.67 kg); reference service life 60 years.
APPLICABLE PRODUCT CATEGORY RULES	**DECLARED PRODUCT**
EN 15804:2012+A1:2013; EPD Ireland PCR Part A.	Cedral fibre cement slates
DATE OF ISSUE	**SCOPE OF EPD**
23/03/2020	Cradle to grave
DATE OF EXPIRY	**LCA CONSULTANT OR PERSON RESPONSIBLE FOR LCA**
23/03/2025	EcoReview, Kilkenny, Co. Kilkenny, Ireland, +353 87 258 9783 / +31 646 264 9327 info@ecoreview.ie / www.ecoreview.eu
TYPE OF EPD: SINGLE OR MULTI PRODUCT	**LCA SOFTWARE AND DEVELOPER IF APPLICABLE**
Single Product	Ecochain
PRODUCT CLASSIFICATION OR NACE CODE	**NAME AND VERSION OF INVENTORY USED**
23.65 Manufacture of fibre cement	Ecoinvent version 3.4
COMPARABILITY	
Environmental Product Declarations from different programmes may not be directly comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See clause 5.3 of EN 15804:2012+2012+A1:2013	
The CEN Norm /EN 15804 serves as the core PCR	
Independent verification of the declaration according to ISO 14025	

Internally ☐ Externally ✕

SIGNATURE OF PROGRAMME OPERATOR	SIGNATURE VERIFIER
Pat Barry - CEO - Irish Green Building Council  IGBC IRISH GREEN BUILDING COUNCIL	Chris Foster, EuGeos Limited 

2. Scope and Type of EPD

This is a Cradle to Grave EPD. The Modules that are declared are shown in the table below.

PRODUCT STAGE			CONSTRUCTION ON PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse - Recovery - Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X - Module declared.

MND - Module not declared.

3. Detailed product description

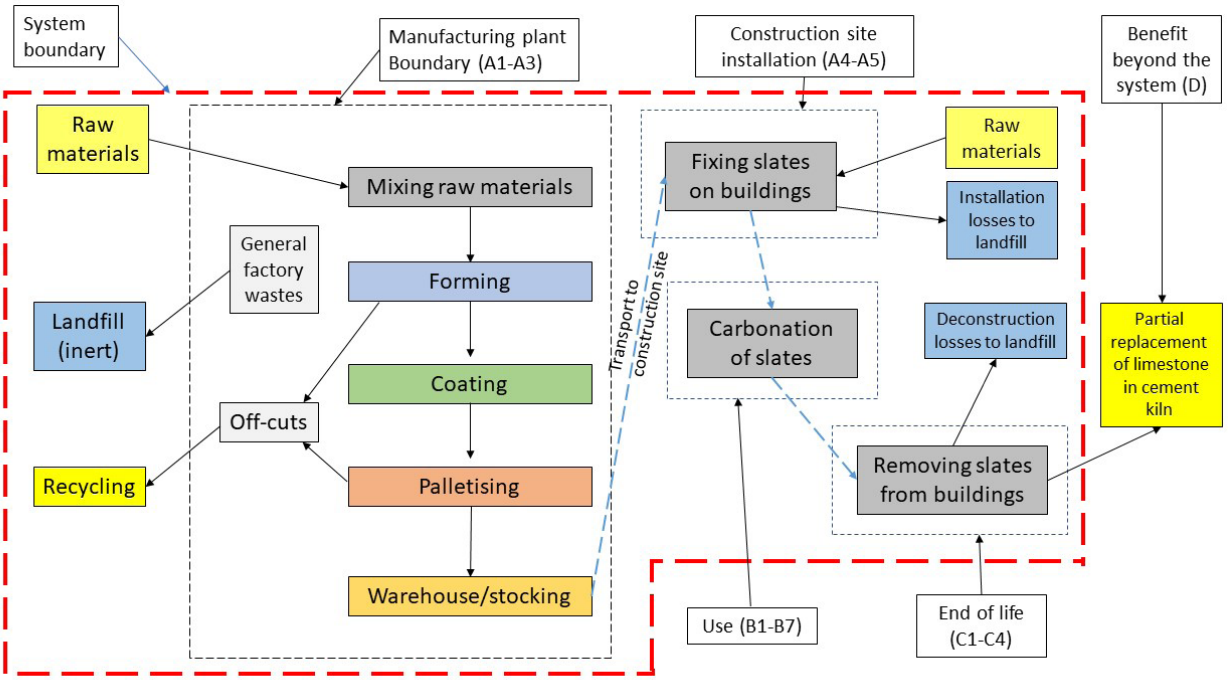
This LCA is carried out for the Cedral fibre cement slate. The constituent raw materials of the slate comprise: cement, GGBS, limestone, admixtures, synthetic fibres, pigments, paint and water. Cedral fibre cement slates are manufactured in accordance with IS EN 492:2012+A2:2018, 'Fibre-cement slates and fittings. Product specification and test methods.

3.1 Manufacturing Process Description

Cedral fibre cement slates are manufactured from a slurry of the above raw materials. The process is similar to the process used in papermaking, the Hatschek Process. Cellulose papers are mixed with water and refined to a consistency suitable for mixing with further materials. Ground limestone, synthetic fibres, and other minor constituents are then mixed with the cellulose slurry. This mix is then pumped into the final mixer, where additional water, cement and GGBS are added. The slurry is fed into vats containing rotating sieve cylinders that deposit a thin layer on to a felt. The layer is then transferred to a forming drum until a sheet of the desired thickness is achieved. This sheet is trimmed and cut into the required slate sizes. These are then placed between forming templates and compressed. The compressed slates are cured in a heated chamber and then at ambient indoor conditions. Then they are coated with pigmented paints. Finally, the slates are palletised, and are ready for despatch to the market.

This LCA also covers the installation, use and end-of-life stages. This covers: transport to customer, installation on site, deconstruction/demolition, disposal and re-use. Installation on site includes use of copper nails/rivets to fix the slates. In the use phase (B1), it is assumed that the slates carbonate. At the end of life, it is assumed the slates are used to replace raw limestone that is used as a raw material for making cement.

The LCA phases are shown below:



4. LCA results - Cedral Fibre Cement Slates

Environmental impact per m^2 of installed slates.

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP	[kg CO2-Eq.]	14.585	0.5	1.163	16.248	6.40E-02	3.05E-01	-3.948	0	0	0	0	0	0	0	0.005	0.033	0	-0.061
ODP	[kg CFC11-Eq.]	7.97E-07	8.97E-08	1.30E-07	1.02E-06	1.12E-08	1.69E-08	0	0	0	0	0	0	0	0	9.99E-10	5.97E-09	3.66E-12	-8.17E-09
AP	[kg SO2-Eq.]	4.27E-02	3.03E-03	1.40E-03	4.72E-02	6.12E-04	2.67E-02	0	0	0	0	0	0	0	0	1.78E-05	2.51E-04	8.17E-08	-8.21E-04
EP	[kg (PO4) -Eq.]	5.07E-03	3.34E-04	3.83E-04	5.79E-03	6.00E-05	7.70E-03	0	0	0	0	0	0	0	0	2.87E-06	5.39E-05	1.40E-08	-1.83E-04
POCP	[kg ethene-Eq.]	3.19E-03	2.64E-04	1.71E-04	3.62E-03	3.61E-05	1.27E-03	0	0	0	0	0	0	0	0	8.96E-07	6.62E-06	3.99E-09	-2.38E-05
ADPE	[kg Sb-Eq.]	5.94E-02	6.97E-04	8.42E-03	6.85E-02	1.71E-04	1.41E-04	0	0	0	0	0	0	0	0	4.00E-05	2.29E-04	1.50E-07	-3.85E-04
ADPF	[MJ]	1.24E+02	7.50E+00	1.81E+01	1.50E+02	9.56E-01	3.86E+00	0	0	0	0	0	0	0	0	8.73E-02	5.07E-01	3.30E-04	-8.00E-01

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources.

Note - MND - Module not declared INA - Indicator not assessed.

4. LCA results - Cedral Fibre Cement Slates

Resource use per m² of installed slates.

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	1.77E+01	1.24E-01	1.47E+01	3.26E+01	1.72E-02	7.90E-01	0	0	0	0	0	0	0	0	1.15E-03	2.78E-03	8.07E-06	-3.85E-02
PERM	[MJ]	8.10E-02	0	0	8.10E-02	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0
PERT	[MJ]	1.77E+01	1.24E-01	1.47E+01	3.26E+01	1.72E-02	7.90E-01	0	0	0	0	0	0	0	0	1.15E-03	2.78E-03	8.07E-06	-3.85E-02
PENRE	[MJ]	1.40E+02	8.07E+00	1.81E+01	1.66E+02	1.02E+00	3.56E+00	0	0	0	0	0	0	0	0	8.88E-02	5.11E-01	3.35E-04	-8.19E-01
PENRM	[MJ]	8.10E-02	0	0	8.10E-02	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0
PENRT	[MJ]	1.40E+02	8.07E+00	1.81E+01	1.66E+02	1.02E+00	3.56E+00	0	0	0	0	0	0	0	0	8.88E-02	5.11E-01	3.35E-04	-8.19E-01
SM	[kg]	0	0	0	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0
RSF	[MJ]	0	0	0	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0.00E+00	0.00E+00	0	0	0	0	0	0	0	0	0	0	0	0
FW	[m³]	5.01E-02	1.16E-03	1.18E-03	5.25E-02	1.30E-04	7.47E-03	0	0	0	0	0	0	0	0	4.80E-06	1.56E-05	2.09E-08	-3.94E-03

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water. INA = Indicator not assessed. MND = Module not declared.

SM, RFS and NRSF are not calculated by the EcoChain software.

4. LCA results - Cedral Fibre Cement Slates

Output flows and waste categories per m^2 of installed slates.

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	1.85E-04	5.58E-05	4.68E-05	2.88E-04	7.02E-06	1.61E-05	0	0	0	0	0	0	0	0	6.15E-07	3.55E-06	2.27E-09	-5.11E-06
NHWD	[kg]	8.75E+00	2.99E-01	3.28E-01	9.38E+00	2.98E-02	1.35E-01	0	0	0	0	0	0	0	0	5.29E-03	5.23E-04	2.07E-03	-2.62E-03
RWD	[kg]	1.61E-04	5.14E-05	1.61E-05	2.29E-04	6.47E-06	9.31E-06	0	0	0	0	0	0	0	0	5.63E-07	3.33E-06	2.06E-09	-4.59E-06
CRU	[kg]	0	0	0	0	MND	MND	0	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	MND	MND	0	0	0	0	0	0	0	0	0	0	20.67	0
MER	[kg]	0	0	0	0	MND	MND	0	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	MND	MND	0	0	0	0	0	0	0	0	0	0	0	0
EET	[MJ]	0	0	0	0	MND	MND	0	0	0	0	0	0	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy.

CRU, MFR, MER, EEE, EET are not calculated by the EcoChain software.

5. LCA results - Additional Impact Indicators - Cedral Fibre Cement Slates

Environmental impact per m^2 of installed slates.

PARAMETER	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Human toxicity potential	kg 1,4-DB-eq	1.60E+00	2.14E-01	4.48E-01	2.26E+00	3.06E-02	3.89E+00	0	0	0	0	0	0	0	0	2.34E-03	2.16E-02	6.30E-06	-4.41E-02
Freshwater aquatic ecotoxicity potential	kg 1,4-DB-eq	7.73E-02	5.17E-03	3.85E-03	8.64E-02	6.62E-04	6.60E-02	0	0	0	0	0	0	0	0	7.36E-05	2.43E-04	1.59E-07	-4.98E-04
Marine aquatic ecotoxicity potential	kg 1,4-DB-eq	1.55E+03	4.24E+01	1.47E+02	1.74E+03	8.18E+00	3.73E+02	0	0	0	0	0	0	0	0	1.04E+00	2.66E+00	2.42E-03	-3.26E+01
Terrestrial ecotoxicity potential	kg 1,4-DB-eq	2.54E-02	7.40E-04	1.49E-02	4.11E-02	1.03E-04	1.10E-02	0	0	0	0	0	0	0	0	1.23E-05	3.43E-05	2.38E-08	-1.14E-04

Note - MND - Module not declared INA - Indicator not assessed.

6. Additional LCI Indicators

N/A

7. Calculation rules

Methodology and reproducibility

The process descriptions and quantities in this study are reproducible in accordance to the reference standards that have been used. The references of all sources, both primary and public sources and literature, have been documented in the LCA report. In addition, to facilitate the reproducibility of this LCA, a full set of data records has been generated which can be accessed via the Ecochain tool. This data portfolio contains a summary of all the data used in this LCA, and correspondingly, in the Cedral fibre cement roof slates Ecochain account.

Data quality

Data flows have been modeled as realistically as possible. Data quality assessment is based on the principle that the primary data used for processes occurring at the production site is selected in the first instance. Where this is not available, other reference data is selected from appropriate sources.

Data collection period

The dataset is representative for the production processes used in 2019.

8. Scenarios and additional technical information

A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the Cedral cement fibre slate manufacturing process, as well as waste processing up to the end-of waste state.

A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road, boat and/or train.

A3. Manufacturing

This module covers the manufacturing of Cedral slates and includes all processes linked to production such as mixing, placing and internal transport. Use of electricity, fuels and auxiliary materials in production is taken into account as well. Electricity is 100% renewable - certificate is supplied by electricity supplier.

A4-A5. Transport and Installation

This module covers road + sea transport of the slates from Ireland to construction sites across Ireland and mainland UK and fixing of the slates with copper rivets/nails on the structures. As fixing is manual, it is assumed no energy is consumed in the installation.

References transport:
Road transport: transport, freight, lorry 16-32 metric ton, EURO6
Sea transport: transport, freight, sea, transoceanic ship
Distance by road: 574 km
Distance by sea: 106km

Capacity utilisation: 64%
Bulk density of goods: 1950 kg/m3

Installation of products in the building:
Copper - 0.0728 kg per m2 of installed slates

B1. Use (Carbonation)

The slates are permanently installed in the building and do not require any repair, maintenance or replacement. The only impact during the use phase is that of carbonation, where some CO2 is adsorbed from the atmosphere over the life of the slate.

C2, C3, C4 and D. End of life and benefits beyond the system

Deconstruction (C1) is assumed to be manual, and no energy is consumed. Transport (C2) of the deconstruction/ demolition materials to their destination is taken to be 100km for disposal or reuse. Waste processing (C3) crushing for use as alternate raw material in Portland cement clinker production is assumed to use a small amount of diesel; Disposal in landfill (C4) of losses (0.1% by weight) of slates incurred in the removal from site to landfill (100 km),. Benefit beyond the system (D) of the slates is where they are used as an alternate raw material for Portland cement manufacture.

Processes		Unit (expressed per functional unit)
Collection process specified by type	0.02067	kg collected separately
	0	kg collected with mixed construction waste
Recovery system specified by type	0	kg for re-use
	20.64933	kg for recycling
	0	kg for energy recovery
Disposal specified by type	0.02067	kg material for landfill

9. Mandatory additional information on release of dangerous substances to indoor air, soil and water

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, nor they do not exceed the threshold with the European Chemicals Agency.

10. Other optional additional environmental information

The Reference Service Life (RSL) is 60 years. This service life is based upon Cedral’s experience of manufacture, installation and use of fibre cement slates for over 70 years for fibre cement slates manufactured at Athy, Co. Kildare. These fibre cement slates have not had any significant differences in manufacturing techniques and materials used in the past 70 years, and continue to perform satisfactorily.

11. References

EPD Ireland Product Category Rules: PART A Implementation and use of IS 15804:2012 and CEN TR 16970 in Ireland for the development of Environmental Product Declarations,29.06.2018 -www.epdireland.org