B-EPD ENVIRONMENTAL PRODUCT DECLARATION

ETEX
EQUITONE [natura – textura - materia] fibre cement sheets

The production and installation of 1 m^2 (thickness 8 mm) of a “EQUITONE [natura – textura - materia]” panel and its related impacts over cradle-to-grave life cycle stages, over a reference service life of 60 years.

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Valid until 07.10.2026

Third party verified
Conform to EN 15804+A2, NBN/DTD B08-001 and ISO 14025

Modules declared Cradle-to-grave					
A123	A4	A5	B	C	D
•	•	•	•	•	•

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OWNER OF THIS ENVIRONMENTAL PRODUCT DECLARATION
Etex services

EPD PROGRAM OPERATOR
Federal Public Service of Health, Food Chain Safety and Environment
www.b-epd.be

The intended use of this EPD is to communicate scientifically based environmental information for construction products, for the purpose of assessing the environmental performance of buildings. This EPD is only valid when registered on www.b-epd.be. The FPS Public Health cannot be held responsible for the information provided by the owner of the EPD.

PRODUCT DESCRIPTION

PRODUCT NAME
EQUITONE [natura – textura - materia]

PRODUCT DESCRIPTION
EQUITONE [natura – textura - materia] is an air-cured calcium silicate fibre cement sheet produced at Neubeckum production plant, Germany. EQUITONE [natura-textura-materia] are naturally hardened fiber cement sheets comprising cellulose and polymer fibers for water retention, improved tensile load distribution and increased breaking load and distortion. EQUITONE [natura] is a glaze-coated façade panel with a translucent surface structure. EQUITONE [textura] is a coated façade panel with a slightly grainy surface. The coated top layer of EQUITONE [materia] façade panels is sanded.

INTENDED USE
EQUITONE [natura-textura-materia] serve as cladding materials for back-ventilated curtain façades. The façade panels serve towards assembly on substructures made of wood or metal. Once installed correctly according to the manufacturer's guidelines EQUITONE [natura-textura-materia] need no further maintenance, repair, replacement or refurbishment during the full life span of the product.

REFERENCE FLOW / DECLARED UNIT
The functional unit is defined as: the production and installation of 1 m^2 (thickness 8 mm) of a "EQUITONE [natura – textura - materia]" sheets and its related impacts over cradle-to-grave life cycle stages, where the product's expected average reference service life is of 60 years.

Packaging is included.

The weight per reference flow is 15,07 kg.
The minimum (dry) density of the product is 1650 kg / m^3.
Dimensions of the panel per FU: 1 m^2 of thickness 8mm

INSTALLATION
The product is installed according to the following scenario(s): fixation of the panel to a substructure in wood or metal. This EPD declares the screws and energy consumption to fixate the panels, but does not include the substructure.

IMAGES OF THE PRODUCT AND ITS INSTALLATION

COMPOSITION AND CONTENT

Components	Composition / content / ingredients	Quantity
Product	*- Cement* *- Pigments* *- Cellulose* *- Water* *- Coating* *- Others*	*70-80%* *<5%* *<5%* *10-20%* *<5%* *<10%*
Fixation materials	*- Screws for wooden substructure)- Rivets (for metal substructure)*	*6 p*
Jointing materials	*NA*	*/*
Treatments	*NA*	*/*
Packaging	*- Pallet* *- Carton* *- PE band on a carton roll* *- Metal straps*	*0,0688 kg* *0,0485 kg* *0,0320 kg* *0,0260 kg*

The product does not contain materials listed in the “Candidate list of Substances of Very High Concern for authorization”.

REFERENCE SERVICE LIFE

The reference service life is estimated at 60 years.

EQUITONE [natura-textura-materia] is a rather new product on the market (°2007), and there is not yet extensive evidence regarding its reference service life. However there are some studies that suggest that it is feasible to assume that this product lasts for the average lifetime of a building[1].

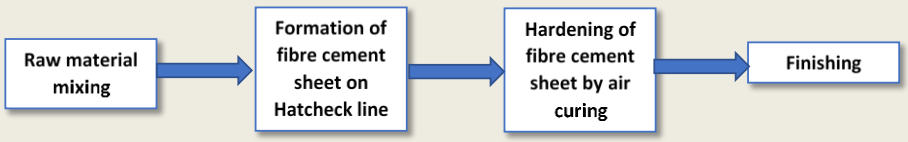
The RSL is valid under normal conditions of use.

DESCRIPTION OF GEOGRAPHICAL REPRESENTATIVITY

The EPD is representative for the Belgian market.

DESCRIPTION OF THE PRODUCTION PROCESS AND TECHNOLOGY

EQUITONE [natura-textura-materia] are large format panels made of fiber cement. They are manufactured largely in accordance with an automated winding process (Hatschek process): the raw materials are mixed with water to prepare a homogenous mixture. Rotating screen cylinders are immersed in this fiber cement pulp which drain internally. The screen surface is covered in a thin film of fiber cement which is transferred onto an infinite conveyor belt from where it is conveyed to a format roller which is gradually covered in an increasingly thicker layer of fiber cement. Once the requisite material thickness is achieved, the still moist and malleable fiber cement layer (fiber cement fleece) is separated and removed from the format roller. The fiber cement fleece is cut to size and leftovers from the wet process are returned to the production process preventing any waste from being incurred. The cut fleece is stacked and compressed at high pressure. The panels are then set aside for binding before stacking on pallets and store for further setting. The setting time lasts approx. 4 weeks. The façade panels are then dried, mechanically treated to obtain the desired surface aspect. EQUITONE [natura] is finished with two semi-transparent water-based acryl dispersions on the panel face (front) and a transparent back-sealing coating (rear). The surface of the EQUITONE [materia] receives a mechanical surface treatment giving the rough texture. They are given a partially transparent seal on the back.
The surface finish of the EQUITONE [textura] is a water-based acrylate dispersion with grainy structure on the facing side and a transparent back-sealing coating on the rear. Waste from damaged or broken panels is recycled by an external company as raw material for cement production.



[1] ‘Durability of Autoclaved Cellulose Fiber Cement Composites’, A.M.Cooke, Managing Director, Building Materials and Technology Pty Ltd, Sydney, NSW, Australia

TECHNICAL DATA / PHYSICAL CHARACTERISTICS

Technical property	Standard	Value	Unit	Comment
Gross density dry (min)	EN12467	1650	kg/m^3	
Standard board thickness		8	mm	
Thermal conductivity		0.407	W/(mK)	
Water vapour diffusion resistance factor acc. to DIN V 4108-4, EN ISO 12572	DIN 4108-4, EN ISO 12572	140-350	-	
Flexural strength parallel	EN12467	24	N/mm^2	
Flexural strength perpendicular	EN12467	17	N/mm^2	
Modulus of elasticity parallel	EN12467	> 17000	N/mm^2	
Modulus of elasticity perpendicular	EN12467	> 15000	N/mm^2	
Moisture content at 23 °C, 80% humidity		10	M.-%	
Coefficient of thermal expansion		0.01	10-6K-1	
Chemical resistance similar to concrete C 35/45		-	-	
Ageing resistance similar to concrete C 35/45		-	-	
Permanent temperature resistance		80	°C	

LCA STUDY

DATE OF LCA STUDY
September 2021

SOFTWARE
For the calculation of the LCA results, the software program SimaPro 9.1.1.1 (PRé Consultants, 2021) has been used in combination with a specific LCA software program for ETEX.

INFORMATION ON ALLOCATION
At Etex, different types of cement fiber products are produced. However EQUITONE [natura-textura-materia] products are produced only on certain production lines, with no co-products being produced as part of the process. Only facility level data were available for electricity use, the use of natural gas, etc. The facility level data have been allocated to the analyzed product using their respective annual production volume (physical relationship), therefore volume allocation is applied. Material inputs and outputs which were not available at the product level, such as waste, were allocated similarly, by mass allocation.

INFORMATION ON CUT OFF
Following processes were considered below the cut-off:
- Transport of packaging of raw materials
- The metal templates in which the boards are produced need to be greased periodically. The template oil is considered below cut-off
- Packaging and transport of ancillary materials used during installation
- Waste treatment of ancillary materials used during installation
- Wearable sieves and cutting knives

INFORMATION ON EXCLUDED PROCESSES
Following processes were excluded for the inventory:
- Infrastructure and land use of the factory
- Environmental impacts caused by the personnel of the production plants are not included in the LCA, e.g. waste from the cafeteria and sanitary installations, accidental pollution caused by human mistakes, or environmental effects caused by commuter traffic

INFORMATION ON BIOGENIC CARBON MODELLING
The fibre cement panels contain cellulose, which is a biobased material. Uptake of biogenic CO_2 within cellulose is reported in module A1, release of biogenic CO_2 related to this flow is reported in C4.
The fibre cement panels are transported using wooden pallets and a carton coverage. Uptake of biogenic CO_2 within these pallets and carton is reported in module A3, release in module A5.

	Biogenic carbon content (kg C / FU)
Biogenic carbon content in product (at the gate)	1,53E-01
Biogenic carbon content in accompanying packaging (at the gate)	3,29E-01

INFORMATION ON CARBON OFFSETTING
Carbon offsetting is not allowed in the EN 15804 and hence not taken into account in the calculations.

ADDITIONAL OR DEVIATING CHARACTERISATION FACTORS
The characterization factors from EC-JRC were applied. No additional or deviating characterization factors were used.

DATA

SPECIFICITY

The data used for the LCA are specific for this product which is manufactured by a single manufacturer in a single production site.

PERIOD OF DATA COLLECTION

Manufacturer specific data have been collected for the year 2016.

INFORMATION ON DATA COLLECTION

Company specific data for the product stage have been collected by Eternit and were provided to VITO through an excel file. The LCI data has been checked by the EPD verifier (Evert Vermaut, Vinçotte). VITO uses publicly available generic data for all background processes such as the production of electricity, transportation by means of a specific truck, etc. Primary data is used for modules A1, A2, A3, and A5. The rest of the study is based on scenarios (module A4, modules B1-B7, modules C1-C4, and module D).

DATABASE USED FOR BACKGROUND DATA

The main LCI source used in this study is the Ecoinvent 3.6 database (Wernet et al., 2019).

ENERGY MIX

The German electricity mix has been used to model electricity use in life cycle stage A3. The Belgian electricity mix (consumption mix + import) has been used to model electricity use in life cycle stages A5, C1, C3, C4 and D. The used records are respectively the ecoinvent records ‘Electricity, medium voltage {DE}| market for | Cut-off, U’ and ‘Electricity, low voltage {BE}| market for | Cut-off, U’ (Wernet et al., 2016).

PRODUCTION SITES

The production site is located at 59269 Neubeckum, Germany.

SYSTEM BOUNDARIES

Product stage			Construction installation stage		Use stage							End of life stage					Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Construction installation stage	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 = included in the EPD
MND = module not declared

EQUITONE [natura-textura-materia] does not contain recycled content.

In the default end-of-life scenario as described by the B-PCR 100% is landfilled, so the end-of-waste state is not reached.

The production waste is partly externally recycled. However, it has been assumed that the recycled waste has no economic value, so 100% of the impacts of the production are allocated to the product and 0% to recycled production waste.

POTENTIAL ENVIRONMENTAL IMPACTS PER REFERENCE FLOW

	Production			Construction process stage		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
GWP total (kg CO2 equiv/FU)	1,14E+01	3,44E-01	2,22E+00	7,09E-01	3,04E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,62E-03	2,01E-01	1,20E-05	6,46E-01	-2,08E-01	1,86E+01
GWP fossil (kg CO2 equiv/FU)	1,20E+01	3,43E-01	3,33E+00	7,08E-01	1,83E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,60E-03	2,01E-01	1,19E-05	8,36E-02	-2,07E-01	1,85E+01
GWP biogenic (kg CO2 equiv/FU)	-6,19E-01	1,92E-04	-1,11E+00	2,93E-04	1,21E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,03E-05	8,20E-05	4,57E-08	5,62E-01	-2,32E-05	4,18E-02
GWP luluc (kg CO2 equiv/FU)	5,82E-03	2,04E-04	2,89E-03	2,36E-04	1,00E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,19E-06	7,03E-05	2,73E-08	4,59E-05	-4,49E-04	1,03E-02
ODP (kg CFC 11 equiv/FU)	9,10E-07	7,11E-08	3,64E-07	1,63E-07	1,68E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,43E-10	4,57E-08	2,44E-12	3,54E-08	-2,70E-08	1,76E-06
AP (mol H^+ eq)	3,48E-02	6,12E-03	7,95E-03	2,92E-03	6,01E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,47E-06	8,21E-04	3,21E-08	7,17E-04	-7,35E-04	5,93E-02
EP - freshwater (kg P-equiv/FU)	2,42E-04	3,26E-06	1,47E-04	5,58E-06	4,41E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,93E-08	1,58E-06	3,22E-10	8,86E-07	-6,39E-06	4,45E-04
EP - marine (kg N-equiv/FU)	7,95E-03	1,53E-03	2,12E-03	8,69E-04	1,45E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,33E-06	2,44E-04	6,92E-09	2,66E-04	-1,97E-04	1,44E-02
EP - terrestrial (mol N-equiv/FU)	9,20E-02	1,70E-02	2,31E-02	9,61E-03	1,64E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,63E-05	2,70E-03	8,37E-08	2,94E-03	-2,20E-03	1,64E-01
POCP (kg NMVOC equiv/FU)	2,47E-02	4,52E-03	6,91E-03	3,01E-03	4,58E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,18E-06	8,25E-04	2,25E-08	8,37E-04	-7,68E-04	4,54E-02

ADP Elements (kg Sb equiv/FU)	4,48E-06	4,64E-07	1,60E-06	1,21E-06	2,84E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,81E-09	3,92E-07	3,24E-11	8,52E-08	-2,38E-07	1,11E-05
ADP fossil fuels (MJ/FU)	8,57E+01	4,82E+00	5,02E+01	1,08E+01	1,70E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,04E-01	3,03E+00	4,60E-04	2,70E+00	-4,20E+00	1,74E+02
WDP (m^3 water eq deprived /FU)	4,51E+00	1,35E-02	1,77E-02	3,24E-02	4,76E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,88E-04	8,44E-03	4,40E-06	1,17E-02	-6,99E-02	5,07E+00

GWP total = total Global Warming Potential (Climate Change); GWP-luluc = Global Warming Potential (Climate Change) land use and land use change; ODP = Ozone Depletion Potential; AP = Acidification Potential for Soil and Water; EP = Eutrophication Potential; POCP = Photochemical Ozone Creation; ADPE = Abiotic Depletion Potential – Elements; ADPF = Abiotic Depletion Potential – Fossil Fuels; WDP = water use (Water (user) deprivation potential, deprivation-weighted water consumption)

RESOURCE USE

	Production			Construction process		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
PERE (MJ/FU, net calorific value)	1,39E+01	8,75E-02	9,08E+00	1,46E-01	7,27E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,12E-02	4,19E-02	4,93E-05	9,10E-02	-1,02E+01	3,07E+01
PERM (MJ/FU, net calorific value)	5,52E+00	0,00E+00	1,04E+01	0,00E+00	-3,09E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,28E+01
PERT (MJ/FU, net calorific value)	1,95E+01	8,75E-02	1,95E+01	1,46E-01	4,18E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,12E-02	4,19E-02	4,93E-05	9,10E-02	-1,02E+01	4,35E+01
PENRE (MJ/FU, net calorific value)	9,64E+01	4,89E+00	5,67E+01	1,09E+01	1,99E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,09E-01	3,05E+00	4,87E-04	2,71E+00	-4,63E+00	1,95E+02
PENRM (MJ/FU, net calorific value)	7,59E-02	0,00E+00	1,31E+00	0,00E+00	-7,46E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,43E-01
PENRT (MJ/FU, net calorific value)	9,65E+01	4,89E+00	5,80E+01	1,09E+01	1,92E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,09E-01	3,05E+00	4,87E-04	2,71E+00	-4,63E+00	1,95E+02
SM (kg/FU)	6,62E-03	0,00E+00	9,10E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,31E+00	1,57E-02
RSF (MJ/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

NRSF (MJ/FU, net calorific value)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW (m^3 water eq/FU)	1,33E-01	4,25E-04	1,24E-02	8,26E-04	1,56E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,97E-05	2,19E-04	1,32E-07	2,61E-03	-1,58E-03	1,65E-01

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 = Net use of fresh water

WASTE CATEGORIES & OUTPUT FLOWS

	Production			Construction process stage		Use stage							End-of-life stage					
	A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
Hazardous waste disposed (kg/FU)	1,13E-01	8,64E-06	6,14E-05	2,75E-05	1,13E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	7,99E-08	7,95E-06	3,80E-10	2,95E-06	-9,02E-06	1,24E-01
Non-hazardous waste disposed (kg/FU)	5,40E-01	1,25E-01	2,95E-01	6,85E-01	1,79E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,87E-04	1,45E-01	9,04E-07	1,51E+01	-2,66E-02	1,86E+01
Radioactive waste disposed (kg/FU)	2,50E-04	3,29E-05	9,63E-05	7,36E-05	5,49E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,99E-07	2,07E-05	4,41E-09	1,99E-05	-1,80E-05	5,49E-04
Components for re-use (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling (kg/FU)	0,00E+00	0,00E+00	1,14E+00	0,00E+00	1,81E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,25E-02	0,00E+00	-1,33E+00	1,33E+00
Materials for energy recovery (kg/FU)	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy (MJ/FU)	0,00E+00	0,00E+00	1,37E-02	0,00E+00	3,72E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-3,86E-01	3,86E-01

IMPACT CATEGORIES ADDITIONAL TO EN 15804

		Production			Construction process		Use stage							End-of-life stage					
		A1 Raw material	A2 Transport	A3 manufacturing	A4 Transport	A5 Installation	B1 Use	B2 Maintenance	B3 Repair	B4 Replacement	B5 Refurbishment	B6 Operational energy use	B7 Operational water use	C1 Deconstruction / demolition	C2 Transport	C3 Waste processing	C4 Disposal	D Reuse, recovery, recycling	Total excl module D
	*PM (disease incidence)*	2,23E-07	1,70E-08	6,87E-08	5,47E-08	4,76E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,19E-11	1,40E-08	2,12E-13	1,50E-08	-1,03E-08	4,40E-07
	*IRHH (kg U235 eq/FU)*	2,74E-01	2,17E-02	7,70E-02	4,72E-02	5,05E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,17E-03	1,33E-02	5,17E-06	1,55E-02	-1,88E-02	5,00E-01
	*ETF (CTUe/FU)*	1,39E+02	3,62E+00	2,51E+01	8,67E+00	2,11E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,54E-02	2,43E+00	2,15E-04	1,45E+00	-2,77E+00	2,01E+02
	*HTCE (CTUh/FU)*	7,75E-09	1,69E-10	1,55E-09	2,34E-10	2,31E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,07E-12	6,82E-11	7,65E-15	3,47E-11	-2,33E-10	1,21E-08
	*HTnCE (CTUh/FU)*	1,12E-07	3,56E-09	2,39E-08	9,61E-09	1,98E-08	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,94E-11	2,65E-09	1,48E-13	8,38E-10	-2,51E-09	1,72E-07
	*Land Use Related impacts (dimensionless)*	1,05E+02	2,18E+00	1,34E+02	9,40E+00	2,64E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,74E-02	2,09E+00	3,08E-04	4,97E+00	-7,79E+01	2,84E+02

HTCE = Human Toxicity – cancer effects; HTnCE = Human Toxicity – non cancer effects; ETF = Ecotoxicity – freshwater; (potential comparative toxic unit)
PM = Particulate Matter (Potential incidence of disease due to PM emissions);
IRHH = Ionizing Radiation – human health effects (Potential Human exposure efficiency relative to U235);

	*Global Warming Potential*	*The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.* *It is split up in 4:* - *Global Warming Potential total (GWP-total) which is the sum of GWP-fossil, GWP-biogenic and GWP-luluc* - *Global Warming Potential fossil fuels (GWP-fossil) : The global warming potential related to greenhouse gas (GHG) emissions to any media originating from the oxidation and/or reduction of fossil fuels by means of their transformation or degradation (e.g. combustion, digestion, landfilling, etc).* - *Global Warming Potential biogenic (GWP-biogenic) : The global warming potential related to carbon emissions to air (CO2, CO and CH4) originating from the oxidation and/or reduction of aboveground biomass by means of its transformation or degradation (e.g. combustion, digestion, composting, landfilling) and CO2 uptake from the atmosphere through photosynthesis during biomass growth – i.e. corresponding to the carbon content of products, biofuels or above ground plant residues such as litter and dead wood.[2]* - *Global Warming Potential land use and land use change (GWP-luluc): The global warming potential related to carbon uptakes and emissions (CO2, CO and CH4) originating from carbon stock changes caused by land use change and land use. This sub-category includes biogenic carbon exchanges from deforestation, road construction or other soil activities (including soil carbon emissions).*
	*Ozone Depletion*	*Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbonsor halons), Which break down when they reach the stratosphere and then catalytically destroy ozone molecules.*
	*Acidification potential*	*Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.*
	*Eutrophication potential*	*The potential to cause over-fertilization of water and soil, which can result in increased growth of biomass and following adverse effects.* *It is split up in 3:* - *Eutrophication potential – freshwater: The potential to cause over-fertilization of freshwater, which can result in increased growth of biomass and following adverse effects.* - *Eutrophication potential – marine: The potential to cause over-fertilization of marine water, which can result in increased growth of biomass and following adverse effects.* - *Eutrophication potential – terrestrial: The potential to cause over-fertilization of soil, which can result in increased growth of biomass and following adverse effects.*
	*Photochemical ozone creation*	*Chemical reactions brought about by the light energy of the sun creating photochemical smog. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.*
	*Abiotic depletion potential for non-fossil ressources*	*Consumption of non-renewable resources, thereby lowering their availability for future generations. Expressed in comparison to Antimonium (Sb).* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Abiotic depletion potential for fossil ressources*	*Measure for the depletion of fossil fuels such as oil, natural gas, and coal. The stock of the fossil fuels is formed by the total amount of fossil fuels, expressed in Megajoules (MJ).* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Ecotoxicity for aquatic fresh water*	*The impacts of chemical substances on ecosystems (freshwater).* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Human toxicity (carcinogenic effects)*	*The impacts of chemical substances on human health via three parts of the environment: air, soil and water.*

[2] Carbon exchanges from native forests shall be modelled under GWP - luluc (including connected soil emissions, derived products or residues), while their CO_2 uptake is excluded.

		The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.
	*Human toxicity (non-carcinogenic effects)*	*The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Particulate matter*	*Accounts for the adverse health effects on human health caused by emissions of Particulate Matter (PM) and its precursors (NOx, SOx, NH3)*
	*Resource depletion (water)*	*Accounts for water use related to local scarcity of water as freshwater is a scarce resource in some regions, while in others it is not.* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*
	*Ionizing radiation - human health effects*	*This impact category deals mainly with the eventual impact on human health of low dose ionizing radiation 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.*
	*Land use related impacts*	*The indicator is the "soil quality index" which is the result of an aggregation of following four aspects:* - *Biotic production* - *Erosion resistance* - *Mechanical filtration* - *Groundwater* *The aggregation is done based on a JRC model. The four aspects are quantified through the LANCA model for land use.* *The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

DETAILS OF THE UNDERLYING SCENARIOS USED TO CALCULATE THE IMPACTS

A1 – RAW MATERIAL SUPPLY

This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process.

ETEX uses different pigments to colour their fibre cement panels. Due to the lack of appropriate proxies for many of the pigments the model prorated the content up to 100% for the Titanium dioxide and Ferrite, which are available in Ecoinvent.. Considering that Titanium dioxide has an overall higher contribution than the other pigments, this is a worst case scenario. The impacts of the pigments will be thus overestimated.

A2 – TRANSPORT TO THE MANUFACTURER

The raw materials are transported to the manufacturing site.

A3 – MANUFACTURING

This module takes into account the production process.

A4 – TRANSPORT TO THE BUILDING SITE

Fuel type and consumption of vehicle or vehicle type used for transport	Truck 16-32 ton (EURO 5)	Truck >32 ton (EURO 5)	Truck 7.5-16 ton (EURO 5)
Distance	100 (40% from factory to construction site) 35 (60%*85% from supplier to construction site)	100 (60% from factory to supplier)	35 (60%*15% from supplier to construction site)
Capacity utilisation (including empty returns)	50%	50%	50%
Bulk density of transported products	Ecoinvent	Ecoinvent	Ecoinvent
Volume capacity utilisation factor	Ecoinvent	Ecoinvent	Ecoinvent

The B-PCR provides default transport scenarios for the transport to the building site for cases where specific data on transport are missing. The B-PCR provides scenario's for this life cycle stage. Fibre cement panels are categorized as 'loose products' in table 5 of the B-PCR. The following transport steps apply:

- 40% directly to the construction site over 100 km with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U')
- 60% to a supplier over 100 km with a >32 ton lorry (ecoinvent record: 'Transport, freight, lorry >32 metric ton, EURO5 {RER}| transport, freight, lorry >32 metric ton, EURO5 | Cut-off, U')
- 85% of these 60% is transported over 35 km from supplier to construction site with a 16-32 ton lorry (ecoinvent record: 'Transport, freight, lorry 16-32 metric ton, EURO5 {RER}| transport, freight, lorry 16-32 metric ton, EURO5 | Cut-off, U')
- 15% of these 60% is transported over 35 km from supplier to construction site with a 7.5-16 ton lorry (ecoinvent record: 'Transport, freight, lorry 7.5-16 metric ton, EURO5 {RER}| transport, freight, lorry 7.5-16 metric ton, EURO5 | Cut-off, U')

A5 – INSTALLATION IN THE BUILDING

The installation involves an amount of 0,00176 kWh per screw used to fix the EQUITONE [natura-textura-materia] product, where 6 screws are necessary for the functional unit. The dataset used to model the impacts is "Electricity, low voltage {BE}| market for | Cut-off, U".

During the installation, depending on how the EQUITONE [natura-textura-materia] sheets are cut, there is a loss rate between 5-30%, depending on the building shape. For this EPD an average loss rate of 10% is used.

All packaging material for the EQUITONE [natura-textura-materia] product is transported to End of Life (EoL) and disposed of in line with the B-PCR default EoL scenarios for Belgium.

Parts of the installation	quantity	Description
Processes necessary for the installation of the product	*0,01056 kWh*	*energy needed to fix the screws*
Fixation materials	*6*	*Screws*
Material losses	*10%*	*Average material losses*
Packaging	*- Pallet* *- Carton* *- PE band on a carton roll* *- Metal straps*	*0,0688 kg* *0,0485 kg* *0,0320 kg* *0,0260 kg*

Ancillary materials for installation (specified by material);	6 Screws			
Water use	None			
Other resource use	10% losses			
Quantitative description of energy type (regional mix) and consumption during the installation process	0,01056 kWh electricity, low voltage			
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	packaging waste: *0,0688* kg wood	packaging waste: 0,0485 kg cardboard	packaging waste: 0,0320 kg plastic	Packaging waste: 0,0260 kg steel
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal	60% recycling 20% incinerated	95% recycling 5% incinerated	35% recycling 60% incinerated 5% landfill	95% recycling 5% landfill

(specified by route)				
Direct emissions to ambient air, soil and water	None	None	None	
Distance	Not applicable	Not applicable	Not applicable	

B – USE STAGE (EXCLUDING POTENTIAL SAVINGS)

B1: No emissions during the use phase.
B2: The product does not require maintenance.
B3: The product does not require repair.
B4: No replacement required.
B5: No refurbishment
B6: The product does not require operational energy use.
B7: No operational water use.

C: END OF LIFE

The default scenario for Cement fibre boards from NBN/DTD B08-001 is used to model the End-of-life of the boards. The default scenario for metals from NBN/DTD B08-001 is used to model the End-of-life of the screws.

C1: The dismantling of EQUITONE [natura-textura-materia] involves the same amount of energy as for the installation, which is 0,01056 kWh.
C2: The default scenario for fibre cement boards from NBN/DTD B08-001 describes that the end-of-life waste is transported to a sorting facility over a distance of 30 km. Afterwards, 100% of the fibre cement boards and 5% of the metal screws is transported to a landfill over a distance of 50 km.
C3: No recycling/reuse of fibre cement boards, 95% recycling of metal screws
C4: 100% landfill of fibre cement boards, 5% landfill of metal screws

Module C2 – Transport to waste processing					
Type of vehicle (truck/boat/etc.)	Fuel consumption (litres/km)	Distance (km)	Capacity utilisation (%)	Density of products (kg/m^3)	Assumptions
Truck 16-32 ton	0,256 l diesel/km	80	50%	Ecoinvent scenario	Ecoinvent scenario

End-of-life modules – C3 and C4		
Parameter	Unit	Value
Wastes collected separately	kg	0,0132
Wastes collected as mixed construction waste	kg	15,07
Waste for re-use	kg	0
Waste for recycling	kg	0,0125
Waste for energy recovery	kg	0
Waste for final disposal	kg	15,07

D – BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES

In module D, the benefits and loads beyond the system boundaries are quantified. Following waste streams are considered after their end-of-waste: wooden pallets in A3 and A5 (of which 60% is recycled), plastic packaging in A3 and A5 (of which 35% is recycled), paper and cardboard in A5 (of which 95% is recycled), steel cables in A3 and A5 (of which 95% is recycled) and metal screws in C3 (of which 95% is recycled).

Quantitative description of the loads beyond the system boundaries	Treatment of 0,04254 kg of scrap steel to prepare it for to prepare it for recycling at the remelter
	Sorting of 0,042kg of waste wood to prepare it for recycling
	Treatment of 0,012 kg plastic to prepare it for recycling
	Treatment of 0,046 kg paper to prepare it for recycling as pulp
Quantitative description of the benefits beyond the system boundaries	Avoided production of 0,80 MJ of heat using natural gas
	Avoided production of 0,40 MJ of Belgian electricity mix
	Avoided production of 0,04254 kg primary steel
	Avoided production of 0,042 kg primary softwood
	Avoided production of 0,012 kg primary polypropylene/ polypropylene granulates
	Avoided production of 0,016 kg primary sulfate pulp

ADDITIONAL INFORMATION ON RELEASE OF DANGEROUS SUBSTANCES TO INDOOR AIR, SOIL AND WATER DURING THE USE STAGE

INDOOR AIR

Under normal conditions of use, EQUITONE [natura-textura-materia] products do not cause any adverse health effects or release of volatile organic compounds (VOCs) to indoor air.

SOIL AND WATER

No environmental impact to water, air or soil is expected due to the extremely low metal release from the low maintenance requirements.

DEMONSTRATION OF VERIFICATION

EN 15804+A2 serves as the core PCR
Independent verification of the environmental declaration and data according to standard EN ISO 14025:2010 Internal ☐ External ☒
Third party verifier: Evert Vermaut (Vincotte) Jan Olieslagerslaan 35 1800 Vilvoorde, Belgium evermaut@vincotte.be

ADDITIONAL TECHNICAL INFORMATION FOR SCENARIO DEVELOPMENT

This EPD does not include the framework on which the panels are installed. At building level the impact of the framework should be added. If specific information on quantities is missing, following weights can be used. The values are applicable for exterior wall cladding.

Wooden framework

Components	quantity	Description
Wooden frame	*2,4 kg*	
EPDM sealing tape	*0,018 kg*	*UV protection of the joints*

Aluminium framework

Components	quantity	Description
Aluminium profiles	*1,61 kg*	
PVC foam	*0,02 kg*	*The foam strip is designed to create a watertight seal even with minimal force applied. It also minimizes vibrations from the facade panel and prevents contact between uncoated fiber cement and the aluminum support structure.*

Steel framework

Components	quantity	Description
Steel frame	*2,48 kg*	
PVC foam	*0,02 kg*	*The foam strip is designed to create a watertight seal even with minimal force applied. It also minimizes vibrations from the facade panel and prevents contact between uncoated fiber cement and the aluminum support structure.*

APPLICATION UNIT

This paragraph gives information on the applied product and how the reference flow and table with impacts relate to different applications. The table below gives an overview of the standard thicknesses, the thickness range and the ratio to the declared unit of 1 m^2 for each application. The environmental impact is proportional with the thickness.

Application	Standard thickness	Thickness range	Ratio to the declared unit of 1 m^2
Exterior wall covering	*8 mm*	*8 and 12 mm*	*1*
Ceilings	*8 mm*	*8 and 12 mm*	*1*

ADDITIONAL INFORMATION ON REVERSIBILITY

For the application and installation as described in this EPD a qualitative assessment of the reversibility is given. Following 4 indicators shall be used (based on BAMB – buildings as material banks). The assessment is applicable for exterior wall cladding and for all frameworks.

Reversibility	-	*Reversible with light repairable damage (fixation with screws, bolts and dowels)*
Simplicity of disassembly	-	*simple - no specific dismantling tools required*
Speed of disassembly	-	*speedy disassembly*
Ease of handling (size and weight)	-	*can be handled manually, but size and/or weight requires two or more workers*
Robustness of material (material resistance to disassembly)	-	*the material resists well during disassembly*

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General information

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Contact programma operator	epd@environment.belgium.be
Based on following PCR documents	EN 15804+A2:2019 NBN/DTD B 08-001 and its complement
PCR review conducted by	Federal Public Service of Health and Environment & PCR Review committee
Author(s) of the LCA and EPD	Arthur De Jaegher, arthur@enperas.com
Identification of the project report	Life cycle assessment of EQUITONE [natura-textura-materia] (VITO, 07-09-21)
Verification	External independent verification of the declaration and data according to EN ISO 14025 and relevant PCR documents
Name of the third party verifier Date of verification	Evert Vermaut (Vinçotte) 08.09.2021
www.b-epd.be	**www.environmentalproductdeclarations.eu**

Comparing EPDs is not possible unless they are conform to the same PCR and taking into account the building context.
The program operator cannot be held responsible for the information supplied by the owner of the EPD nor LCA practitioner.

LCA practitioner

www.vito.be
www.enperas.be

Building calculator of the regional authorities

www.totem-building.be

Federal Public Service of Health, Food Chain Safety and Environment

www.b-epd.be

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