

# Environmental Product Declaration



In accordance with ISO 14025:2006, ISO 21930:2017 and EN 15804:2012+A2:2019/AC:2021 for:

## Cânhamor ECOblock® 30

from

**Cânhamor, Lda.**



Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
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EPD type:	Single product EPD

*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)*



## General information

### Programme information

<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>E-mail:</b>	<a href="mailto:info@environdec.com">info@environdec.com</a>

<b>Accountabilities for PCR, LCA and independent, third-party verification</b>
<b>Product Category Rules (PCR)</b>
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>PCR 2019:14 Construction products (EN 15804+A2), version 1.3.4</i>
PCR review was conducted by: <i>The Technical Committee of the International EPD® System.</i>
<b>Life Cycle Assessment (LCA)</b>
LCA accountability: <i>Rita Pinheiro Garcia, Itecons – Institute for Research and Technological Development in Construction, Energy, Environment and Sustainability</i>
<b>Third-party verification</b>
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:
<input checked="" type="checkbox"/> EPD verification by individual verifier
Third-party verifier: <i>Elisabet Amat, GREENIZE</i>
Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier:
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> 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:

Cânhamor, Lda.

### Contact:

Elad Kaspin; tel: +351 961 428 559; [elad@canhamorhemp.com](mailto:elad@canhamorhemp.com)

### Description of the organisation:

Cânhamor is the first hemp block manufacturer in the Iberian Peninsula. Our mission is to revolutionise conventional materials and methods. We make hemp blocks from natural and sustainable materials that are significantly easier and faster to work with and provide an ecological, highly insulated and durable alternative. Our vision is to build with nature instead of exploiting it, creating a better future for ourselves and future generations.

### Name and location of production site:

Cânhamor, Lda.

Cerca do Carepetal, Estrada Nacional 1 s/n

7630-284 Colos, Portugal

<https://canhamorhemp.com>

## Product information

### Product name:

Cânhamor ECOblock® 30

### Product identification:

Hemp block

### Product description:

Prefabricated hemp blocks with 30 cm width for application in exterior walls, providing a superior level of insulation.

Characteristics	Cânhamor ECOblock® 30	Standard
Modular dimensions (mm x mm)	500x250	EN 772-16
Width (mm)	300	EN 772-16
Blocks per m <sup>2</sup> <sup>a</sup>	7,6	-
Dry weight (kg)	13,3	-
Maximum weight (kg)	15,9	-
Dry apparent density (kg/m <sup>3</sup> )	355	EN 772-13
Compressive strength (kPa)	300	EN 772-1
Dry thermal conductivity (W/m <sup>0</sup> K)	0,082	EN 12664
Dry thermal resistance (m <sup>2</sup> K/W)	3,66	ISO 6946
Thermal transmission coefficient <sup>b</sup> (W/m <sup>20</sup> K)	0,26	ISO 6946
Specific heat capacity (J/kg <sup>0</sup> K)	1091,8	-
Thermal delay <sup>b</sup> (h)	14,4	ISO 13786
Reaction to fire	B-s1,d0	EN 13501-1
Sound absorption coefficient $\alpha$	0,95	EN ISO 354
Sound resistance index RW <sup>b</sup> (dB)	45	ISO 10140-1
Water vapour diffusion resistance factor $\mu$	5,25	ISO 12572
Sd diffusion equivalent thickness (m)	1,58	EN ISO 12572

<sup>a</sup> With 8 mm adhesive mortar; <sup>b</sup> With 2 cm plaster.

UN CPC code:

37520 Boards, blocks and similar articles of vegetable fibre, straw or wood waste agglomerated with mineral binders

Geographical scope:

The LCA study was carried out according to the European scope.

Product Market: Global.

**LCA information**Functional unit / declared unit:

1 unit of hemp block, including packaging (13,3 kg/DU, dry weight).

Reference service life:

The service life of the building (50 years) was considered, since once installed the product is protected by other elements and does not require maintenance.

Time representativeness:

2022

Database(s) and LCA software used:

- ecoinvent v3.9.1, EF Database v2.0, and Agribalyse v3.1.1
- SimaPro v9.5

Data Quality:

Primary data was provided by Cânhamor and was based on the average production of Cânhamor ECOblock® in 2022. For processes which the producer had no influence on or no specific information about, such as extraction of raw materials, production of customised products and electricity generation, literature and generic data from ecoinvent database v3.9.1, EF Database 2.0 and Agribalyse 3.1.1 database was used, considering geographical and temporal significance.

Cut-off rules:

Criteria for the exclusion of inputs and outputs followed the requirements of EN 15804: 2012+A2 2019 and ISO 21930:2017. The LCA considered all the production processes of the materials and energy consumed in the system, as well as the management processes of the wastes generated, for which inventory data were available. Personnel-related processes, such as transportation of employees to and from work, production and end-of-life processes of infrastructure and capital goods used in the product system as well as in upstream and downstream processes, and consumption and emissions in administrative areas and laboratories were not taken into account. With the exception of the latter, no material or energy flows were excluded from the modelling for which the project managers would have known that a significant contribution could be expected on the indicators.

Allocation:

Several co-products are obtained from the hemp plant: fiber, shives/hurds and dust. Following EN 15804:2012+A2:2019, economic allocation was used for the allocation of the impacts of the hemp production process, with the exception of the intrinsic physical properties of the material (biogenic carbon content and primary energy content), which were allocated based on mass. Furthermore, all products sent to recycling are treated under the "polluter pays" principle.

### Electricity Sources:

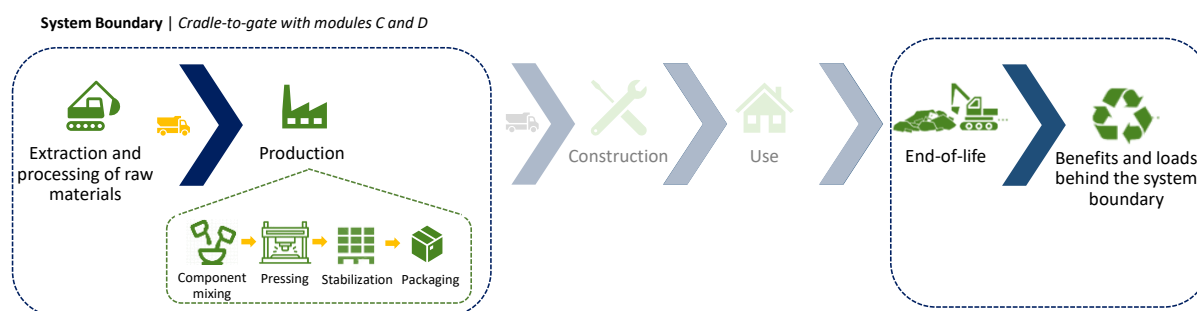
Electricity used in module A3 was modelled using the Portuguese energy grid residual mix from ecoinvent v3.9.1.

Type of information	Description
Electricity mix	Hard coal: 2%; Hydro: 16%; Natural gas: 25%; Oil: 3%; Wind: 17%; Biomass: 4%; PV: 4%; European attribute mix: 29%
GWP-GHG (kg CO <sub>2</sub> eq/kWh)	0,343

### Description of system boundaries:

Cradle-to-gate with modules C and D.

This EPD covers the information module A1-A3, C1-C4 and D, comprising of the following modules: [A1] raw material extraction and processing, processing of secondary material input; [A2] transport to the manufacturer; [A3] manufacturing; [C1] de-construction, demolition; [C2] transport to waste processing; [C3] waste processing for reuse, recovery and/or recycling; [C4] disposal and module D.



### Product stage [A1-A3]:

Modules A1-A3 cover the extraction, production and acquisition of the main raw materials and pre-products, as well as electricity generation, transport of all raw materials considered in module A1 to the factory gate, and production of the final products, including waste management.

### Construction process stage [A4-A5]:

The construction process stage is not included.

### Use stage [B1-B7]:

The use stage is not included.

### End of life stage [C1-C4]:

#### Module C1:

Diesel consumption and particulate emissions in the demolition of hemp blocks was considered, based on the ecoinvent 3.9.1 process *Waste concrete, not reinforced {Europe without Switzerland} treatment of waste concrete, not reinforced, collection for final disposal*.

#### Module C2:

For the transport of the hemp blocks at the end-of-life, a distance of 50 km to the waste operators was considered.

#### Module C3:

No waste is sent to reuse, recycling or energy recovery.

#### Module C4:

A scenario of landfill disposal as inert materials (100%) was considered for the waste hemp blocks.

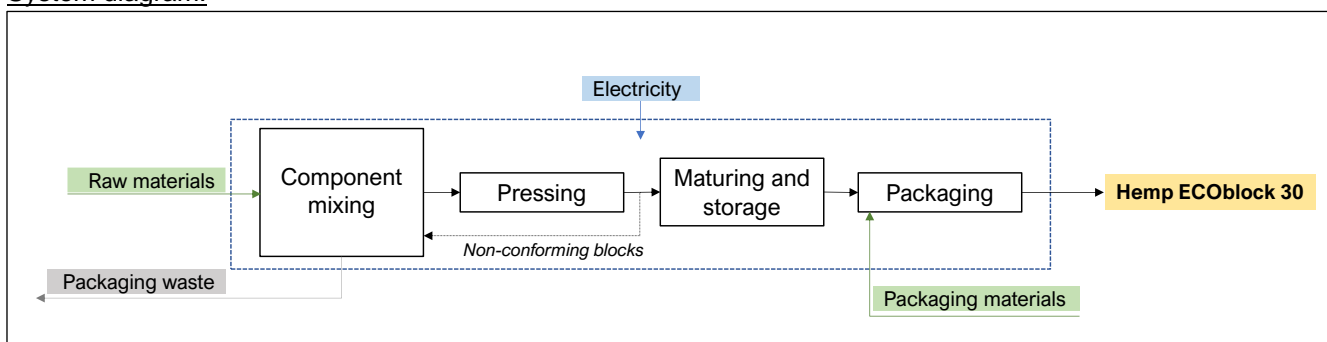
#### Resource recovery stage [D]:

At present there are no processes for re-use or recovery. Therefore, the potential benefits beyond the system boundaries (D) are zero.

Module	Parameters	Cânhamor ECOblock® 30
<b>De-construction, demolition [C1]</b>	Diesel consumption (MJ/unit) <sup>a</sup>	0,64
<b>Transport to recovery/disposal [C2]</b>	Distance to end-of-life (km)	50
	Type of transport	Truck
<b>Final disposal [C4]</b>	End-of-life scenario	100% landfill

<sup>a</sup> Based on ecoinvent 3.9.1 process *Waste concrete, not reinforced (Europe without Switzerland) treatment of waste concrete, not reinforced, collection for final disposal*.

#### System diagram:



The production of the Cânhamor ECOblock® 30 is carried out in a cold process and comprises four main stages: mixing, pressing, maturing and storage, and packaging. Raw materials are mixed with water in a horizontal mixer and the mixture is transported using wheelbarrows to a mobile press, where blocks are formed. Blocks are then stocked using an electric lift fork and are left to mature for two months. The maturing phase is necessary for the material to develop adequate mechanical strength for installation. During the block maturing phase, the carbonation process starts, which consists in the reaction of the calcium hydroxide contained in the lime with the carbon dioxide present in the atmosphere with consequent formation of calcium carbonate. This phenomenon involves the withdrawal of CO<sub>2</sub> from the atmosphere and the storage of carbon in the product in the form of calcium carbonate. Carbonation continues during the average 6-months storage period. The assessment of CO<sub>2</sub> uptake due to carbonation during storage was performed based on Lecompte et al. (2017). Afterward storage, blocks are packed and transported to the construction site. There is no reported emission of pollutants to air associated with the production of the hemp blocks.



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

	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	PT	-	-	-	-	-	-	-	-	-	EU				EU
Specific data used	39%					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0					-	-	-	-	-	-	-	-	-	-	-	-

X: included / ND: not declared / PT: Portugal / EU: European.

## Content information

### Cânhamor ECOblock® 30<sup>\*,\*\*</sup>

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material (C)		Biogenic material (CO <sub>2</sub> )
			weight-% of product	kg C/DU	kg CO <sub>2</sub> /DU
Hemp shives/hurds	4,10E+00	0,00	12,94	1,72E+00	6,32E+00
Binder	9,22E+00	0,00	0,00	0,00E+00	0,00E+00
TOTAL	1,33E+01	0,00	12,94	1,72E+00	6,32E+00
Packaging materials	Weight, kg	Weight-% (versus the product)	Biogenic material, kg C/DU		Biogenic material, kg CO <sub>2</sub> /DU
Plastic film	5,63E-03	0,04%	0,00E+00		0,00E+00
Wooden pallet	4,00E-01	3,02%	1,88E-01		6,88E-01
Label	1,30E-04	0,00%	3,90E-05		1,43E-04
TOTAL	4,05E-01	3,07%	1,88E-01		6,89E-01

\*The product does not contain any substance included in the Candidate List of Substances of Very High Concern (SVHCs) for authorization with concentrations higher than 0.1% weight by weight (w/w).

\*\*Dry weight.



## Results of the environmental performance indicators

Life cycle impact assessment results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. The use of the results of modules A1-A3 without considering the results of module C is discouraged. A1-A3 results include the “balancing-out reporting” of biogenic CO<sub>2</sub> of packaging released in module A5. C4 results include a virtual emission of biogenic CO<sub>2</sub> that would be permanently stored in the product at the end-of-life.

### Mandatory impact category indicators according to EN 15804 (based on EF 3.1)

Results per declared unit (1 unit)							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO <sub>2</sub> eq.	4,64E+00	5,96E-02	3,29E-01	0,00E+00	3,79E-02	0,00E+00
GWP-biogenic	kg CO <sub>2</sub> eq.	-6,12E+00	1,11E-05	9,84E-05	0,00E+00	6,32E+00	0,00E+00
GWP-luluc	kg CO <sub>2</sub> eq.	1,49E-01	2,44E-06	6,38E-06	0,00E+00	2,40E-06	0,00E+00
GWP-total	kg CO <sub>2</sub> eq.	-1,33E+00	5,97E-02	3,29E-01	0,00E+00	6,36E+00	0,00E+00
ODP	kg CFC 11 eq.	5,88E-08	9,41E-10	7,04E-09	0,00E+00	6,02E-10	0,00E+00
AP	mol H <sup>+</sup> eq.	2,12E-02	5,71E-04	7,76E-04	0,00E+00	3,56E-04	0,00E+00
EP-freshwater	kg P eq.	6,94E-04	4,50E-07	2,22E-06	0,00E+00	3,00E-07	0,00E+00
EP-marine	kg N eq.	1,08E-02	2,68E-04	2,94E-04	0,00E+00	1,67E-04	0,00E+00
EP-terrestrial	mol N eq.	8,56E-02	2,92E-03	3,10E-03	0,00E+00	1,81E-03	0,00E+00
POCP	kg NMVOC eq.	1,32E-02	8,59E-04	1,27E-03	0,00E+00	5,35E-04	0,00E+00
ADP-minerals&metals*	kg Sb eq.	2,14E-07	2,51E-09	1,12E-08	0,00E+00	1,58E-09	0,00E+00
ADP-fossil*	MJ	3,04E+01	7,85E-01	4,33E+00	0,00E+00	4,99E-01	0,00E+00
WDP*	m <sup>3</sup>	9,59E-01	1,01E-03	3,96E-03	0,00E+00	6,42E-04	0,00E+00
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.

## Additional mandatory and voluntary impact category indicators

Results per declared unit (1 unit)							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
GWP-GHG <sup>1</sup>	kg CO <sub>2</sub> eq.	4,79E+00	5,97E-02	3,29E-01	0,00E+00	3,79E-02	0,00E+00
Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017							

## Resource use indicators

Results per declared unit (1 unit)							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	1,15E-02	1,53E-03	1,14E-02	0,00E+00	1,35E-02	0,00E+00
PERM	MJ	7,21E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	7,21E+01	1,53E-03	1,14E-02	0,00E+00	1,35E-02	0,00E+00
PENRE	MJ	3,01E+01	7,85E-01	4,33E+00	0,00E+00	4,99E-01	0,00E+00
PENRM	MJ	1,13E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	3,02E+01	7,85E-01	4,33E+00	0,00E+00	4,99E-01	0,00E+00
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 <sup>3</sup>	2,86E-02	3,90E-05	1,81E-04	0,00E+00	2,83E-05	0,00E+00
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

<sup>1</sup> This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO<sub>2</sub> is set to zero.

## Waste indicators

Results per declared unit (1 unit)							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1,08E-04	5,25E-06	2,86E-05	0,00E+00	0,00E+00	0,00E+00
Non-hazardous waste disposed	kg	7,95E-02	5,83E-05	2,14E-04	0,00E+00	1,46E+01	0,00E+00
Radioactive waste disposed	kg	4,54E-05	3,82E-08	3,71E-07	0,00E+00	3,87E-08	0,00E+00

## Output flow indicators

Results per declared unit (1 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	4,01E-01	0,00E+00	0,00E+00	0,00E+00	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

## Additional environmental information

*Instruction for proper use, maintenance and service of the product:*

The ECOblocks cannot be directly exposed to the environment; therefore, they need to be plastered from the outside. Always use mortars, plasters and paints that are breathable, as the blocks. This will create a breathable wall that will prevent humidities and mould, minimising maintenance needs.

As any other material, it is good practice to prevent humidities from the ground by impermeabilization of the slab.

## Additional social and economic information

Cânhamor is located in Colos, Alentejo, A rural area, known for the lack of people and opportunities. One of the goals of Cânhamor is to develop the area and create more business opportunities. All employees of Cânhamor live in Alentejo, contributing to the local economy. Furthermore, Cânhamor seeks to source all raw materials from national suppliers. Hemp is currently the only raw material sourced from abroad. Hence, Cânhamor has implemented the Hemp Farmer Partnership Program to support hemp production in Portugal, and, starting from 2025, we will use our own hemp.

## References

European Standard. CEN/TR 15941:2010. Sustainability of construction works - Environmental product declarations - Methodology for selection and use of generic data, 2010.

European Standard. EN 15804:2012+A2:2019/AC:2021. Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products, 2019.

General Programme Instructions of the International EPD® System. Version 4.0.

International Organization for Standardization (ISO). ISO 21930:2017 – Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services, 2017.

International Organization for Standardization (ISO). EN ISO 14040:2006. Environmental management – life cycle assessment –principles and framework, 2006.

International Organization for Standardization (ISO). EN ISO 14044:2006. Environmental management – Life cycle assessment – Requirements and guidelines, 2006.

International Organization for Standardization (ISO). ISO 14025:2006. Environmental labels and declarations — Type III environmental declarations — Principles and procedures, 2006.

Lecompte T., Levasseur A. & Maxime D. Lime and hemp concrete LCA: a dynamic approach of GHG emissions and capture. 2nd Int Conf Bio-based Build Mater; 1st Conf Ecol Valoris Granul Fibrous Mater 35:513–521, 2017.

PCR 2019:14. Construction Products. Version 1.3.4.

SimaPro software, PRé Consultants bv 1990-2022, Release 9.5.0.0.

