DECLARATION SHEET
ENVIRONMENTAL AND SANITARY

1m3 of hemp concrete for filling and insulating walls or partitions

In accordance with standards EN ISO 14025, NF EN 15804 + A1 and NF EN 15804 / CN

October 2018
PRODUCTION : EVEA
Le Sillon 8, avenue des Thébaudières 44800 Saint-Herblain
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Warning

The information contained in this declaration is provided under the responsibility of the manufacturers who are members of Construire en Chanvre participating in the collective FDES process (producers of FDES) according to standard NF EN 15804 + A1 and its national complement, NF EN 15804 / CN.
Any exploitation, total or partial, of the information provided in this document must at least be accompanied by the full reference to the original FDES as well as to its producer who can submit a full copy.
It is recalled that the results of the study are based only on facts, circumstances and assumptions that have been submitted to the during the study. If these facts, circumstances and assumptions differ, the results are subject to change.
In addition, the results of the study should be considered as a whole, with regard to the hypotheses, and not taken in isolation.
CEN standard EN 15804 + A1: serves as Product Category Definition Rules (SPC).

Reading Guide

The display of inventory data complies with the requirements of standard NF EN 15804 + A1.
In the following tables 2.53E-06 should be read: 2.53x10 -6 (scientific writing).
The units used are specified before each flow, they are:
- the kilogram "kg",
- the gram "g",
- the liter "l",
- the kilowatt per hour "kWh",
- the megajoule "MJ",
- the linear meter "ml"

Abbreviations:
- LCA: Life Cycle Analysis
- VOC: Volatile Organic Compounds
- DVR: Reference Lifetime
- DU: Declared Unit
- UF: Functional Unit
- PCI: Lower Calorific Power
- LDPE: Low density polyethylene
- HDPE: High density polyethylene
- PP: Polypropylene

Caution when using FDES for product comparison
The FDES of construction products may not be comparable if they do not comply with the NF EN standard 15804 + A1.
Standard NF EN 15804 + A1 defined in § 5.3 Comparability of DEP for construction products, the conditions in which construction products can be compared, based on information provided by the FDES: "A comparison of the environmental performance of construction products using EPD information should be based on the use of products and their impact on the building, and must take into account the entire life cycle (all information modules). «

SUMMARY

1 INTRODUCTION

The framework used for the presentation of the environmental product declaration is based on the national NF supplement EN 15804 / CN. This sheet constitutes a framework adapted to the presentation of the environmental characteristics of the products of construction in accordance with the requirements of standard NF EN 15804 + A1, its national supplement NF EN 15804 / CN and the provision of comments and additional information useful in keeping with the spirit of this standard in matters sincerity and transparency. The information contained in this declaration is provided under the responsibility of the participating members.

Contact :
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Contact details:
director@interchanvre.org

2 GENERAL INFORMATION

1. Name of declarant

Association law 1901 - Building in Hemp
140 rue Chevaleret
75013 Paris

2. Name of the hemp producers for which the FDES is representative:

NOM DES SOCIETES	Siège social
AGROCHANVRE	La Prise Gontier de Haut 50 720 Barenton
CAVAC	Fief Chapitre, 85 400 Sainte-Gemme-la-Plaine
EUROCHANVRE	7 Route Dijon, 70 100 Arc-lès-Gray
GATICHANVRE	45 Rue de l'Essonne, 91 720 Prunay-sur-Essonne
LA CHANVRIERE	Rue du Général Gaulle, CS 20602 10 200 Bar-sur-Aube
PLANETE CHANVRE	Bellevue, D402, 77 120 Aulnoy

3. Name of the producers of binders and commercial references for which the FDES is representative

NOM DES SOCIETES	Siège social	Références couvertes
BCB Tradical	ZAC de Valentin – BP 3011 25 045 Besançon cedex	Tradical PF 70 Tradical ThermO Tradical PF 80M Tradical PF Batir
CESA	28b Route de Montanceix La Jarthe 24 110 Saint-Astier	Tradeco Batichanvre Batichanvre Isol
LAFARGE	2 Avenue du Général de Gaulle 92 148 Clamart Cedex	Nathural NHL Tradibat 85 HL 5
SOCLI	Le Castans 65370 Izaourt	CALIX HL 5 Chaux Rabot NHL5
VICAT	6 Place de l'Iris 92 400 Courbevoie	Ciment Naturel Prompt

Commercial references are provided under the responsibility of manufacturers.

4. Type of FDES: from cradle to grave.

5. Type of FDES: collective.

The rules characterising the inclusion of references to the study were defined by performing a sensitivity analysis in accordance with Annex L of the national supplement NF EN 15804 / CN.

The commercial references that can be attached to this FDES must respect the maximum values specified (or minimum in the case of the yield of the hemp crop) in the following table. Manufacturers authorized to use this FDES are cited in §2.2 and §2.3.

6. Publication date: October 2018
7. End of validity date: October 2023
8. Verification: verified

CEN standard EN 15804 serves as a SPC a).

Independent verification of the declaration, in accordance with EN ISO 14025: 2010

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Verification: Auditor's name: Frédéric Rossi (ESTEANA)
Verification program: FDES-INIES program
Address : Association HQE. 4, avenue du Recteur Poincaré - 75016 Paris.
Website : http://www.inies.fr/accueil/

a) Rules for defining product categories
b) Optional for communication between companies, compulsory for communication between a company and its customers (see EN ISO 14025: 2010, 9.4).

SENSITIVE PARAMETER	UNIT	LIMIT VALUE
Hemp yield (minimum limit value)	kg/ha	5,07E+03
Share of the turnover of the hemp plant from of the sale of chènevottes	%	4,00E+01
Phosphorus emitted into the soil - Hemp	kg/ha	2,64E+01
Nitrogen emitted into the soil - Hemp	kg/ha	7,59E+01
Characteristics of the binder	The binder must be in the list of commercial references listed above (or an equivalent formula)	
Electricity consumption during manufacturing hemp shives	kWh/kg of shive	4,53E+01
Quantity of shives in the final product	kg/m3	1,30E+02
Quantity of binder in the final product	kg/m3	3,50E+02
Quantity of water in the final product	kg/m3	3,90E+02
Transport of the binder to the site	km	4,30E+02

3 DESCRIPTION OF THE DECLARED UNIT AND THE PRODUCT

9. Description of the declared unit:
"Ensure a non-loadable filling of wall or partition of 1m3 in hemp concrete with an implementation according to professional rules of execution of Building in Hemp, for a thermal conductivity of about 0.09 W / m.K, over a reference lifespan of 100 years. "
The thermal conductivity of about 0.09 W / m.K is an indicative value provided by the association building in hemp based on the average values of their members. This value can vary depending on the hemp concrete used, specific values are available from manufacturers.

10. Product description:
The hemp concrete for insulation and wall filling is obtained by mixing a light aggregate (chives) and lime-type mineral binders.

11. Description of the use of the product (field of application):
The hemp concrete used for the realisation of non-load-bearing wall ensures the filling and the insulation by being associated with load-bearing structures, most commonly of wood but also of concrete or metal. It is implemented by layering via pouring or projection into walls or lining.

12. Other technical characteristics not included in the declared unit:
Not applicable.

13. Description of the main components and / or materials of the product:
The realisation of a hemp concrete requires to control the dosage of each of the three constituents « chives - binder - water ". Depending on the type of binder used, the dosage is specific to each manufacturer. The dosages used for this study are the result of a validity framework applied to the data provided by the manufacturers of the Construire en Hemp which meets the threshold performance measured in certified laboratory, as required by the rules professional. The dosage used for the implementation of hemp concrete for walls or partitions is presented in the following table, for 1m3 of wall:

COMPONENT	UNIT	VALUE
shives	kg/m3	1,05E+02
binder	kg/m3	2,53E+02
water	L/m3	3,24E+02

The shives are wrapped in HDPE film and placed on a pallet for delivery. The binders are packed in paper / PP bags, put on a pallet and surrounded by LDPE film. An average of the packaging used by each manufacturer was used for this study, the values are presented in the following table:

14. Specify if the product contains substances from the candidate list according to the REACH regulation (if higher at 1% by mass)
The references cited in §2.2 do not contain any substance from the candidate list according to the REACH regulation, 0.1% by mass.

SHIVES	UNIT	VALUE
HDPE	kg/m3	7,88E-02
Palette	kg/m3	5,25E+00
Iron	kg/m3	2,43E-01
BINDERS	**UNIT**	**VALUE**
PP	kg/m3	5,63E-02
LDPE	kg/m3	8,63E-01
Palette	kg/m3	4,02E+00
Paper	kg/m3	8,25E-01

15. Description of the reference lifetime (if applicable and in accordance with §7.2.2 of NF EN 15804 + A1)

PARAMETER	UNIT	VALUE/DESCRIPTION
Referent lifetime	Years	100
Properties declared of the product at the exit of factory	-	Shives conforms to the granulate label building hemp, hemp concrete in accordance with the rules professional
Theoretical application parameters	-	Professional rules
Presumed quality of work	-	The quality of the work is presumed in accordance with the recommendations listed on the product data sheet.
Outdoor environment	-	-
Indoor environment	-	Product performance for the indoor environment are specified in professional rules. A detail of pollutant emissions volatility of
Terms of use	-	Use of the product is assumed conforms to the recommendations of the sheet technical products.
Maintenance	-	No maintenance is required

4 STAGES OF THE LIFE CYCLE

Product life cycle diagram:

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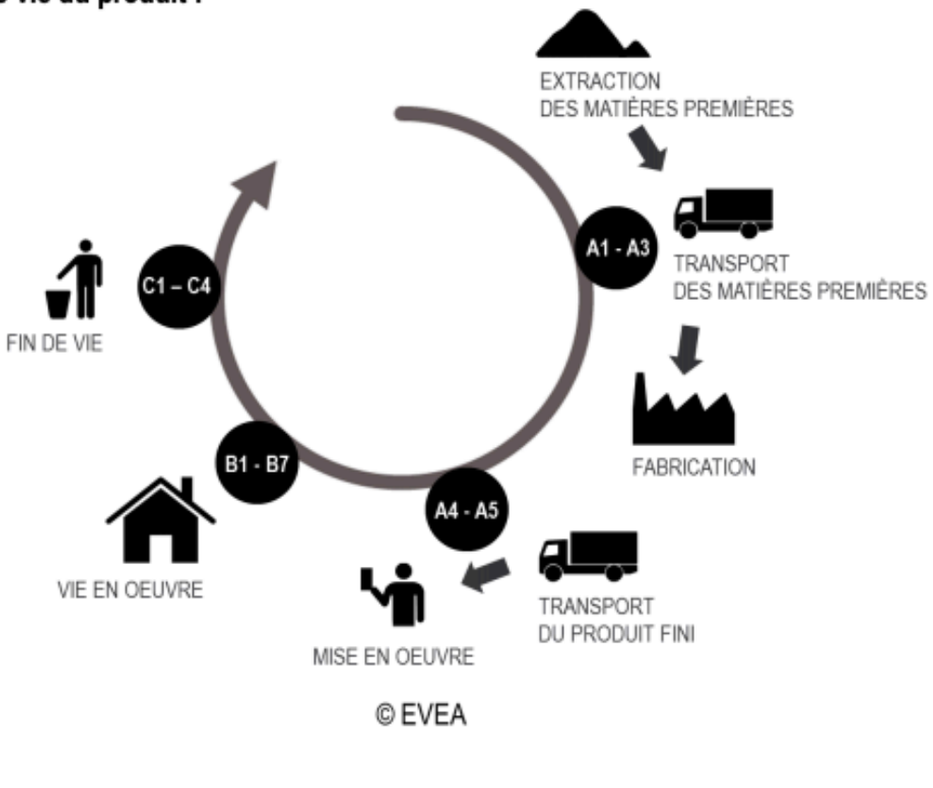
de vie du produit :



4.1 Production stage, A1-A3

Steps A1 to A3 include all processes from the cultivation and extraction of raw materials to their factory transformation.

4.2 Construction stage, A4-A5

Transport to the site:

PARAMETER	UNIT	VALUE/DESCRIPTIONS
Description du scénario		The main components of the product (shives and binder) are delivered by truck from their manufacturing plants to supplier or customer site. The transport distance is averaged and weighted according to the sales volume of each region. Geographical representativeness is the Metropolitan France.
Fuel type and vehicle consumption or type of vehicle	-	The vehicles considered are Euro 5 type trucks and payload of 16-32 tonnes for delivery to negotiate. For delivery between merchants and the site (30 km) Euro 5 trucks with payload of 7.5-16 tonnes are considered.
Distance to the site	km	Hemp : 380km Binder: 352km
Capacity to use	%	36% (generic ecoinvent module)
Density of the product transported	kg/m3	-
Coefficient of use of the volume capacity		-

Building of the installation:

PARAMETER	UNIT	VALUE/DESCRIPTION
Description du scénario	-	The product is implemented by hand using an OSB board which serves as reusable formwork throughout the site. Processing waste consists of the scraps of the mixed product (considered to be buried) and its packaging packaging as disposed of by burial and incineration (50/50). The assumption is made of a 30 km transport for all waste.
OSB framework	m3/m3	1,44E-03
Waste produced during implementation	-	-
Scrap waste (mixed components)	kg/m3	1,36E+01
OSB framework	kg/m3	9,79E-01
Wood pallet	kg/m3	9,27E+00
HDPE	kg/m3	7,88E-02
HDPE	kg/m3	8,63E-01
PP	kg/m3	5,63E-02
Papier	kg/m3	8,25E-01
Iron	kg/m3	2,43E-01
Direct emissions to ambient air: VOC	kg/m3	Aucune émission de COV n'est reportée.

4.3 Life stage implemented, B1-B7

B1 Use

PARAMETER	UNIT	VALUE/DESCRIPTION
Description du scénario	-	No VOC emissions are reported
VOC emissions	kg/m3	-
Carbonate rate	%	75% for lime-based binders

B2 Maintenance: No maintenance is deemed necessary over the chosen reference lifetime.

B3 Repair: No repair is deemed necessary over the chosen reference life.

B4 Replacement: No replacement is deemed necessary over the chosen reference lifetime.

B5 Rehabilitation: No rehabilitation is deemed necessary over the chosen reference life.

B6 - B7 Energy and water use: No consumption is deemed necessary over the chosen reference lifetime.

4.4 End-of-life stage C1-C4

PARAMETER	UNIT	VALUE/DESCRIPTION
Description du scénario	-	The product is removed using a thermal chipper, and then crushed before being sent to a disposal center. The products are considered to be 100% disposed of by landfill as non-hazardous waste. Transport of 30 km from the site to the treatment site is taken into account.
Quantity collected separately	kg/m3	6,82E+02
Quantity collected with mixed construction waste	kg/m3	-
Quantity intended for reused	kg/m3	-
Quantity intended for recycling	kg/m3	-
Quantity intended for energy recovery	kg/m3	-
Amount of product eliminated	kg/m3	6,82E+02
Carbonation rate	%	70.05% for cement-based binders Calculation of carbonation according to standard EN 16757: 2017

4.5 Recovery/reuse/recycle potentiel. D

The D module isn't taken in consideration in this study

5 INFORMATION FOR THE LIFE CYCLE ANALYSIS CALUCLATION

	NF EN 15804+A1:2014 et NF EN 15804/CN:2016
The system boundaries	The system boundaries respect the limits imposed by standard NF EN 15804 + A1 and its national supplement NF EN 15804 / CN.
Allocations	The collection of data from production sites is based on mass allocation. Hemp cultivation is allocated economically, except for flows intrinsic to matter (carbon and matter energy) which are allocated by mass.
Geographical representativeness and temporal representativeness of primary data	Generic data from the ecoinvent 3.4 database (Allocation cut-off by classification, 2016) and scenarios from AFNOR FD P01-015. The data have been chosen to allow the best possible temporal and geographic representativeness. The most recent data available in the database has been used. Regarding geographic representativeness, data corresponding to the country considered were used when available. Failing this, European or Swiss perimeter data were preferably used. Specific industrial data was collected for the 2016 or 2017 reference years at the production sites. Software used: SimaPro is a life cycle analysis software (V8.4) Ev-DEC, (http://www.ev-dec.com/) developed by the consulting firm EVEA (www.evea-conseil.com), which helps in the realization of the FDES.
Variability of results	The results provided in this FDES are results of a fictitious product constituted during the establishment of the validity framework, due to a great variability of the results (from 25 to 100%) on the basis of a sample of 18 products (6 chènevottes, 12 binders). The maximum impacts of the sample are less than 1.4 times the reported results. For most of the indicators, the impacts of the sample are lower than the reported results.

6 RESULT OF THE LIFE CYCLE ANALYSIS

Use of ressources	Manufaturing steps			Implementation stage		Life stage implemented							End of life stage				D Benefits and expenses beyond the system's borders
	A1 Raw material supply	A2 Transportation	A3 Fabrication	A4 Transportation	A5 Installation	B1 Use	B2 Maintenance	B3 Reparation	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction / Demolition	C2 Transportation	C3 Waste treatment	Dump	
Use of renewable primary energy resources as raw materials MJ PCI / UF	5,95E+01	3,74E-01	2,99E+01	2,15E+01	1,38E+01	-7,33E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,75E+00	3,33E+00	1,91E+00	6,29E+01	N.C
Use of renewable primary energy resources as raw	8,81E-06	7,37E-08	5,54E-06	3,98E-06	2,19E-06	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,96E-07	6,18E-07	5,66E-07	1,30E-06	N.C
Total use of renewable primary energy resources (primary	4,31E-01	1,21E-03	1,00E-01	6,86E-02	6,50E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,08E-02	1,06E-02	1,30E-02	3,04E-02	N.C
primary energy resources used as raw materials MJ PCI	2,09E+00	2,03E-04	1,18E-01	1,14E-02	5,60E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,48E-03	1,76E-03	2,45E-03	6,77E-03	N.C
Use of non-renewable primary energy resources as raw	4,19E-02	2,34E-04	1,64E-02	1,11E-02	9,96E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,24E-03	1,73E-03	1,71E-03	1,34E-02	N.C
Total use of non-renewable primary energy	7,39E-04	7,55E-07	4,83E-05	6,91E-05	2,21E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,09E-06	1,04E-05	5,29E-05	5,46E-06	N.C
Use of secondary material kg / UF	1,08E+03	5,88E+00	3,59E+02	3,24E+02	1,38E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,97E+01	5,02E+01	2,26E+01	1,13E+02	N.C
Use of renewable secondary fuels MJ PCI / UF	1,03E+04	5,02E+01	3,42E+03	2,24E+03	1,21E+03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,12E+03	3,49E+02	3,19E+02	6,21E+02	N.C
Use of non-renewable secondary fuels MJ	3,26E+01	1,40E-01	7,23E+00	7,62E+00	3,49E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	9,00E-01	1,18E+00	5,73E-01	2,84E+00	N.C
Net freshwater use m3 / UF																	

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Use of ressources	Manufaturing steps			Implementation stage		Life stage implemented							End of life stage				D Benefits and expenses beyond the system's borders
	A1 Raw material supply	A2 Transportation	A3 Fabrication	A4 Transportation	A5 Installation	B1 Use	B2 Maintenance	B3 Reparation	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction / Demolition	C2 Transportation	C3 Waste treatment	Dump	
Use of renewable primary energy resources as raw materials MJ PCI / UF	1,02E+02	1,06E-01	1,52E+02	4,84E+00	1,18E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,31E-01	7,46E-01	5,39E+00	3,11E+00	N.C
Use of renewable primary energy resources as raw materials MJ PCI / UF	1,80E+03	0,00E+00	1,56E+02	0,00E+00	-1,72E+02	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	-1,79E+03	N.C
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ	1,90E+03	1,06E-01	3,08E+02	4,84E+00	-1,60E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,31E-01	7,46E-01	5,39E+00	-1,79E+03	N.C
primary energy resources used as raw materials MJ PCI / UF																	
Use of non-renewable primary energy resources as raw materials MJ PCI / UF	1,22E+03	6,06E+00	7,22E+02	3,31E+02	2,28E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,00E+01	5,13E+01	6,99E+01	1,15E+02	N.C
Total use of non-renewable primary energy resources (primary energy and primary energy	3,45E+00	0,00E+00	6,49E+01	0,00E+00	-6,48E+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	N.C
Use of secondary material kg / UF	1,22E+03	6,06E+00	7,87E+02	3,31E+02	1,63E+02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,00E+01	5,13E+01	6,99E+01	1,15E+02	N.C
Use of renewable secondary fuels MJ PCI / UF	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	N.C
Use of non-renewable secondary fuels MJ PCI / UF	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	N.C
Net freshwater use m3 / UF	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	N.C
	1,06E+00	1,28E-03	2,85E-01	6,23E-02	4,05E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,40E-03	9,64E-		E-01	N.C

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Waste category	Manufaturing steps			Implementation stage		Life stage implemented							End of life stage				D Benefits and expenses beyond the system's borders
	A1 Raw material supply	A2 Transportation	A3 Fabrication	A4 Transportation	A5 Installation	B1 Use	B2 Maintenance	B3 Reparation	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction / Demolition	C2 Transportation	C3 Waste treatment	Dump	
Hazardous waste eliminated	8,20E-01	3,20E-03	5,77E-01	1,99E-01	2,61E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,30E-02	3,03E-02	8,18E-02	7,36E-02	NC
Non-hazardous waste disposed	2,18E+01	5,48E-01	1,14E+01	1,70E+01	2,25E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,69E-01	2,67E+00	9,66E-01	6,83E+02	NC
Déchets radioactifs éliminés kg/UF	6,05E-03	4,26E-05	6,97E-03	2,27E-03	2,11E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	2,77E-04	3,53E-04	7,77E-04	7,37E-04	NC

Outgoing flow		Manufaturing steps			Implementation stage		Life stage implemented							End of life stage				D Benefits and expenses beyond the system's borders
		A1 Raw material supply	A2 Transportation	A3 Fabrication	A4 Transportation	A5 Installation	B1 Use	B2 Maintenance	B3 Reparation	B4 Replacement	B5 Rehabilitation	B6 Energy use	B7 Water use	C1 Deconstruction / Demolition	C2 Transportation	C3 Waste treatment	Dump	
Components intended for reuse kg / UF		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	NC
Materials intended for recycling kg / UF		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	NC
Materials for energy recovery kg / UF		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	NC
Energy supplied to the outside (by energy carrier (MJ / UF)	Electricity	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	NC
	Steam	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	NC
	Process gas	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	NC

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Impact / flow category	UNIT	TOTAL FABRICATION	TOTAL IMPLEMENTATION	LIFE CYCLE IMPLEMENTATION	TOTAL END OF LIFE	TOTAL LIFECYCLE
Climate warming	kg CO_2 eq/UF	8,98E+01	3,53E+01	-7,33E+01	7,08E+01	1,23E+02
Depletion of the ozone layer	kg CFC 11 eq/UF	1,44E-05	6,18E-06	0,00E+00	2,98E-06	2,36E-05
Acidification of soil and water	kg SO_2 eq/UF	5,32E-01	1,34E-01	0,00E+00	7,48E-02	7,41E-01
Eutrophication	kg $(PO_4)^{3-}$ eq/UF	2,21E+00	6,74E-02	0,00E+00	1,55E-02	2,29E+00
Photochemical ozone formation	Ethene eq/UF	5,86E-02	2,11E-02	0,00E+00	2,00E-02	9,97E-02
Depletion of abiotic resources (elements)	kg Sb eq/UF	7,88E-04	9,12E-05	0,00E+00	6,98E-05	9,49E-04
Depletion of abiotic resources (fossils)	MJ PCI/UF	1,45E+03	4,62E+02	0,00E+00	2,25E+02	2,13E+03
Water pollution	m^3/UF	3,99E+01	1,11E+01	0,00E+00	5,49E+00	5,65E+01
Air pollution	m^3/UF	1,38E+04	3,45E+03	0,00E+00	4,41E+03	2,16E+04
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials	MJ PCI/UF	2,54E+02	1,67E+01	0,00E+00	9,47E+00	2,80E+02
Use of renewable primary energy resources as raw materials	MJ PCI/UF	1,95E+03	-1,72E+02	0,00E+00	-1,79E+03	-1,18E+01
Total use of primary energy resources renewable (primary energy and energy resources as raw materials	MJ PCI/UF	2,21E+03	-1,56E+02	0,00E+00	-1,78E+03	2,68E+02
Use of non-renewable primary energy, exclusion of non-renewable primary energy resources used as raw materials	MJ PCI/UF	1,95E+03	5,59E+02	0,00E+00	2,76E+02	2,78E+03
Use of non-renewable primary energy resources as raw materials	MJ PCI/UF	6,84E+01	-6,48E+01	0,00E+00	0,00E+00	3,59E+00
Total use of primary energy resources no renewable (primary energy and primary energy resources used as raw materials	MJ PCI/UF	2,01E+03	4,94E+02	0,00E+00	2,76E+02	2,79E+03
Use of secondary material	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ PCI/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ PCI/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net freshwater use	m^3/UF	1,34E+00	4,68E-01	0,00E+00	1,64E-01	1,97E+00
Hazardous waste eliminated	kg/UF	1,40E+00	4,60E-01	0,00E+00	2,09E-01	2,07E+00
Non-hazardous waste eliminated	kg/UF	3,37E+01	3,95E+01	0,00E+00	6,87E+02	7,60E+02
Radioactive waste eliminated	kg/UF	1,31E-02	4,38E-03	0,00E+00	2,14E-03	1,96E-02
Components intended for reuse	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery	kg/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Energy supplied to the exterior (electricity)	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Energy supplied to the exterior (steam)	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Energie fournie à l'extérieure (gaz)	MJ/UF	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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		TEST RESULTS	JUSTIICATION AND/OR TEST REPPORT
Indoor air emission [1] [2]	VOC and formaldehyde emissions		Eurofins Certification n°G15614 (Tradical PF 70, 80M, Thermo, PF Batir) (Other certificats available to the concerned companies)
	Behavior in the face of fungal and bacterial growth	NO test available	-
	Natural radioactive emissions from construction products	NO test available	-
	Fiber and particle emissions	NO test available	-
Emissions to soil and water [1] [2]	Emission the water	Non concerned	-
	Emission in the soil	Non concerned	-

1) Emissions into indoor air, soil and water according to horizontal standards relating to the measurement of emissions of regulated dangerous substances, from construction products, by means of harmonized test methods in accordance with the provisions of the respective Technical Committees European Product Standards, when available.

For more information refer to the EeB Guide: http://www.eebguide.eu/?p=1991

2) In France, the INIES Base technical committee (CTIB) gives recommendations on the declaration of health and comfort characteristics - Guide for writing health and comfort summaries (CTIB N94, 2009)

8 CONTRIBUTION OF THE PRODUCT TO THE QUALITY OF LIFE INSIDE BUILDINGS

Characteristics of the product participating in the creation of hygrothermal comfort conditions in the building:
The thermal conductivities transmitted by the manufacturers of hydraulic binders are between 0.07 and 0.12 W / m.K. This results in an average thermal conductivity of 0.09 W / m.K, or a resistance of 1.11 m2.K / W for a thickness of 10 centimeters.
Note: Each manufacturer has a thermal conductivity value for each of its products, based on specific test results.
Construction systems based on hemp concrete regulate significant variations in humidity and temperature and have a favorable impact on the quality of the air in the structures.
According to CEREMA Sud-Ouest: "[...] hemp concrete contributes to limiting the problems of condensation and mold on the walls, which are harmful to the sanitary comfort of the environments" (Samri - CEREMA; 2008).
According to the study by Driss Samri (2008), and Florence Collet at LGCGM in Rennes: Observations on 30 cm of hemp, terracotta and cellular concrete show that for the same stresses, when the outside temperature increases (or decreases) the temperature inside the hemp concrete has a plateau unlike other materials. Level at 27 ° C against a maximum peak of 30 for cellular concrete and 33 ° for terracotta.
With 400kg / m3 of average density, hemp concrete responds to the thermal and hygrometric demands received by a wall at the entrance as well as in winter and mid-season.
It thus acts favorably on the comfort of users by reducing heating and air conditioning needs, or even eliminating them in certain cases of buildings of passive design.

Hemp concrete has indeed the highest MBV (moisture buffing value) among the products of the construction sector studied in the publication “MBV of various construction materials” (Collet et al. 2013), namely 2g / (m2.RH) The water vapor thus adsorbed and stored in the walls during humidity regulation is directly responsible for the phenomena of temperature and relative humidity clipping that are found in summer as in winter in hemp concrete works.
Characteristics of the product participating in the creation of conditions of acoustic comfort in the building:
Tests to determine the acoustic coefficient were carried out by ARNAUD L. and CEREZO V. at different frequencies, for different formulations of concrete and thicknesses of 10, 20 and 30 cm. It appears that the measured coefficients show a very high absorption capacity for this material. For a thickness of 10 cm, the absorption peak is around 400 to 500 Hz with [?]> 0.9, but the whole spectrum shows a coefficient [?]> 0.5.
However, the products covered by this FDES do not claim any acoustic performance.
Characteristics of the product participating in the creation of visual comfort conditions in the building:
The product does not claim any visual performance.
Characteristics of the product contributing to the creation of conditions of olfactory comfort in the building:
The product does not claim any olfactory performance.

9 POSITIVE ENVIRONMENTAL CONTRIBUTION

Channels for treating the product at the end of its life are currently in development, but not yet established, they are not included in this study:
BIODEGRADABILITY OF CONCRETE AND HEMP MORTARS
In the case of deconstruction, the hemp concrete can be dismantled and separated from the framework that supports it. The mixture thus recovered can be incorporated into an agricultural plant biomass. In agriculture, the mixture of lime (already used in agricultural lime) and hemp (plant biomass capable of biodegrading) can be used as an agricultural amendment.
CRUSHING OF CONCRETE AND HEMP MORTARS
The reuse of mineral binder / hemp mixture in roofing formulas and in floor filling complexes is possible. Following the research work of the Biosourced and natural materials for sustainable construction studies by Sandrine Marceau, Sabine Caré, Pilar Lesage for the 2016 Mabionat seminar: Sandrine Marceau, Sabine Caré, Pilar Lesage. Bio-based and natural materials for sustainable construction. MABIONAT seminar, May 2016, Champ-sur-Marne, France. 2016, (http://mabionat.ifsttar.fr/).
It has been shown that the recycling of hemp concrete was possible by incorporating crushed hemp concrete in a new mixture for roofing and / or intermediate floor complex applications requiring lower mechanical performance than in wall or floor dosages. . For wall or floor dosages, an additional binder will be necessary to reach the performance thresholds of professional rules.