LIFE CYCLE INVENTORY MODULE
(A1-A3 STEPS)

in compliance with NF EN 15804+A2
and its national French complement NF EN 15804+A2/CN

Technical lime binder for hemp concrete
BATICHANVRE plus®

Chaux de Saint Astier CSA

SAINT-ASTIER
LA CHAUX, L'EXCELLENCE POUR LA VIE

7-03-2025
N° 20250242910

This document was translated from its French version.

ICV VÉRIFIÉ inies

Warning

The data included in this declaration were provided under the responsibility of Chaux Saint Astier CESA as per NF EN 15804+A2 and its national French complement NF EN 15804+A2/CN

Any exploitation, be it total or partial, of the data provided in this material must be at least accompanied by the complete reference to the original FDES as well as by the mention of its provider, who will give an integral copy.

Note that the results of this assessment are based solely on facts, circumstances and hypotheses that have been provided during the assessment. Should these facts, circumstances and hypotheses ever change, the results might be altered.

Moreover, the results of this assessment need to be considered as a whole, in relation to the hypotheses, and not taken separately.

Reading help

The inventory data are displayed according to the requirements of the NF EN 15804+A2 standard.
In the following tables, 2,53E-06 is to be read : 2,53x10 -6 (scientific writing).

The units in use are specified before each flow.
The main ones are :
- the kilogram « kg »,
- the gram « g »,
- the litre « l »,
- the kilowatt hours « kWh »,
- the megajoule « MJ ».

Abbreviations :
- LCA : Life Cycle Assessment,
- LCI : Life Cycle Inventory,
- RSL : Reference Service Life,
- FU : Functional Unit,
- LCV : Lower Calorific Values.

Precautionary principle in the use of the LCI as a means of product comparison

Making LCI available on the « base INIES » website benefits manufacturers by providing them with LCI-assessed products for the manufacturing of other construction products in order to create EPD integrating these LCI. The data provided by LCI are as reliable as data from the databases (Ecoinvent, GABI, etc.) usually included in LCA softwares such as GABI, Simapro, etc.

SOMMAIRE

INTRODUCTION

The presentation of this environmental product declaration is based on the national French complement NF EN 15804+A2/CN.
This document represents a suitable framework to the presentation of the environmental characteristics of construction products as per as per NF EN ISO 14025, NF EN 15804+A2 and its national French complement NF EN 15804+A2/CN, as well as to providing commentaries for useful additional information, in line with the standard in terms of sincerity and full disclosure.

The following document was made by : Karibati l'expertise du bâtiment biosourcé contact : Marion Chirat : m.chirat@karibati.com .

The data included in this declaration were provided under the responsibility of Chaux de Saint Astier CESA.

Contact :
Laurent TEDESCHI
Technical director

Contact information :
05 53 54 11 25
l.tedeschi@saint-astier.com

Company information :
Chaux de Saint Astier CSA
28 Bis Route de Montanceix - La Jarthe - 24 110 SAINT-ASTIER
https://www.saint-astier.com/

1 GENERAL INFORMATION

1. **LCI scope**
   This LCI is valid for the Bâtichanvre Plus® binder manufactured by the company Chaux de Saint Astier CESA located in Saint-Astier (24).

2. **Included commercial references**
   The following commercial reference(s) are included in the LCI assessment : BATICHANVRE PLUS®.

3. **LCI type**
   This individual LCI includes a « cradle-to-gate » LCI assessment (A1-A3 steps).

4. **Distribution network**
   This LCI is intended for a BtoB communication.

5. **Issue date & validity**
   This LCI is valid until the 31-12-2030.

6. **Verification :**
   Program operator : FDES INIES

The standard EN 15804+A2 (oct 2019) national French complement (oct 2022) serves as the core PCR [a].
Independent and external verification of the data declaration, as per EN ISO 14025:2010.
Verification by a third party [b]: **Clément Bolle** Tel : +33 781406226 WeLOOP Email: c.bolle@weloop.org Rue du Bourg 254, 59130 Lambersart, FRANCE
[a] Product Category Rules. [b] Optional for BtoB communication, compulsory for BtoC communication (see l'EN ISO 14025 :2010, 9.4).
Registration number to the INIES program (conform to ISO): 20250242910
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Name and address of the program operator: **Association HQE** 4 avenue du recteur Poincaré 75016 Paris https://www.inies.fr/

2 PRODUCT AND FUNCTIONAL UNIT DESCRIPTION

1. Declared functional unit

The following functional unit (FU) was chosen: « 1t of binder Bâtichanvre®PLUS».

2. Product description

The product studied is a technical lime binder developed by Saint-Astier®, specially formulated for concrete solutions.

BATICHANVRE PLUS® is a binder with a patented formulation. It is composed of NHL5 lime (approximately 80%), hydraulic binders, and specific additives.

It comes in 25 kg bags.

3. Product usage description

This product is mainly manufactured for the making of hemp concrete.

4. Main performance of the functional unit

Bâtichanvre plus® is used as a binder for many works.

Declared properties and finishes : Possible uses :
1/ Non-structural wall, reinforcement wall, timbered and half-timbered wall
2/ Screed and pavement
3/ Insulation under the roof
4/ To be used with ISOCANNA® hemp or hemp conforming to the requirements of 'Bâtir en chanvre' (only applicable to the French market).

Evidence of suitability : The couple BATICHANVRE PLUS® / ISOCANNA® complies with the performances required by the French professional standards for hemp building.

Guide to implement the BATICHANVRE PLUS® / ISOCANNA® couple depending on usages :
Hempcrete is non-load-bearing and provides distributed insulation. Its thermal conductivity is 0.069 W/m.K (measured by a COFRAC-accredited laboratory), with a density of approximately 400 kg/m^3.

This product has been awarded the Excell+ label (certificate available upon request).

5. Main components description

Parameter	Units	Value
Quantity of lime binder in FU	kg	1000
Distribution packaging	kg/t	55 bags (25 kg) per pallet, i.e.: Kraft paper: 3.38 PE paper: 0.18 Pallet: 15.267 PE cover: 0.873

Justification of provided data		The data are provided by Chaux de Saint Astier CESA.

6. Substances from the « REACH candidate list » (if concentration exceeding 0.1 % by weight)

The product contains no substance included in the candidate REACH list according to the REACH regulation.

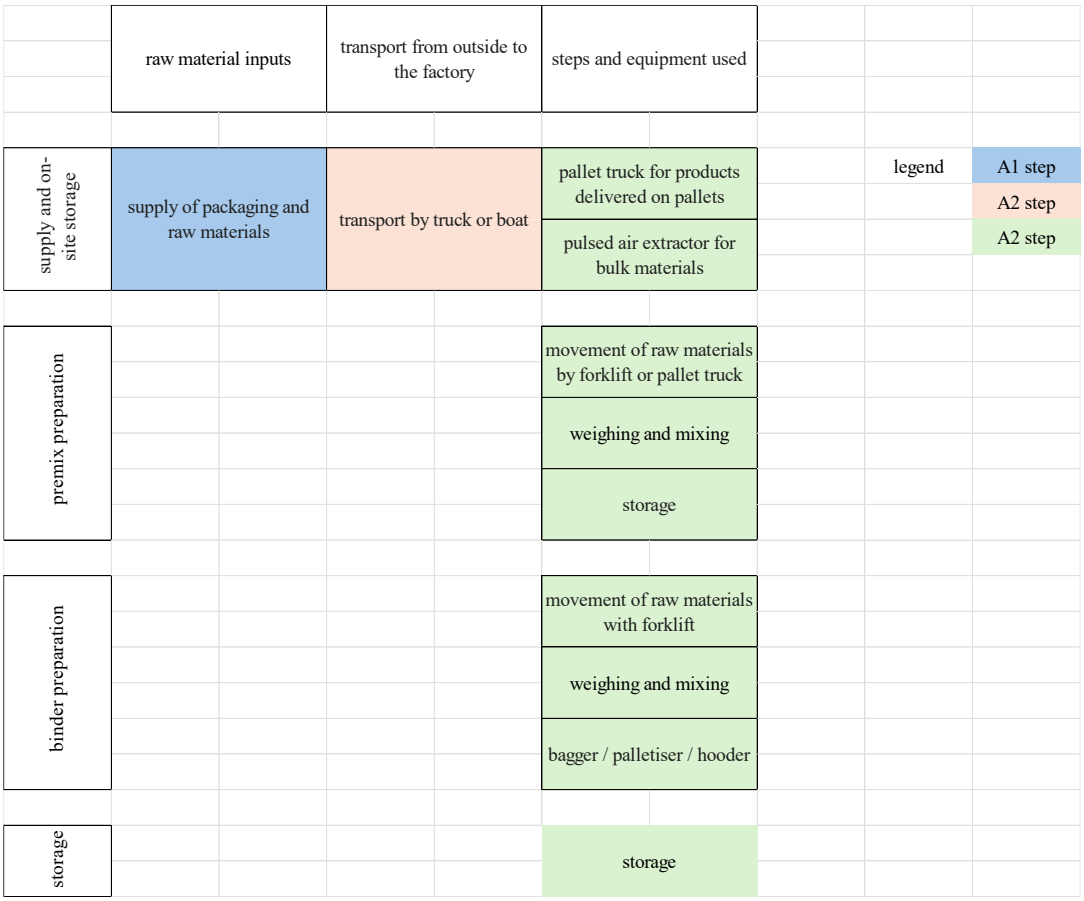
7. Information on biogenic carbon content

The binder does not contain bio-sourced raw materials.

Biogenic carbon content	Per F.U.
Biogenic carbon content [kg C] of the product (at the factory outlet)	0
Biogenic carbon content of associated packaging (at factory outlet) [kg C]	9,13

3. LIFE CYCLE (A1-A3)

The product's A1-A3 steps within its life cycle are displayed right below :



MODULE A1 : Raw material extraction

All the raw materials constituting the Bâtichanvre Plus® lime binder are taken into account here :

- Lime NHL 5 ;
- Others mineral binders ;
- Additives.

MODULE A2 : Transport

The following transports of raw materials are modelised during step A2 :

- Transport of lime NHL 5 ;
- Transport of other binder ;
- Transport of each additive.

MODULE A3 : Manufacturing

The manufacturing of the Bâtichanvre Plus® lime binder takes five steps

- Reception of raw materials
- premix
- blending of raw material and premix
- bagging, palletising, hooding
- storage.

These steps consider all the sourced data, such as energy consumption, consumable, packaging products and transports, maintenance products, as well as all the waste intended for treatment or recovery. All the transports that ensue are also considered.

4. DATA FOR THE LIFE CYCLE ASSESSMENT CALCULATION

Used PCR	NF EN 15804+A2 and NF EN 15804+A2/CN.
System boundary	The system boundaries correspond with the limits of the standard NF EN 15804+A2 and its French complement NF EN 15804+A2/CN. The assessed modules in this LCI are A1-A3. Long-term emissions (over 100 years) are not taken in account
Cut-off rule	Excluded processes: - Construction of processing plants, including manufacturing machinery; - Cleaning of workshops; - Electricity consumption of administrative departments; - Transportation of employees to the production site - Production consumables
Allocation	For energy consumption related to mixing, allocation is based on the sales volumes of the various mortars/binders produced by the plant over the year. The scenario for pallets follows the scenario defined by CODIFAB in 2022 for wood. The other allocations from the database remain unchanged. The general allocation principles (avoidance of allocations, no double counting/omissions, uniform application of application rules, etc.) were implemented in this model
Geographic scope and period under review	Used software : SimaPro LCA software (V9.6). The product is made in France. The primary data were collected from Chaux de Saint Astier CESA and are representative of the 2023 -2024 company data. 2023 for production line consumption data 2024 for raw material supply. The secondary data are from Ecoinvent v3.10 (2024). Two verified LCI were used to modelled two of the components for this lime binder : - For one of the limes, the « Chaux hydraulique naturelle NHL5 de Saint-Astier – CHAUX PURE TRADI 100® » (« Saint Astier NHL5 natural hydraulic lime – TRADI 100® LCI), which was verified in September 2022, was used ; No missing data was found.
Data variability	Non applicable.

5. LIFE CYCLE INVENTORY RESULTS

Environmental impacts / Flux	Total A1-A3 Production
Global warming - total kg CO_2 eq/FU	4,705E+02
Global warning – fossil fuels kg CO_2 eq/FU	5,016E+02
Global warning – biogénic kg CO_2 eq/FU	-3,137E+01
Global warning – land use and land use transformation kg CO_2 eq/FU	2,302E-01
Ozone depletion kg CFC 11 eq/FU	6,241E-06
Acidification H^+ mole per eq/FU	8,404E-01
Aquatic eutrophication of freshwater P mole per eq/FU	1,119E-02
Aquatic eutrophication N mole per eq/FU	2,881E-01
Terrestrial eutrophication N mole per eq/FU	2,591E+00
Photochemical ozone creation NMVOC kg per eq/FU	7,343E-01
Depletion of abiotic resources- fossil MJ PCI/FU	2,687E+03
Depletion of abiotic resources - elements Kg of Sb per eq/FU	4,580E-04
Water demand m^3 of deprivation eq in the world/FU	1,827E+01

environmental Impacts / Flux	Total A1-A3 Production
Fine particle emissions Disease indices /FU	8,391E-06
Ionizing radiation (human health) kBq of U_{235} eq /FU	1,069E+01
Ecotoxicity (fresh water) CTUe /FU	5,304E+03
Human toxicity, carcinogenic effects CTUh /FU	5,266E-07
Human toxicity, non-carcinogenic effects CTUh /FU	6,482E-06
Impacts related to soil quality / Soil qualities dimensionless /FU	3,631E+03

Environmental Impacts / Flux	Total A1-A3 Production
Use of renewable primary energy, excluding renewable primary energy resources used as raw materials MJ PCI/FU	1,357E+02
Use of renewable primary energy resources as raw materials MJ PCI/FU	4,045E+02
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ PCI/FU	5,402E+02
Use of non-renewable primary energy, excluding non-renewable primary energy resources used as raw materials MJ PCI/FU	3,494E+03
Use of non-renewable primary energy resources as raw materials MJ PCI/FU	4,504E+01
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) MJ PCI/FU	3,539E+03
Use of secondary material kg/FU	3,278E+00
Use of renewable secondary fuels MJ PCI/FU	0,000E+00
Use of non-renewable secondary fuels MJ PCI/FU	4,779E+02
Net freshwater use m^3/FU	9,409E-01

Waste categories	Total A1-A3 Production
Hazardous waste disposed kg/FU	1,047E+00
Non--hazardous waste disposed kg/FU	1,508E+02
Radioctive waste disposed kg/FU	1,206E-02

Outgoing flows		Total A1-A3 Production
Components intended for reuse kg/FU		4,719E-02
Materials intended for recycling kg/FU		5,701E-02
Materials for energy recovery kg/FU		4,357E-02
Energy supplied externally (by energy vector) MJ/FU	Electricity	3,521E-02
	steam	6,925E-02
	Gaz from process	0,000E+00

6. BIBLIOGRAPHIY

This LCI refers to the following documents :

- *AFNOR, Norme NF EN ISO 14040, Analyse du cycle de vie / Principes et cadre, Octobre 2006 ;*
- *AFNOR, Norme NF EN ISO 14044, Analyse du cycle de vie / Exigences et lignes directrices, Octobre 2006 ;*
- *AFNOR, Norme NF EN 15804 +A2, Contribution des ouvrages de construction au développement durable - Déclarations environnementales sur les produits - Règles régissant les catégories de produits de construction, oct 2019 ;*
- *AFNOR, Norme NF EN 15804+A2/CN, Contribution des ouvrages de construction au développement durable - Déclarations environnementales sur les produits - Règles régissant les catégories de produits de construction - Complément national à la NF EN 15804+A2,Oct 2022 ;*

If the LCI (« ICV » in French) is verified, an accompanying report written to describe more precisely the modelisation and its key hypotheses was subjected to verification alongside this document.