LIFE CYCLE INVENTORY MODULE

(A1-A3 STEPS)

as per NF EN ISO 14025, NF EN 15804+A1 and its national French complement NF EN 15804/CN ; in compliance with ISO 14025

Saint Astier natural hydraulic NHL3.5 lime – The Versatile Lime

Chaux & Enduits de Saint Astier CESA

2022-07-18

LCI version : 1.01E+0

This document was translated from its French version.

Warning

The data included in this declaration were provided under the responsibility of Chaux & Enduits de Saint Astier CESA as per NF EN ISO 14025, NF EN 15804+A1 and its national French complement NF EN 15804/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.

Reading help

The inventory data are displayed according to the requirements of the NF EN 15804+A1 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.

TABLE OF CONTENTS

INTRODUCTION

The presentation of this environmental product declaration is based on the national French complement NF EN 15804/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+A1 and its national French complement NF EN 15804/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 & Enduits de Saint Astier CESA.

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1 GENERAL INFORMATION

1. **LCI scope**
   This LCI is valid for the Saint Astier NHL3.5 natural hydraulic lime produced by Chaux & Enduits de Saint Astier CESA located in Saint-Astier (24).

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

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

4. **Issue date & validity**
   This LCI was issued in 2022-07-18 and stays valid for 5 years.

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

The standard EN 15804+A1 of the ECS 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]: **Dr. Naeem ADIBI** — Tel : +33 6 45403877 WeLOOP — Email: n.adibi@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 : 20220930829

2 PRODUCT AND FUNCTIONAL UNIT DESCRIPTION

1. Declared functional unit

The following functional unit (FU) was chosen : « 1 ton of natural hydraulic lime ».

2. Product description

The product in question in this LCI is a NHL3.5 natural hydraulic lime produced from quarry stone, coal and water.

3. Product usage description

This product is intended for masonry, both traditional and biobased concrete works, as well as different types of coatings, etc.

4. Main performance of the functional unit

The hydraulic lime is used as a binder in the construction of a wide range of masonry éléments and finishes.

Link to the technical data sheet : https://www.stastier.co.uk/lime/lc-pure-nhl-3-5/

Declared properties and finishes : Lathwork, lime concrete, injection, gruting, rendering, pointing, capping, masonry, ashlar.

Evidence of suitability : NF EN 459-1, NF DTU 20.1, NF DTU 26.1, NF DTU 40.2, NF DTU 52.1, NF DTU 24.1

5. Additional useful technical characteristics

Not concerned.

6. Main components description

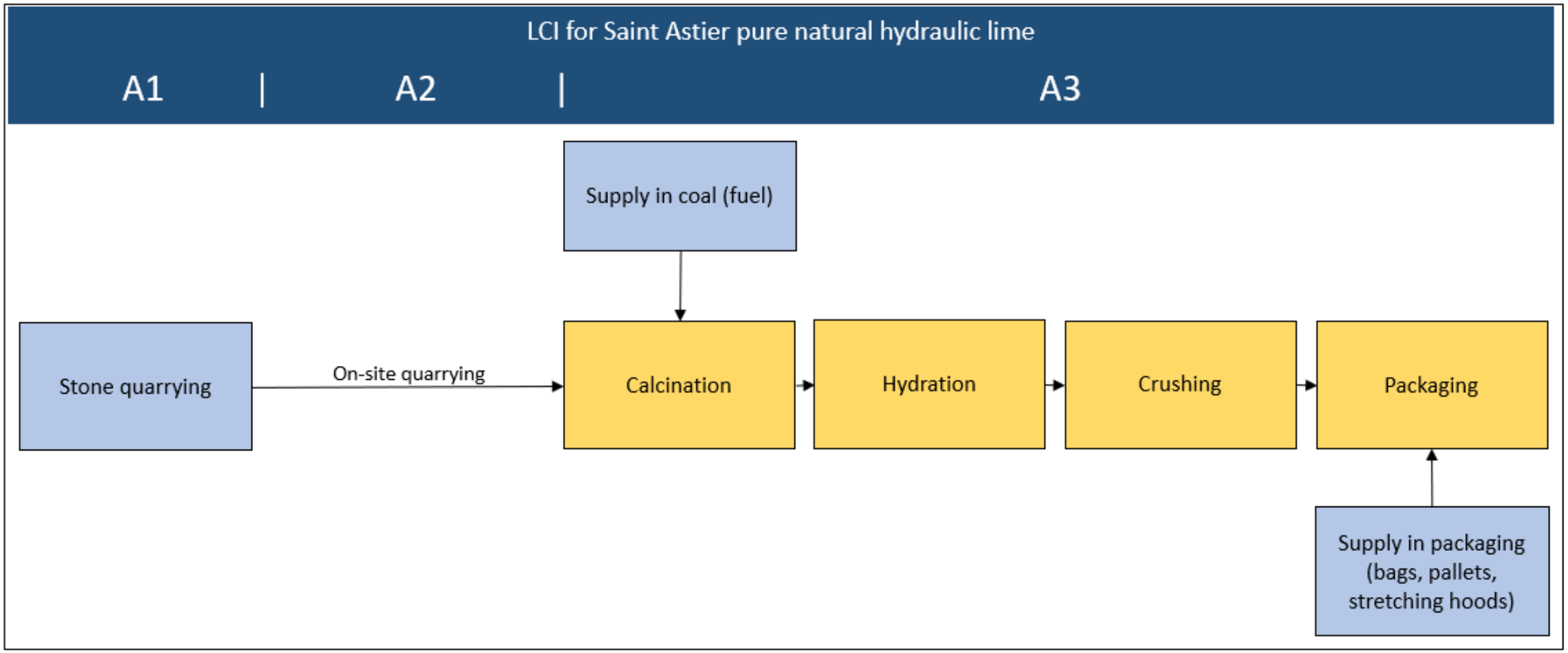
Parameter	Units	Value
Hydraulic lime quantity in FU	t	1 ton
Product composition	%	100% of quarry stone mined in St Astier quarries
Distribution packaging	kg/m3	Stretch hood : 0,8 kg/ton of lime Paper/PE bag : 36 units/ton of lime Pallet : 0,9 units/ton of lime Big bag : 1 units/ton of lime
Justification of provided data		The data are provided by Chaux & Enduits de Saint Astier CESA.

7. 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.

3 LIFE CYCLE (A1-A3)

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



In both scenarios, the stone is extracted on-site : no transport for A2 is therefore taken into account.
The supply in coal (used as fuel) happens on step A3.

MODULE A1 : Raw material extraction

All the raw materials constituting the St Astier pure natural hydraulic lime, as well as all the energy consumptions for stone extraction, were taken into account here :

- Equipment consumption ;
- Explosives ;
- Other raw materials.

MODULE A2 : Transport

The St Astier stone is quarried on-site, so no transport was taken into account at that stage.

MODULE A3 : Manufacturing

The transport for the final product packaging as well as the supply in coal are taken into account during the manufacturing stage.

The manufacturing of the St Astier hydraulic lime takes several steps once the raw materials has arrived at plant :

- Calcination (result : quicklime) ;
- Hydration ;
- Crushing ;
- Packaging.

The final product is slaked hydraulic lime.

These steps take into account 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.

Non evaluated modules of the entire life cycle : A4 to C4.

4 DATA FOR THE LIFE CYCLE ASSESSMENT CALCULATION

Used PCR	NF EN 15804+A1 and NF EN 15804/CN.
System boundary	The system boundaries correspond with the limits of the standard NF EN 15804+A1 and its French complement NF EN 15804/CN. The assessed modules in this LCI are A1-A3.
Cut-off rule	The cut-off rule as defined in the NF EN 15804+A1 standard was used in this LCI.
Allocation	The allocations taken from data bases remain intact and no other allocation was added.
Geographic scope and period under review	Used software : SimaPro LCA software (V9.1). The product is made in France. The primary data were collected from Chaux & Enduits de Saint Astier CESA and are representative of the 2021 company data.

	The secondary data are from Ecoinvent v3.6 (2019).
Data variability	Non applicable.

5 LIFE CYCLE INVENTORY RESULTS

Environmental impacts	Product stage			
	A1 Raw materials extraction	A2 Transport	A3 Manufacturing	Total A1-A3 production stage
Global warming kg CO_2 eq/FU	4,96E+00	0,00E+00	4,53E+02	4,58E+02
Biogenic carbon storage kg CO_2 eq/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total Global warming (incl. Biogenic carbon storage) kg CO_2 eq/FU	4,96E+00	0,00E+00	4,53E+02	4,58E+02
Ozone depletion kg CFC 11 eq/FU	9,63E-07	0,00E+00	4,35E-06	5,31E-06
Acidification of soil and water kg SO_2 eq/FU	3,17E-02	0,00E+00	2,21E-01	2,52E-01
Eutrophication kg $(PO_4)^{3-}$ eq/FU	6,81E-03	0,00E+00	6,43E-02	7,11E-02
Photochemical ozone creation Ethene eq/FU	3,29E-03	0,00E+00	2,07E-02	2,40E-02
Depletion of abiotic resources - elements kg Sb eq/FU	6,60E-05	0,00E+00	1,86E-04	2,52E-04
Depletion of abiotic resource s- fossil fuels MJ PCI/FU	5,97E+01	0,00E+00	2,85E+03	2,91E+03
Water pollution m^3/UF	1,67E+00	0,00E+00	2,33E+01	2,49E+01
Air pollution m^3/UF	6,06E+02	0,00E+00	1,27E+04	1,33E+04

Resource use	Product stage			
	A1 Raw materials extraction	A2 Transport	A3 Manufacturing	Total A1-A3 Production stage
Renewable primary energy excl. RM MJ PCI/FU	4,71E+00	0,00E+00	1,25E+02	1,30E+02
Renewable primary energy used as RM MJ PCI/FU	0,00E+00	0,00E+00	7,79E+01	7,79E+01
Total renewble primary energy MJ PCI/FU	4,71E+00	0,00E+00	2,03E+02	2,08E+02
Non renewable primary energy excl. RM MJ PCI/UF	1,03E+02	0,00E+00	3,09E+03	3,20E+03
Non renewable primary energy used as RM MJ PCI/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total non renewable primary energy MJ PCI/FU	1,03E+02	0,00E+00	3,09E+03	3,20E+03
Use of secondary material kg/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Used of renewable secondary fuels MJ PCI/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non renewable secondary fuels MJ PCI/FU	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water m^3/FU	2,82E-02	0,00E+00	5,75E-01	6,03E-01

Waste categories	Product stage			
	A1 Raw materials extraction	A2 Transport	A3 Manufacturing	Total A1-A3 Production stage
Hazardous waste disposed kg/FU	1,15E-01	0,00E+00	6,51E-01	7,65E-01
Non hazardous waste disposed kg/FU	7,78E-01	0,00E+00	8,98E+01	9,06E+01
Radioactive waste disposed kg/FU	9,42E-04	0,00E+00	4,60E-03	5,54E-03

Outputs (flows)		Production stage			
		A1 Raw material extraction	A2 Transport	A3 Manufacturing	Total A1-A3 Production stage
Components for re-use kg/FU		0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for recycling kg/FU		0.00E+0	0.00E+0	0.00E+0	0.00E+0
Materials for energy recovery kg/FU		0.00E+0	0.00E+0	0.00E+0	0.00E+0
Exported energy MJ/FU	Electricity	0.00E+0	0.00E+0	0.00E+0	0.00E+0
	Thermal	0.00E+0	0.00E+0	0.00E+0	0.00E+0
	Gas	0.00E+0	0.00E+0	0.00E+0	0.00E+0

6 ADDITIONAL INFORMATION ON THE EMISSIONS OF DANGEROUS SUBSTANCES IN THE INTERIOR AIR, GROUND AND WATER DURING THE USE STAGE

Interior air :
Not applicable.

Ground and water :
Not applicable.

7 BIBLIOGRAPHY

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 +A1, Contribution des ouvrages de construction au développement durable - Déclarations environnementales sur les produits - Règles régissant les catégories de produits de construction, Avril 2014 ;*
- *AFNOR, Norme NF EN 15804/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+A1, Juin 2016 ;*

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.