

Environmental Product Declaration

In accordance with ISO14025:2006 and EN15804:2012+A2:2019

NovaClay, Calcined Clay



The Norwegian
EPD Foundation

Owner of the declaration:
NovaClay A/S

Product name:
NovaClay, Calcined Clay

Declared unit:
1 tonne

Product category /PCR:
EN 15804:2012+A2:2019 as core PCR
NPCR PART A: Construction products and
services, Version: 2.0

Program holder and publisher:
The Norwegian EPD foundation

Declaration number:
NEPD-6959-6348-EN

Registration number:
NEPD-6959-6348-EN

Issue date: 30.08.2024

Valid to: 30.08.2029

General information

Product:

Calcined Clay

Program operator:

The Norwegian EPD Foundation
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Declaration number:

NEPD-6959-6348-EN

This declaration is based on Product Category

Rules:

EN 15804:2012+A2:2019 as core PCR
NPCR PART A: Construction products and services,
Version: 2.0

Statement of liability:

The owner of the declaration shall be liable for the underlying information and evidence. EPD Norway shall not be liable with respect to manufacturer, life cycle assessment data and evidences.

Declared unit:

1 tonne Calcined Clay

Declared unit with option:

A1, A2, A3, A4

Functional unit:

-

Verification:

Independent verification of the declaration and data, according to ISO14025:2010

internal

external



David Althoff Palm, Dalemarken AB
Independent verifier approved by EPD Norway

Owner of the declaration:

NovaClay A/S
Contact person: Gunnar Hansen
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Manufacturer:

NovaClay A/S
Viborg Landevej 1, 9500 Hobro, Denmark
Phone: +45 7637 7943
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Place of production:

Viborg Landevej 1, 9500 Hobro, Denmark

Management system:

Quality and environmental management system according to corporate guidelines.

Organisation no:

43355872

Issue date:

30.08.2024

Valid to:

30.08.2029

Year of study:

2020-2023

Comparability:

EPD of construction products may not be able to compare if they do not comply with EN 15804 and are seen in a building context.

The EPD has been worked out by:

Nana Lin Rasmussen, Sweco Denmark A/S

Approved



Manager of EPD Norway

Product

Product description:

The EPD for NovaClay, Calcined Clay is a specific EPD. Calcined Clay can be used as a supplementary Cementitious material (SCM) or inert material.

Product specification:

The main application area is in concrete manufacturing. Calcined Clay consists of 100% clay.

Materials	kg/ton	%
Clay	1000	100
Total	1000	100

Technical data:

Standard DS 206:2024
Standard DS/EN 12620

Market:

Denmark

Reference service life, product/building:

No reference service life (RSL) is declared, not applicable.

Additional technical information

For further technical information contact NovaClay A/S, info@novaclay.dk.

LCA: Calculation rules

Declared unit:

1 tonne of Calcined Clay

Cut-off criteria:

All important raw materials and all significant energy consumption are included. Production processes for raw materials and energy flows that are involved in very small amounts (less than 1%) may be omitted according to EN 15804. These cutoff criteria do not apply to hazardous materials and substances. No known cut-offs have been made in this EPD.

Allocation:

Allocation must be done in accordance with EN15804:2012+A2:2019.

Calcined clay is the only product produced at the one factory. Thus, no allocation principles and procedures have been applied in this LCA study.

Data quality:

Specific data for the EPD is collected by the manufacturer and based on measurements from a factory in the period of 2020-2023. The EPD is based on production from a pilot plant and conservative assumptions, thus the study does not have a complete one-year average for data collection. Due to this, the EPD will be updated when 1 year of full data is available.

The LCA model of the declared product was built in the LCA software *LCA for Experts (LCA FE)* provided by Sphera (version 10.7). Generic data and background data is based on life cycle inventory (LCI) data from the database Managed LCA Content (MLC or Professional Database) from Sphera (version 2023.1) and Ecoinvent database version 3.9.1. All data set applied are less than 10 years old. The LCIA results are calculated using the Environmental Footprint (EF 3.1) and impact methodology for classification and characterization of input and output flows. This is in accordance with EN15804+A2:2019.

System boundaries (X=included, MND=module not declared, MNR=module not relevant)

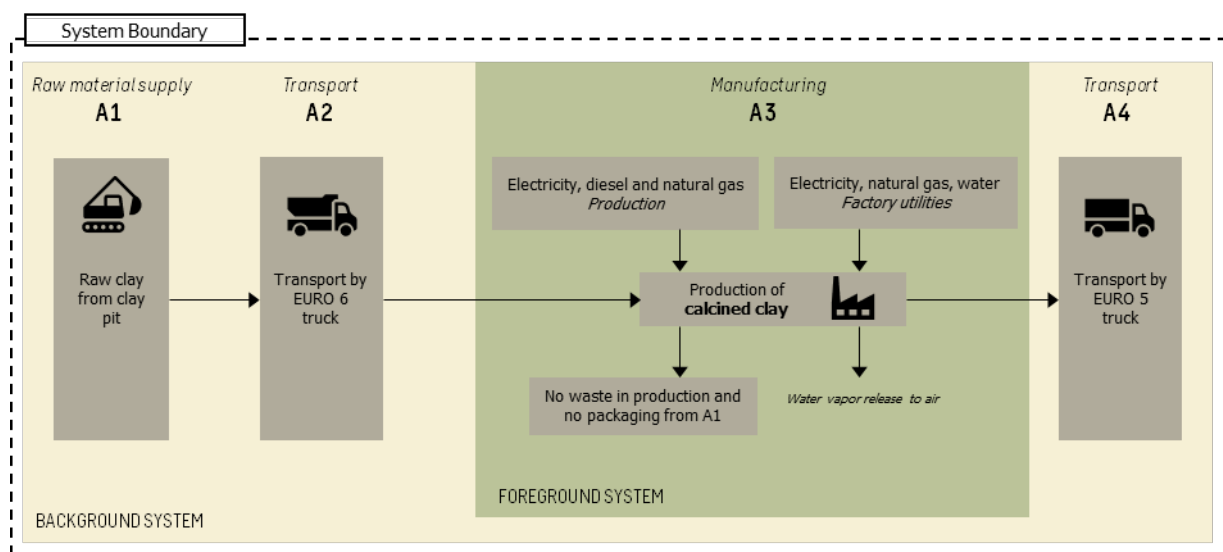
Product stage			Assembly stage		Use stage								End of life stage				Benefits & loads beyond system boundary
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	

System boundary:

According to NPCR Part A this is a choice 4 EPD, which is a cradle to gate (A1-A3) with A4. A5 is optional and not included in this EPD. This scope is possible due to the following conditions being valid according to the NPCR Part A and EN15804+A2:2019 §5.2:

- The product or material is physically integrated with other products during installation so they cannot be physically separated from them at end of life,
- The product or material is no longer identifiable at end of life as a result of a physical or chemical transformation process, and
- The product or material does not contain biogenic carbon.

Below is a system boundary figure of the declared product, including life cycle modules A1, A2, A3 and A4.



The raw clay is transported from clay pits to the factory directly on the truck, thus no packaging material is included. Furthermore, there is no packaging of the declared product in A3 either, as it is transported directly on trucks.

The production of the Calcined Clay is ensured against burnt lime, thus there is no release of CO₂ into the atmosphere from a chemical reaction.

Water, which is bound in the raw clay in A1, is released into the atmosphere during the calcination process in A3.

LCA: Scenarios and additional technical information

The following information describe the scenarios in the different modules of the EPD.

Transport from production place to assembly/user (A4)

The transport in A4 from manufacturing to next product system is declared as an average distance to concrete factories.

Transport from production place to assembly/user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy consumption	Unit	Value
Truck, Euro 5, 26 - 28t gross weight / 18.4t payload capacity	55%	175	0.0292	kg/tkm	5.11 kg/ton

The results are shown for the declared unit of 1 tonne of Calcined Clay.

For the manufacturing process (A3) 100% renewable electricity from Danish wind power (39.62%) and from Danish solar power (60.38%) is used in calculations (Guarantee of Origin certificates).

Core environmental impact indicators

Indicator	Unit	A1	A2	A3	A1-A3	A4
GWP - total	kg CO2 eq	9.84E+00	4.70E+00	3.36E+01	4.81E+01	1.78E+01
GWP - fossil	kg CO2 eq	9.80E+00	4.65E+00	3.36E+01	4.80E+01	1.76E+01
GWP - biogenic	kg CO2 eq	3.18E-02	1.07E-02	-6.21E-03	3.63E-02	4.04E-02
GWP - luluc	kg CO2 eq	1.03E-02	4.37E-02	1.73E-03	5.57E-02	1.65E-01
ODP	kg CFC11 eq	1.58E-07	6.14E-13	1.62E-08	1.75E-07	2.32E-12
AP	molc H+ eq	9.11E-02	6.44E-03	3.11E-02	1.29E-01	7.29E-02
EP- freshwater	kg P eq	3.66E-03	1.72E-05	2.35E-05	3.70E-03	6.53E-05
EP -marine	kg N eq	2.46E-02	2.25E-03	1.16E-02	3.84E-02	3.41E-02
EP - terrestrial	molc N eq	3.07E-01	2.69E-02	1.27E-01	4.61E-01	3.81E-01
POCP	kg NMVOC eq	8.38E-02	5.60E-03	3.44E-02	1.24E-01	6.58E-02
ADP-M&M ²	kg Sb-Eq	3.25E-04	3.13E-07	1.02E-05	3.35E-04	1.18E-06
ADP-fossil ²	MJ	1.25E+02	6.43E+01	5.51E+02	7.41E+02	2.43E+02
WDP ²	m ³	2.34E+00	5.70E-02	4.41E-01	2.84E+00	2.16E-01

GWP-total: Global Warming Potential; **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; See "additional Norwegian requirements" for indicator given as PO4 eq. **EP-marine:** Eutrophication potential, fraction of nutrients reaching freshwater end compartment; **EP-terrestrial:** Eutrophication potential, Accumulated Exceedance; **POCP:** Formation potential of tropospheric ozone; **ADP-M&M:** Abiotic depletion potential for non-fossil resources (minerals and metals); **ADP-fossil:** Abiotic depletion potential for fossil resources; **WDP:** Water deprivation potential, deprivation weighted water consumption

Reading example: 9,0 E-03 = 9,0*10⁻³ = 0,009

Additional environmental impact indicators

Indicator	Unit	A1	A2	A3	A1-A3	A4
PM	Disease incidence	1.54E-06	4.69E-08	4.02E-07	1.99E-06	4.03E-07
IRP ¹	kBq U235 eq.	2.88E-01	1.80E-02	5.02E-02	3.56E-01	6.81E-02
ETP-fw ²	CTUe	8.23E+01	4.60E+01	1.25E+01	1.41E+02	1.74E+02
HTP-c ²	CTUh	3.23E-08	9.34E-10	1.08E-08	4.40E-08	3.53E-09
HTP-nc ²	CTUh	3.77E-07	4.15E-08	3.52E-08	4.54E-07	1.57E-07
SQP ²	Dimensionless	1.38E+02	2.68E+01	8.02E+00	1.73E+02	1.02E+02

PM: Particulate matter emissions; **IRP:** Ionising radiation, human health; **ETP-fw:** Ecotoxicity (freshwater); **ETP-c:** Human toxicity, cancer effects; **HTP-nc:** Human toxicity, non-cancer effects; **SQP:** Land use related impacts / soil quality

¹ This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health 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.

² 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

Resource use

Parameter	Unit	A1	A2	A3	A1-A3	A4
RPEE	MJ	8.13E+00	4.68E+00	1.20E+03	1.21E+03	1.77E+01
RPEM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TPE	MJ	8.13E+00	4.68E+00	1.20E+03	1.21E+03	1.77E+01
NRPE	MJ	1.25E+02	6.45E+01	5.51E+02	7.41E+02	2.44E+02
NRPM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
TRPE	MJ	1.25E+02	6.45E+01	5.51E+02	7.41E+02	2.44E+02
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
W	m ³	5.45E-02	5.12E-03	1.34E-02	7.30E-02	1.94E-02

RPEE Renewable primary energy resources used as energy carrier; *RPEM* Renewable primary energy resources used as raw materials; *TPE* Total use of renewable primary energy resources; *NRPE* Nonrenewable primary energy resources used as energy carrier; *NRPM* Nonrenewable primary energy resources used as materials; *TRPE* Total use of non-renewable primary energy resources; *SM* Use of secondary materials; *RSF* Use of renewable secondary fuels; *NRSF* Use of non-renewable secondary fuels; *W* Use of net fresh water.

End of life – Waste

Parameter	Unit	A1	A2	A3	A1-A3	A4
HW	kg	0.00E+00	2.00E-10	7.02E-08	7.04E-08	7.56E-10
NHW	kg	0.00E+00	9.83E-03	3.88E-01	3.98E-01	3.72E-02
RW	kg	0.00E+00	1.21E-04	5.44E-04	6.65E-04	4.57E-04

HW Hazardous waste disposed; *NHW* Non-hazardous waste disposed; *RW* Radioactive waste disposed.

End of life – output flow

Parameter	Unit	A1	A2	A3	A1-A3	A4
CR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

CR Components for reuse; *MR* Materials for recycling; *MER* Materials for energy recovery; *EEE* Exported electric energy; *ETE* Exported thermal energy.

Information describing the biogenic carbon content at the factory gate

Biogenic carbon content	Unit	Value
Biogenic carbon content in product	kg C	0.00E+00
Biogenic carbon content in the accompanying packaging	kg C	0.00E+00

Additional requirements

Location based electricity mix from the use of electricity in manufacturing

No national electricity mix in the manufacturing has been applied.

Guarantees of origin from the use of electricity in the manufacturing phase

Where guarantees of origin is applied in stead of national production mix – the electricity for the manufacturing process (A3) shall be stated clearly in the EPD per decalred unit.

Electricity source	Foreground / core [kWh]	GWP _{total} [kg CO ₂ -eq/kWh]	SUM [kgCO ₂ -eq]
Guarantee of origin electricity used in the foreground <i>Wind power: 39.62%</i> <i>Solar power: 60.38%</i>	72.53	0.0233	1.69
Residual mix electricity used in the foreground	0	0.536	0

The generation of electricity for manufacturing is reported in module A3 (in accordance with ISO 21930).

The EPD is calculated with guarantee of origin for the electricity. The guarantee of origin utilized in this EPD is provided by Centrica Energy Trading A/S for 2024. Results with national consumption grid mix is not calculated.

Additional environmental impact indicators required for construction products

In order to increase the transparency of biogenic carbon contribution to climate impact, the indicator GWP-IOBC is required as it declares climate impacts calculated according to the principle of instantaneous oxidation. GWP-IOBC is also referred to as GWP-GHG in context to Swedish public procurement legislation.

Parameter	Unit	A1	A2	A3	A1-A3	A4
GWP-IOBC	kg	9.84E+00	4.70E+00	3.36E+01	4.81E+01	1.78E+01

GWP-IOBC Global warming potential calculated according to the principle of instantaneous oxidation.

Hazardous substances

The declaration is based upon reference to threshold values and/or test results and/or material safety data sheets provided to EPD verifiers. Documentation available upon request to EPD owner.

- The product contains no substances given by the REACH Candidate list.






Indoor environment

Carbon footprint

Carbon footprint has not been worked out for the product.

Bibliography

ISO 14025:2010	Environmental labels and declarations - Type III environmental declarations - Principles and procedures
ISO 14044:2006	Environmental management - Life cycle assessment - Requirements and guidelines
EN 15804:2012+A2:2019	Sustainability of construction works - Environmental product declaration - Core rules for the product category of construction products
ISO 21930:2007	Sustainability in building construction - Environmental declaration of building products

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