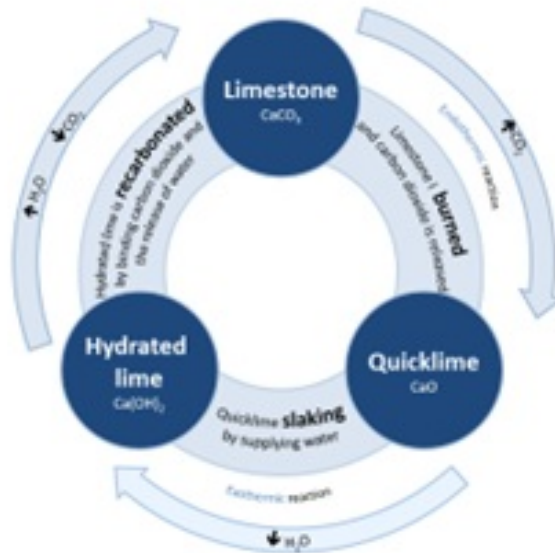


# Environmental product declaration

In accordance with 14025 and EN15804+A2

Quicklime NFK (CL 90-Q)



**Owner of the declaration:**  
Franzefoss Minerals AS

**Product:**  
Quicklime NFK (CL 90-Q)

**Declared unit:**  
1 tonne

**This declaration is based on Product Category Rules:**  
CEN Standard EN 15804:2012+A2:2019 serves as core PCR  
EN 16908:2017 Cement and building lime

**Program operator:**  
The Norwegian EPD Foundation

**Declaration number:**  
NEPD-4124-3341-EN

**Registration number:**  
NEPD-4124-3341-EN

**Issue date:**  
05.01.2023

**Valid to:**  
05.01.2028

**EPD Software:**  
LCA.no EPD generator ID: 60671

## General information

### Product

Quicklime NFK (CL 90-Q)

### Program operator:

Post Box 5250 Majorstuen, 0303 Oslo, Norway  
The Norwegian EPD Foundation  
Phone: +47 23 08 80 00  
web: [post@epd-norge.no](mailto:post@epd-norge.no)

### Declaration number:

NEPD-4124-3341-EN

### This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR  
EN 16908:2017 Cement and building lime

### 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 information, life cycle assessment data and evidences.

### Declared unit:

1 tonne Quicklime NFK (CL 90-Q)

### Declared unit with option:

A1-A3,A4

### Functional unit:

### General information on verification of EPD from EPD tools:

Independent verification of data, other environmental information and the declaration according to ISO 14025:2010, § 8.1.3 and § 8.1.4. Individual third party verification of each EPD is not required when the EPD tool is i) integrated into the company's environmental management system, ii) the procedures for use of the EPD tool are approved by EPD Norway, and iii) the process is reviewed annually. See Appendix G of EPD-Norway's General Programme Instructions for further information on EPD tools.

### Verification of EPD tool:

Independent third party verification of the EPD tool, background data and test-EPD in accordance with EPD Norway's procedures and guidelines for verification and approval of EPD tools.

Third party verifier:

Martin Erlandsson, IVL Swedish Environmental Research Institute  
(no signature required)

### Owner of the declaration:

Franzefoss Minerals AS  
Contact person: Jan Olav Ryan  
Phone: +47 91 19 78 15  
e-mail: [Jan.Olav.Ryan@kalk.no](mailto:Jan.Olav.Ryan@kalk.no)

### Manufacturer:

NorFraKalk AS  
Hamnevegen 4  
7652 Verdal, Norway

### Place of production: Not

Franzefoss Minerals AS  
Olav Ingstadsvei 5, Postboks 51  
1309 Rud, Norway

### Management system:

ISO 9001:2015 og ISO 14001:2015

### Organisation no:

882 153 002

### Issue date:

05.01.2023

### Valid to:

05.01.2028

### Year of study:

2021

### Comparability:

EPD of construction products may not be comparable if they not comply with EN 15804 and seen in a building context.


### Development and verification of EPD:

The declaration is created using EPD tool lca.tools ver EPD2022.03, developed by LCA.no. The EPD tool is integrated in the company's management system, and has been approved by EPD Norway.

Developer of EPD: Jan Olav Ryan

Reviewer of company-specific input data and EPD: Håvard Jacobsen

### Approved:



Håkon Hauan  
Managing Director of EPD-Norway

## Product

### Product description:

Quicklime, calcium oxide, CaO, is produced in high shaft kilns, rotating furnaces or in ring furnaces by heating limestone, CaCO<sub>3</sub> (calcium carbonate), at approx. 1200°C: CaCO<sub>3</sub> = CaO + CO<sub>2</sub>.

Quicklime can be used as a starting material for slaked quicklime Ca(OH)<sub>2</sub> or hydrated lime or wet slaked lime. The final product can be used for various stabilization purposes such as stabilization (deep stabilization, mass stabilization, ground stabilization) lime paint, chemicals with exothermic properties (dewatering, hygienisation) etc. applications

### Product specification

Approved according to the following standards:

NS-EN 459 as CL 90-Q which consists of:

CaO Calcium oxide >96%

CaCO<sub>3</sub> Calcium carbonate <3%

Materials	Value	Unit
Brentkalk	1000	kg

### Technical data:

The product consists of >96% CaO + MgO, in bulk.

After the limestone (CaCO<sub>3</sub>) has been taken out of quarries or mines, it is crushed different fractions (furnace stone). The reactive line includes that furnace stone sinters in a shaft furnace, which can be crushed down and sieved (fractionation) and production of finely ground quicklime (mill process).

EPD applies to quicklime in various fractions. It has been prepared declarations of performance, CE documentation, product data sheets and safety data sheets. Technical data appears in that documentation.

Quicklime can carbonate when exposed to air.

### Market:

Local production sites and customers in Norway as well as export

### Reference service life, product

The lifetime of the product will be equivalent to the lifetime of that application the product is part of, or the process in which quicklime is used.

### Reference service life, building or construction works

Depending on the area of use

## LCA: Calculation rules

### Declared unit:

1 tonne Quicklime NFK (CL 90-Q)

### Cut-off criteria:

All major raw materials and all the essential energy is included. The production processes for raw materials and energy flows with very small amounts (less than 1%) are not included. These cut-off criteria do not apply for hazardous materials and substances.

### Allocation:

The allocation is made in accordance with the provisions of EN 15804. Incoming energy and water and waste production in-house is allocated equally among all products through mass allocation. Effects of primary production of recycled materials is allocated to the main product in which the material was used. The recycling process and transportation of the material is allocated to this analysis.

### Data quality:

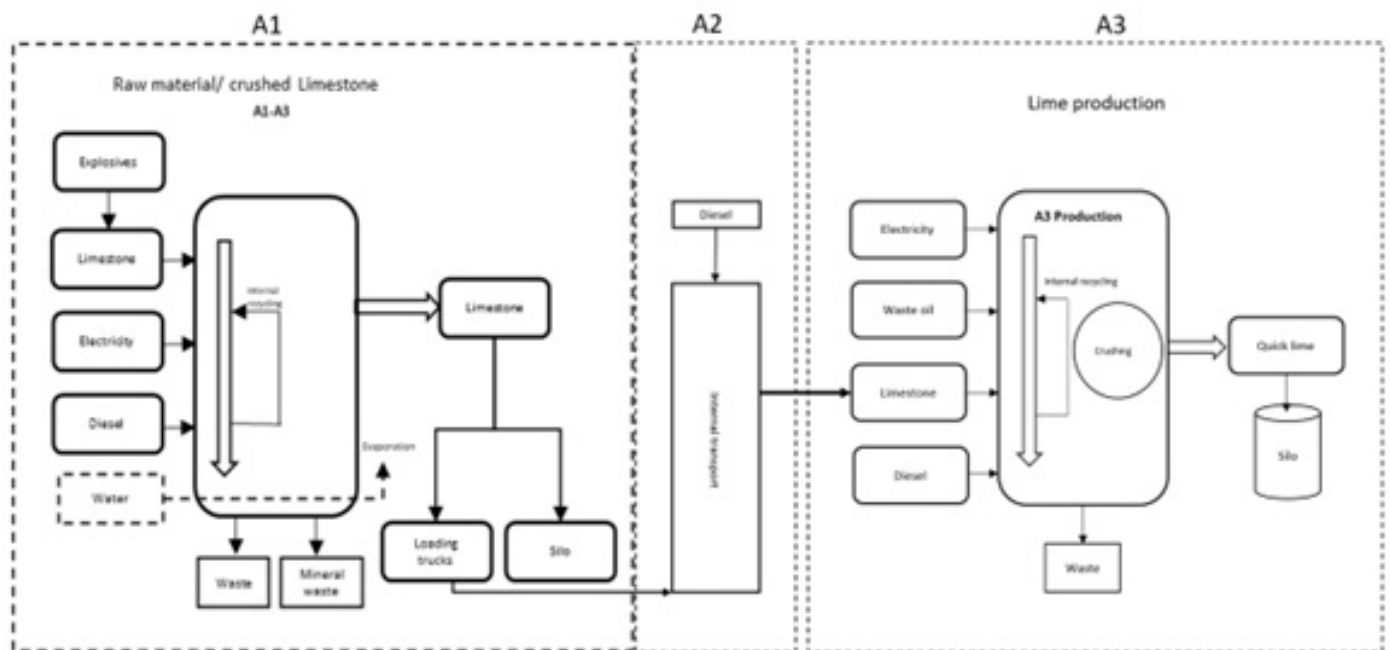
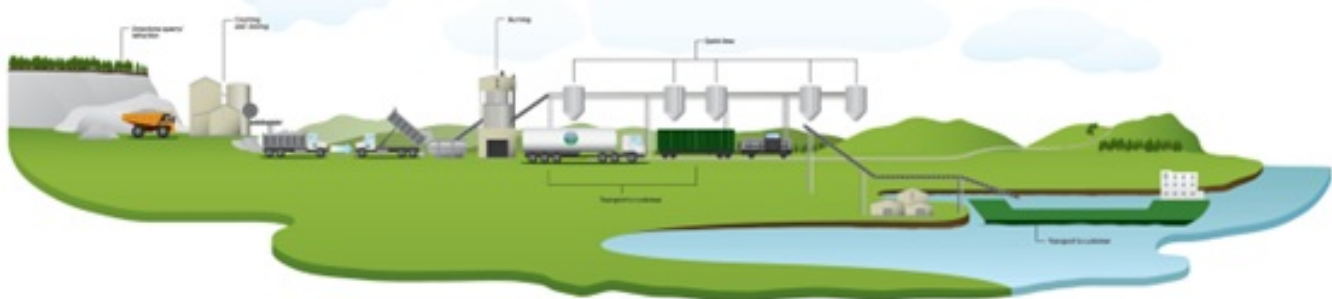
Specific data for the product composition are provided by the manufacturer. The data represent the production of the declared product and were collected for EPD development in the year of study. Background data is based on EPDs according to EN 15804 and different LCA databases.

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

Product stage				Construction installation stage	Use stage										End of life stage			Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Re-use-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:

The flowchart below illustrates the system boundaries for the analysis and what should be included in the process



### Additional technical information:














## **LCA: Scenarios and additional technical information**

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

<b>Transport from production place to user (A4)</b>	<b>Capacity utilisation (incl. return) %</b>	<b>Distance (km)</b>	<b>Fuel/Energy Consumption</b>	<b>Unit</b>	<b>Value (Liter/tonne)</b>
Lastebil med henger over 32 tonn, EURO 6 (km)	53,3 %	100	0,023	l/tkm	2,30

## LCA: Results

The LCA results are presented below for the declared unit defined on page 2 of the EPD document.

Environmental impact				
	Indicator	Unit	A1-A3	A4
	GWP-total	kg CO <sub>2</sub> -eq	1,04E+03	8,72E+00
	GWP-fossil	kg CO <sub>2</sub> -eq	1,04E+03	8,71E+00
	GWP-biogenic	kg CO <sub>2</sub> -eq	8,12E-02	3,73E-03
	GWP-luluc	kg CO <sub>2</sub> -eq	2,41E-02	2,65E-03
	ODP	kg CFC11 -eq	2,35E-06	2,10E-06
	AP	mol H <sup>+</sup> -eq	2,30E-01	2,80E-02
	EP-FreshWater	kg P -eq	4,04E-04	6,93E-05
	EP-Marine	kg N -eq	5,84E-02	6,14E-03
	EP-Terrestrial	mol N -eq	7,79E-01	6,85E-02
	POCP	kg NMVOC -eq	1,78E-01	2,69E-02
	ADP-minerals&metals <sup>1</sup>	kg Sb -eq	2,07E-04	1,55E-04
	ADP-fossil <sup>1</sup>	MJ	1,56E+02	1,41E+02
	WDP <sup>1</sup>	m <sup>3</sup>	2,78E+03	1,08E+02

GWP total Global Warming Potential total; GWP fossil Global Warming Potential fossil fuels ; GWP biogenic Global Warming Potential biogenic; GWP luluc Global Warming Potential land use change; ODP Ozone Depletion; AP Acidification; EP freshwater Eutrophication aquatic freshwater; EP marine Eutrophication aquatic marine; EP terrestrial Eutrophication terrestrial ;POCP Photochemical zone formation; ADPE Abiotic Depletion Potential minerals and metals; ADPf Abiotic Depletion Potential fossil fuels;

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"







\*INA Indicator Not Assessed

1. 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

### Remarks to environmental impacts

265 kg (26%) of the CO<sub>2</sub> emissions stemming from Quicklime, are caused by the burning of waste oil in the production of Quicklime.

**Additional environmental impact indicators**











	<b>Indicator</b>	<b>Unit</b>	<b>A1-A3</b>	<b>A4</b>
	PM	Disease incidence	2,24E-06	8,00E-07
	IRP <sup>2</sup>	kgBq U235 -eq	8,09E-01	6,18E-01
	ETP-fw <sup>1</sup>	CTUe	7,26E+03	1,03E+02
	HTP-c <sup>1</sup>	CTUh	2,79E-08	0,00E+00
	HTP-nc <sup>1</sup>	CTUh	1,04E-06	1,00E-07
	SQP <sup>1</sup>	dimensionless	1,26E+02	1,62E+02

PM Particulate Matter emissions; IRP Ionizing radiation – human health; ETP-fw Eco toxicity – freshwater; HTP-c Human toxicity – cancer effects; HTP-nc Human toxicity – non cancer effects; SQP Soil Quality (dimensionless)

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed

1. 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
2. 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.




Resource use				
	Indicator	Unit	A1-A3	A4
	PERE	MJ	2,03E+02	1,78E+00
	PERM	MJ	0,00E+00	0,00E+00
	PERT	MJ	2,03E+02	1,78E+00
	PENRE	MJ	1,56E+02	1,41E+02
	PENRM	MJ	0,00E+00	0,00E+00
	PENRT	MJ	1,56E+02	1,41E+02
	SM	kg	3,66E-01	0,00E+00
	RSF	MJ	3,33E-01	6,23E-02
	NRSF	MJ	3,58E+03	2,09E-01
	FW	m <sup>3</sup>	1,50E+00	1,61E-02

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 resources; SM Use of secondary materials; RSF Use of renewable secondary fuels; NRSF Use of non renewable secondary fuels; FW Use of net fresh water

"Reading example: 9,0 E-03 = 9,0\*10<sup>-3</sup> = 0,009"

\*INA Indicator Not Assessed








End of life - Waste				
Indicator		Unit	A1-A3	A4
	HWD	kg	1,07E+01	7,74E-03
	NHWD	kg	6,82E+00	1,23E+01
	RWD	kg	9,19E-04	9,66E-04

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed;

"Reading example: 9,0 E-03 =  $9,0 \cdot 10^{-3} = 0,009$ "

\*INA Indicator Not Assessed

End of life - Output flow				
Indicator		Unit	A1-A3	A4
	CRU	kg	0,00E+00	0,00E+00
	MFR	kg	1,84E+01	0,00E+00
	MER	kg	2,04E-03	0,00E+00
	EEE	MJ	5,95E+00	0,00E+00
	EET	MJ	9,00E+01	0,00E+00

CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported energy Thermal

"Reading example: 9,0 E-03 =  $9,0 \cdot 10^{-3} = 0,009$ "

\*INA Indicator Not Assessed

Biogenic Carbon Content		
Indicator	Unit	At the factory gate
Biogenic carbon content in product	kg C	0,00E+00
Biogenic carbon content in accompanying packaging	kg C	0,00E+00

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO<sub>2</sub>

## Additional Norwegian requirements

### Greenhouse gas emissions from the use of electricity in the manufacturing phase

National production mix from import, low voltage (production of transmission lines, in addition to direct emissions and losses in grid) of applied electricity for the manufacturing process (A3).

Electricity mix	Data source	Amount	Unit
Elektrisitet, Norge (kWh)	ecoinvent 3.6	24,33	g CO <sub>2</sub> -eq/kWh

### Dangerous substances

The product contains no substances given by the REACH Candidate list or the Norwegian priority list.

### Indoor environment






## Additional Environmental Information

Environmental impact indicators EN 15804+A1 and NPCR Part A v2.0				
Indicator	Unit	A1-A3	A4	
GWP	kg CO <sub>2</sub> -eq	1,04E+03	8,62E+00	
ODP	kg CFC11 -eq	2,06E-06	1,70E-06	
POCP	kg C <sub>2</sub> H <sub>4</sub> -eq	4,25E-03	1,07E-03	
AP	kg SO <sub>2</sub> -eq	5,47E-02	1,82E-02	
EP	kg PO <sub>4</sub> <sup>3-</sup> -eq	7,45E-03	1,97E-03	
ADPM	kg Sb -eq	2,07E-04	1,55E-04	
ADPE	MJ	1,43E+02	1,39E+02	
GWPIOBC	kg CO <sub>2</sub> -eq	6,76E+00	8,72E+00	

GWP Global warming potential; ODP Depletion potential of the stratospheric ozone layer; POCP Formation potential of tropospheric photochemical oxidants; AP Acidification potential of land and water; EP Eutrophication potential; ADPM Abiotic depletion potential for non fossil resources; ADPE Abiotic depletion potential for fossil resources; GWP-IOBC/GHG Global warming potential calculated according to the principle of instantaneous oxidation (except emissions and uptake of biogenic carbon)

## 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 Environmental product declaration - Core rules for the product category of construction products.  
 ISO 21930:2007 Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products.  
 ecoinvent v3, Allocation, cut-off by classification, Swiss Centre of Life Cycle Inventories.  
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 NPCR Part A: Construction products and services. Ver. 2.0, 24.03.2021 EPD Norway.  
 NPCR 018 Part B for natural stone products, aggregates and fillers, Ver. 1.1, 20.01.2022, EPD Norway.

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