

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Crushed stone from Håkestad Quarry



The Norwegian EPD Foundation

Owner of the declaration:

Larvik Granite AS

Product:

Crushed stone from Håkestad Quarry

Declared unit:

1 tonne

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR

NPCR 018:2022 Part B for natural stone products, aggregates and fillers

Program operator:

The Norwegian EPD Foundation

Declaration number:

NEPD-7756-7124-EN

Registration number:

NEPD-7756-7124-EN

Issue date: 09.10.2024

Valid to: 09.10.2029

EPD software:

LCAno EPD generator ID: 690981

General information

Product

Crushed stone from Håkestad Quarry

Program operator:

The Norwegian EPD Foundation
Post Box 5250 Majorstuen, 0303 Oslo, Norway
Phone: +47 977 22 020
web: www.epd-norge.no

Declaration number:

NEPD-7756-7124-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR
NPCR 018:2022 Part B for natural stone products, aggregates and
fillers

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 Crushed stone from Håkestad Quarry

Declared unit with option:

A1,A2,A3,A4,C1,C2,C3,C4,D

Functional unit:

Not applicable.

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.
Verification of each EPD is made according to EPD-Norway's
guidelines for verification and approval requiring that tools are 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 by an independent third
party verifier. 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 EPDNorway's procedures and
guidelines for verification and approval of EPD tools.

Third party verifier:

Martin Erlandsson, IVL Swedish Res. Inst

(no signature required)

Owner of the declaration:

Larvik Granite AS
Contact person: Stephan Christian Kleive
Phone: +47 33 13 82 00
e-mail: sales@larvik-granite.no

Manufacturer:

Larvik Granite AS
Storgata 128
N-3262 Larvik, Norway

Place of production:

Larvik Granite AS production site Håkestad (Norway)
Håkestadveien 345
3280 Tjodalyng, Norway

Management system:

Organisation no:

NO 930307378

Issue date:

09.10.2024

Valid to:

09.10.2029

Year of study:

2022

Comparability:

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

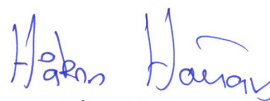
Development and verification of EPD:

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: Pedro Ferreira

Reviewer of company-specific input data and EPD: Børge Heggen
Johansen, Energiråd AS

Approved:



Håkon Hauan
Managing Director of EPD-Norway

Product

Product description:

Crushed stone produced at Håkestad Steinindustri.

The products are based on surplus material/exploded rock from natural stone production. Crushing and screening are carried out in mobile crushing plants.

Product specification

100% crushed stone of light coarse-grained Larvikite with a density of approximately 2.75 tons/m³.

Materials	Value	Unit
Stone	1000	kg

Technical data:

Declarations of performance and CE documentation have been prepared for all fractions. The operation has been audited by the Norwegian Control Council and has certificate 1111-CPR-0780.

Market:

Local market in Vestfold, and for export to Europe.

Reference service life, product

Depending on the area of application.

Reference service life, building or construction works

Normally, the lifespan of buildings is assumed to be around 60 years.

LCA: Calculation rules

Declared unit:

1 tonne Crushed stone from Håkestad Quarry

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. 1.9% of the raw materials for stone extraction are economically allocated to crushed stone. The remaining part is allocated to the production of granite blocks.

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. The data quality of the raw materials in A1 is presented in the table below.

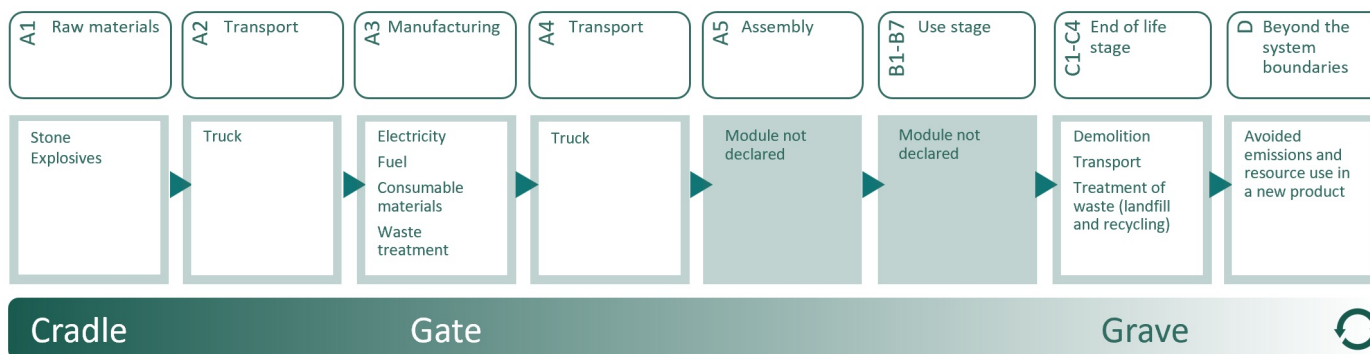
System boundaries (X=included, MND=module not declared, MNR=module not relevant)

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	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	X	X	X	X	X	

System boundary:

A1 is the extraction of natural stone. A2 includes the transport of explosives to the production plant. A3 is the actual production process of crushing stone blocks. A4 includes the transport of crushed stone and gravel for customers within a radius of 5.5 km.

A flow chart for the production of stone/crushed stone from raw material to finished product is shown in the figure below.



Additional technical information:

Sorting/fractions	Number of crushing stages
0/800	0 (Blasting)
22/120	1
0/20	1
0/32	1
0/63	1
16/22	2
20/64	2
0/4	2
4/16	2
2/5	2
0/2	2

LCA: Scenarios and additional technical information














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

Transport distance to customer (module A4) is 5.5km. Modules C and D show average values, based on Norwegian statistics, where 99% of the product is recycled as aggregate and 1% goes to landfill. 50 km in C2 can be used as an industry average.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	6	0,043	l/tkm	0,24
De-construction demolition (C1)		Unit	Value		
Gravemaskin, 50 - 70 tonns (per liter diesel)		L/DU	0,12		
Transport to waste processing (C2)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Truck, 16-32 tonnes, EURO 6 (km)	36,7 %	50	0,043	l/tkm	2,15
Waste processing (C3)		Unit	Value		
Waste treatment of stone products after demolition (kg)		kg/DU	990,000000000		
Disposal (C4)		Unit	Value		
Waste, stone, for landfill (kg)		kg/DU	10,000000000		
Benefits and loads beyond the system boundaries (D)		Unit	Value		
Substitution of stone materials (kg)		kg/DU	990,000000000		

LCA: Results

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

Environmental impact											
Indicator	Unit	Extraction (A1-A3)	Crushing 1 (A1-A3)	Crushing 2 (A1-A3)	A4	C1	C2	C3	C4	D	
 GWP-total	kg CO ₂ -eq	3,53E-01	2,23E+00	4,56E+00	8,99E-01	4,46E-01	8,17E+00	7,13E-01	4,29E-02	-2,31E+00	
 GWP-fossil	kg CO ₂ -eq	3,53E-01	2,22E+00	4,55E+00	8,98E-01	4,45E-01	8,17E+00	7,03E-01	4,28E-02	-2,27E+00	
 GWP-biogenic	kg CO ₂ -eq	1,40E-04	4,84E-04	9,28E-04	3,72E-04	1,50E-04	3,38E-03	6,07E-03	3,64E-05	-4,52E-02	
 GWP-luluc	kg CO ₂ -eq	6,50E-05	1,86E-04	3,76E-04	3,20E-04	1,89E-04	2,91E-03	9,73E-04	8,40E-06	-1,53E-03	
 ODP	kg CFC11 -eq	7,60E-08	4,79E-07	9,82E-07	2,04E-07	9,37E-08	1,85E-06	1,39E-07	2,09E-08	-4,13E-07	
 AP	mol H+ -eq	3,03E-03	2,37E-02	4,81E-02	2,58E-03	2,17E-03	2,35E-02	5,69E-03	4,18E-04	-2,04E-02	
 EP-FreshWater	kg P -eq	1,80E-06	8,30E-06	1,69E-05	7,18E-06	4,21E-06	6,53E-05	4,44E-05	3,20E-07	-6,02E-05	
 EP-Marine	kg N -eq	1,19E-03	1,04E-02	2,12E-02	5,11E-04	7,38E-04	4,64E-03	1,67E-03	1,57E-04	-7,08E-03	
 EP-Terrestrial	mol N -eq	1,39E-02	1,15E-01	2,33E-01	5,71E-03	8,13E-03	5,19E-02	1,92E-02	1,73E-03	-8,31E-02	
 POCP	kg NMVOC -eq	3,66E-03	3,14E-02	6,38E-02	2,19E-03	2,47E-03	1,99E-02	5,14E-03	4,94E-04	-2,19E-02	
 ADP-minerals&metals ¹	kg Sb-eq	1,79E-06	3,52E-06	7,12E-06	2,48E-05	6,14E-06	2,26E-04	8,92E-06	3,79E-07	-2,01E-04	
 ADP-fossil ¹	MJ	4,94E+00	3,06E+01	6,26E+01	1,36E+01	6,27E+00	1,23E+02	2,18E+01	1,38E+00	-3,83E+01	
 WDP ¹	m ³	3,14E+00	8,25E+00	1,51E+01	1,31E+01	2,78E+00	1,19E+02	2,41E+03	2,91E+00	-1,80E+03	

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 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; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption

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

Not applicable.

Additional environmental impact indicators











Indicator		Unit	Extraction (A1-A3)	Crushing 1 (A1-A3)	Crushing 2 (A1-A3)	A4	C1	C2	C3	C4	D
	PM	Disease incidence	4,60E-08	6,16E-07	1,26E-06	5,50E-08	9,10E-09	5,00E-07	9,11E-08	8,90E-09	-4,35E-07
	IRP ²	kgBq U235 -eq	2,09E-02	1,31E-01	2,68E-01	5,94E-02	2,61E-02	5,40E-01	3,66E-01	6,00E-03	-3,52E-01
	ETP-fw ¹	CTUe	3,51E+01	4,90E+01	6,65E+01	1,01E+01	5,05E+00	9,15E+01	1,55E+01	6,83E-01	-3,95E+01
	HTP-c ¹	CTUh	1,61E-10	6,80E-10	1,37E-09	0,00E+00	3,69E-10	0,00E+00	9,90E-10	2,00E-11	-1,98E-09
	HTP-nc ¹	CTUh	3,06E-09	1,55E-08	3,16E-08	1,10E-08	6,43E-09	1,00E-07	1,39E-08	4,00E-10	-4,85E-08
	SQP ¹	dimensionless	6,25E-01	3,90E+00	7,99E+00	9,50E+00	8,12E-01	8,64E+01	1,23E+01	5,04E+00	8,70E+01

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 = Potential Soil Quality Index (dimensionless)

"Reading example: 9,0 E-03 = 9,0*10⁻³ = 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	Extraction (A1-A3)	Crushing 1 (A1-A3)	Crushing 2 (A1-A3)	A4	C1	C2	C3	C4	D
	PERE	MJ	1,63E-01	2,99E-01	4,77E-01	1,94E-01	7,04E-02	1,77E+00	1,12E+01	2,13E-02	-8,98E+00
	PERM	MJ	9,73E-05	9,73E-05	9,73E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PERT	MJ	1,63E-01	2,99E-01	4,77E-01	1,94E-01	7,04E-02	1,77E+00	1,12E+01	2,13E-02	-8,98E+00
	PENRE	MJ	4,94E+00	3,06E+01	6,26E+01	1,36E+01	6,27E+00	1,23E+02	2,18E+01	1,38E+00	-4,05E+01
	PENRM	MJ	4,76E-03	4,76E-03	4,76E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	PENRT	MJ	4,94E+00	3,06E+01	6,26E+01	1,36E+01	6,27E+00	1,23E+02	2,18E+01	1,38E+00	-4,05E+01
	SM	kg	2,17E-03	1,43E-05	1,43E-05	0,00E+00	9,79E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	RSF	MJ	1,08E-03	4,24E-03	8,56E-03	6,96E-03	1,97E-03	6,32E-02	0,00E+00	4,39E-04	-1,84E-01
	NRSF	MJ	-3,44E-03	6,02E-02	1,23E-01	2,49E-02	-3,42E-02	2,26E-01	0,00E+00	1,26E-03	-1,89E-01
	FW	m ³	1,98E-02	2,11E-02	2,27E-02	1,45E-03	6,25E-04	1,32E-02	3,74E-02	1,65E-03	-1,41E+00

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 = Net use of fresh water

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






*INA Indicator Not Assessed

End of life - Waste											
Indicator		Unit	Extraction (A1-A3)	Crushing 1 (A1-A3)	Crushing 2 (A1-A3)	A4	C1	C2	C3	C4	D
	HWD	kg	3,32E-04	2,22E-03	6,31E-03	7,01E-04	3,73E-04	6,37E-03	2,18E-03	0,00E+00	-9,24E-03
	NHWD	kg	9,00E-03	5,66E-02	1,37E-01	6,61E-01	1,81E-02	6,01E+00	6,89E-02	1,00E+01	-2,80E-01
	RWD	kg	3,41E-05	2,12E-04	4,35E-04	9,25E-05	4,16E-05	8,41E-04	2,31E-04	0,00E+00	-3,04E-04

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

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

*INA Indicator Not Assessed

End of life - Output flow											
Indicator		Unit	Extraction (A1-A3)	Crushing 1 (A1-A3)	Crushing 2 (A1-A3)	A4	C1	C2	C3	C4	D
	CRU	kg	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
	MFR	kg	5,16E-04	1,91E-02	6,20E-02	0,00E+00	9,45E-03	0,00E+00	9,90E+02	0,00E+00	0,00E+00
	MER	kg	6,59E-04	1,15E-03	2,48E-03	0,00E+00	2,36E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EEE	MJ	4,00E-04	4,00E-04	4,02E-04	0,00E+00	1,71E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00
	EET	MJ	6,05E-03	6,06E-03	6,08E-03	0,00E+00	2,58E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00

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

"Reading example: 9,0 E-03 = 9,0*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 CO₂

Additional 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).

Dangerous substances

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

Indoor environment

Not applicable.

Additional Environmental Information






Additional environmental impact indicators required in NPCR Part A for construction products

Indicator	Unit	Extraction (A1-A3)	Crushing 1 (A1-A3)	Crushing 2 (A1-A3)	A4	C1	C2	C3	C4	D
GWPIOBC	kg CO ₂ -eq	3,53E-01	2,23E+00	4,55E+00	8,99E-01	4,46E-01	8,17E+00	7,04E-01	4,29E-02	-2,42E+00

GWPIOBC: Global warming potential calculated according to the principle of instantaneous oxidation. 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.

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 21930:2017 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.
 Iversen et al., (2021) eEPD v2021.09 Background information for EPD generator tool system verification, LCA.no Report number: 07.21
 Vold, M., and Iversen, O. M. K. (2022) EPD generator for for NPCR 018 Part B for natural stone products, aggregates and fillers
 Background information for EPD generator application and LCA data, LCA.no report number: 09.22.
 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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