

Environmental product declaration

in accordance with ISO 14025 and EN 15804+A2

Crushed Rock Aggregates from Norsk Stein - Tau Quarry





Norsk Stein AS Product:

Owner of the declaration:

Crushed Rock Aggregates from Norsk Stein - Tau Quarry

This declaration is based on Product Category Rules:

Declared unit: 1 tonne

CEN Standard EN 15804:2012+A2:2019 serves as core PCR NPCR Part A: Construction products and services. Ver. 1.0. April 2017 **Program operator:** The Norwegian EPD Foundation

Declaration number: NEPD-4798-4060-EN

Registration number: NEPD-4798-4060-EN

Issue date: 04.09.2023

Valid to: 04.09.2028

EPD Software: LCA.no EPD generator ID: 51853

The Norwegian EPD Foundation



General information

Product Crushed Rock Aggregates from Norsk Stein - Tau Quarry

Program operator:

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

Declaration number:

NEPD-4798-4060-EN

This declaration is based on Product Category Rules:

CEN Standard EN 15804:2012+A2:2019 serves as core PCR NPCR Part A: Construction products and services. Ver. 1.0. April 2017

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 Rock Aggregates from Norsk Stein - Tau Quarry

Declared unit with option:

A1,A2,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. 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 Environmental Research Institute (no signature required)

Owner of the declaration:

Norsk Stein AS Contact person: Henrik Skogland Phone: + 47 47 33 52 82 e-mail: skogland@mibau-stema.com

Manufacturer:

Norsk Stein AS Jelsavegen 512 4234 Jelsa, Norway

Place of production:

Norsk Stein, Tau

, Norway

Management system:

Organisation no:

958 990 022

Issue date: 04.09.2023

Valid to: 04.09.2028

Year of study:

2020

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: Bjørn Martin Vika Gjesteland

Reviewer of company-specific input data and EPD: Henrik Skogland

Approved:

Håkon Hauan

Managing Director of EPD-Norway



Product

Product description:

The rock, quartzdiorite, is considered particularly hard, and is characterized by its ligth tint and green shimmer. Due to exceptional rock properties at Tau, these aggregates are predominantly used in the asphalt industry.

Further use is to serve all parts of road constructions, civil engineering work and railway ballast.

Product specification

Crushed rock (quartzdiorite) in bulk - predominantly aggregates used for production of asphalt and as railway ballast.

In compliance with Regulation 305/2011/EU of the European Parliament and the Council of 9th of March 2011 (the Construction Products Regulation – CPR), we hold a certificate for construction of the following products, according to the approved standards:

- Aggregates for Concrete: EN 12620:2002+A1:2008
- Aggregates for Asphalt: EN 13043:2002
- Aggregates for Roads: EN 13242:2002+A1:2007
- Armourstone: EN 13383-1:2002+AC:2004

• Railway ballast: EN 13450:2002

Materials	Value	Unit
Bedrock Quartz Diorite	1000	kg

Technical data:

If applicable, products come along with a CE mark and DoP. Upon request we can also provide specific TDS.

Density: 2,77 ± 0.1 Mg/m³

More specific technical data/ material properties are stated in above mentioned DoP/ TDS

Market:

From our production site at Tau, we mainly supply aggregates for the coastal regions along the North Sea and Baltic Sea throughout Europe. We also supply domestic markets, mostly with aggregates for the asphalt industry.

Reference service life, product

Norsk Stein products are tested according to all demanded properties according to CE. Results can be made available upon request.

The high quality of our products provides a long-term service life in end-use for our customers.

Reference service life, building or construction works

Not applicable.

LCA: Calculation rules

Declared unit:

1 tonne Crushed Rock Aggregates from Norsk Stein - Tau 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.

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.

Production data is collected in 2021 from the site of production for the year 2020.

The data is from various reporting systems within the company.



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

P	roduct stag	ge		uction ion stage				Use stage					End of I	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	Β7	C1	C2	C3	C4	D
Х	Х	Х	Х	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

System boundary:

As the products are mainly used for bound purposes, the end phase C1-C4, and D are not considered in this EPD. This consideration will normally take place in the EPD published by producers of asphalt and concrete.



In order to find the specific result for the product in question, simply summarize the various processes needed to produce the final product. For example, if you want to see the impact of 31,5/63mm, simply summarize respective values stated in the below section *LCA: Results*

- in this case; from columns QUARRY/T + PRIMARY/T + SECONDARY/T.

The overall Global Warming Potential (GWP) of each product is also stated in the below column.

PRODUCT	GWP kg CO2 eq	NEEDED PROCESSES to PRODUCE VARIOUS PRODUCTS	REMARKS
Raw Blast Rock	2,31	QUARRY	
0/300mm	2,44	QUARRY + PRIMARY	
20/120mm	2,67	QUARRY + PRIMARY + SECONDARY	
11/40mm	2,67	QUARRY + PRIMARY + SECONDARY	Can be washed during loading
0/11mm	2,67	QUARRY + PRIMARY + SECONDARY	40% PRIMARY, 60% SECONDARY
31,5/63mm	2,67	QUARRY + PRIMARY + SECONDARY	Can be washed during loading
0/2mm	3,27	QUARRY + PRIMARY + SECONDARY + TERTIARY	
2/5mm	3,27	QUARRY + PRIMARY + SECONDARY + TERTIARY	Can be washed during loading
5/8mm	3,27	QUARRY + PRIMARY + SECONDARY + TERTIARY	Can be washed during loading
8/11,2mm	3,27	QUARRY + PRIMARY + SECONDARY + TERTIARY	Can be washed during loading
11,2/16mm	3,27	QUARRY + PRIMARY + SECONDARY + TERTIARY	Can be washed during loading
16/22,4mm	3,27	QUARRY + PRIMARY + SECONDARY + TERTIARY	Can be washed during loading
22,4/32mm	3,27	QUARRY + PRIMARY + SECONDARY + TERTIARY	Can be washed during loading
0/2mm WASHED	3,85	QUARRY + PRIMARY + SECONDARY + TERTIARY + WASHING PLANT	Processed in separate washing plant

Should the customer want to reduce the amount of fines in our finished products, we are able to wash our product as it is being loaded, through a separate system. If the order is for washed 32/63mm, typically for track ballast, this has to be added as well. So, with reference to the above example, one needs to summarize QUARRY+PRIMARY+SECONDARY+WASHING of PRODUCT to find the final results.

Additional technical information:

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Our loading system at Tau is capable of blending our single fractions into numerous different blends and variations, such as 0/32mm SUBBASE, 8/16mm, 0/5mm and so on.

In these cases, the specific blend will determine the total environmental impact the final loaded product has. A product might consist of fractions with different production processes. For example, a final blend could be made from fractions that all have been through the processes of QUARRY (100%) and PRIMARY (100%), but only partly SECONDARY (60%) and TERTIARY (40%). In these cases, NORSK STEIN will be able to produce a more product specific EPD for that particular blend.



LCA: Scenarios and additional technical information

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

The method of transportation and distance chosen in this EPD is merely an example.

The actual destination and end-customers chosen method for transportation will have to be considered for each case.

Norsk Stein as a part of Mibau-Stema Group mainly sells and transports to international markets.

Our own fleet of vessels are highly efficient and in general are fitted with the newest of technology to reduce emissions.

In addition to international markets, we also supply domestic and local markets with the use of various third-party owned vessels and vehicles.

Transport from production place to user (A4)	Capacity utilisation (incl. return) %	Distance (km)	Fuel/Energy Consumption	Unit	Value (Liter/tonne)
Skip, Tilslagsbåt 35000 DWT (km)	50,0 %	1500	0,003	l/tkm	4,50



LCA: Results

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

Environ	nental impact								
	Indicator	Unit	QUARRY/ T (EN 15804 +A2)	PRIMARY/ T (EN 15804 +A2)	SECONDARY/ T (EN 15804 +A2)	TERTIARY/ T (EN 15804 +A2)	WASHING PLANT/ T (EN 15804 +A2)	WASHING of PRODUCT/ T (EN 15804 +A2)	A4
P	GWP-total	kg CO ₂ -eq	2,31E+00	2,44E+00	2,67E+00	3,27E+00	3,85E+00	3,34E+00	1,64E+01
P	GWP-fossil	kg CO ₂ -eq	2,31E+00	2,44E+00	2,67E+00	3,26E+00	3,84E+00	3,33E+00	1,64E+01
P	GWP-biogenic	kg CO ₂ -eq	3,00E-03	3,22E-03	3,94E-03	6,23E-03	7,80E-03	6,41E-03	3,90E-03
P	GWP-luluc	kg CO ₂ -eq	3,53E-04	3,93E-04	5,14E-04	8,87E-04	1,30E-03	9,35E-04	8,64E-03
Ò	ODP	kg CFC11 -eq	3,48E-07	3,74E-07	4,19E-07	5,35E-07	6,29E-07	5,46E-07	3,00E-06
Ê	AP	mol H+ -eq	1,34E-01	1,36E-01	1,38E-01	1,44E-01	1,49E-01	1,44E-01	4,86E-01
÷	EP-FreshWater	kg P -eq	1,63E-05	1,74E-05	2,02E-05	2,83E-05	4,87E-05	3,06E-05	5,40E-05
÷	EP-Marine	kg N -eq	4,38E-02	4,43E-02	4,53E-02	4,77E-02	4,95E-02	4,79E-02	1,10E-01
÷	EP-Terrestial	mol N -eq	6,83E-01	6,89E-01	6,99E-01	7,26E-01	7,45E-01	7,28E-01	1,22E+00
	POCP	kg NMVOC -eq	1,28E-01	1,30E-01	1,33E-01	1,40E-01	1,46E-01	1,41E-01	3,18E-01
*5Ð	ADP-minerals&metals ¹	kg Sb -eq	1,50E-05	1,58E-05	1,80E-05	2,48E-05	3,20E-05	2,56E-05	9,30E-05
A	ADP-fossil ¹	MJ	2,56E+01	2,74E+01	3,05E+01	3,87E+01	4,75E+01	3,97E+01	2,10E+02
6	WDP ¹	m ³	2,92E+01	4,56E+01	1,04E+02	2,92E+02	3,66E+02	3,00E+02	4,89E+01

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



ŀ	Additional	environmental	impact indicators							
	Ir	ndicator	Unit	QUARRY/ T (EN 15804 +A2)	PRIMARY/ T (EN 15804 +A2)	SECONDARY/ T (EN 15804 +A2)	TERTIARY/ T (EN 15804 +A2)	WASHING PLANT/ T (EN 15804 +A2)	WASHING of PRODUCT/ T (EN 15804 +A2)	A4
		PM	Disease incidence	1,25E-06	1,28E-06	1,34E-06	1,48E-06	1,59E-06	1,49E-06	0,00E+00
		IRP ²	kgBq U235 -eq	9,66E-02	1,06E-01	1,24E-01	1,74E-01	2,22E-01	1,79E-01	9,09E-01
		ETP-fw ¹	CTUe	7,75E+03	7,75E+03	7,75E+03	7,76E+03	7,77E+03	7,76E+03	1,14E+02
	444 × ****	HTP-c ¹	CTUh	7,26E-10	7,89E-10	9,30E-10	1,33E-09	2,13E-09	1,42E-09	0,00E+00
	200 E	HTP-nc ¹	CTUh	3,90E-08	4,04E-08	4,37E-08	5,32E-08	7,02E-08	5,51E-08	0,00E+00
	6	SQP ¹	dimensionless	3,84E+00	4,11E+00	4,64E+00	6,10E+00	7,83E+00	6,30E+00	2,73E+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									
h	ndicator	Unit	QUARRY/ T (EN 15804 +A2)	PRIMARY/ T (EN 15804 +A2)	SECONDARY/ T (EN 15804 +A2)	TERTIARY/ T (EN 15804 +A2)	WASHING PLANT/ T (EN 15804 +A2)	WASHING of PRODUCT/ T (EN 15804 +A2)	A4
	PERE	MJ	1,69E+00	2,82E+00	7,05E+00	2,07E+01	2,13E+01	2,08E+01	1,23E+00
E.	PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
°≓ s	PERT	MJ	1,69E+00	2,82E+00	7,05E+00	2,07E+01	2,13E+01	2,08E+01	1,23E+00
Ð	PENRE	MJ	2,56E+01	2,74E+01	3,05E+01	3,88E+01	4,75E+01	3,98E+01	2,10E+02
.Å2	PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
IA	PENRT	MJ	2,56E+01	2,74E+01	3,05E+01	3,88E+01	4,75E+01	3,98E+01	2,10E+02
	SM	kg	2,77E-03	2,77E-03	2,77E-03	2,77E-03	2,77E-03	2,77E-03	0,00E+00
1	RSF	MJ	9,06E-03	1,07E-02	1,52E-02	2,85E-02	7,38E-02	3,37E-02	4,23E-02
Ū.	NRSF	MJ	3,74E-02	4,34E-02	5,78E-02	9,98E-02	1,53E-01	1,06E-01	3,66E-01
\$	FW	m ³	2,76E-02	4,52E-02	8,99E-02	2,18E-01	9,22E-01	2,98E-01	7,65E-03

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; SERT = Total use of non renewable primary energy resources; SERT = Use of non renewable primary energy resources; SERT = Use of non renewable primary energy resources; SERT = Total use of non renewable primary energy resources; SERT = Use of secondary materials; PENRT = 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									
In	dicator	Unit	QUARRY/ T (EN 15804 +A2)	PRIMARY/ T (EN 15804 +A2)	SECONDARY/ T (EN 15804 +A2)	TERTIARY/ T (EN 15804 +A2)	WASHING PLANT/ T (EN 15804 +A2)	WASHING of PRODUCT/ T (EN 15804 +A2)	A4
	HWD	kg	1,51E-02	1,52E-02	1,55E-02	1,64E-02	1,74E-02	1,66E-02	7,64E-03
Ū	NHWD	kg	8,35E-02	9,28E-02	1,22E-01	2,13E-01	2,68E-01	2,19E-01	3,81E-01
æ	RWD	kg	1,49E-04	1,62E-04	1,84E-04	2,43E-04	2,99E-04	2,50E-04	1,47E-03

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 flo	w								
Indicato	or	Unit	QUARRY/ T (EN 15804 +A2)	PRIMARY/ T (EN 15804 +A2)	SECONDARY/ T (EN 15804 +A2)	TERTIARY/ T (EN 15804 +A2)	WASHING PLANT/ T (EN 15804 +A2)	WASHING of PRODUCT/ T (EN 15804 +A2)	A4
¢⊳	CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
3	MFR	kg	5,75E-03	5,75E-03	5,75E-03	5,75E-03	5,75E-03	5,75E-03	0,00E+00
D₽	MER	kg	7,03E-05	7,03E-05	7,03E-05	7,03E-05	7,03E-05	7,03E-05	0,00E+00
$\Im \triangleright$	EEE	MJ	1,03E-02	1,03E-02	1,03E-02	1,03E-02	1,03E-02	1,03E-02	0,00E+00
ÞI	EET	MJ	1,55E-01	1,55E-01	1,55E-01	1,55E-01	1,55E-01	1,55E-01	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 or the Norwegian priority list.

Indoor environment

Additional Environmental Information

Additional environmental i	mpact indicators required in N	PCR Part A	for constr	uction prod	ucts			
Indicator	Unit	QUARRY/ T (EN 15804 +A2)	PRIMARY/ T (EN 15804 +A2)	SECONDARY/ T (EN 15804 +A2)	TERTIARY/ T (EN 15804 +A2)	WASHING PLANT/ T (EN 15804 +A2)	WASHING of PRODUCT/ T (EN 15804 +A2)	A4
GWPIOBC	kg CO ₂ -eq	2,29E+00	2,42E+00	2,65E+00	3,25E+00	3,82E+00	3,31E+00	1,64E+01

GWP-IOBC: 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.



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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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