

Environmental Product Declaration



In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for:

Achnaba Green Schist Setts and Paving Stone

(average based on representative product)

from



Programme:	The International EPD® System, www.environdec.com
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General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products, version 1.3.4. Together with EN 15804:2012+A2:2019/AC:2021
PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepcion, Chile. The review panel may be contacted via the Secretariat www.envirodec.com/contact
Life Cycle Assessment (LCA)
LCA accountability: <i>Dr Shashwat Ganguly, Looper Tech Ltd, Edinburgh, United Kingdom</i>
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: <input checked="" type="checkbox"/> EPD verification by individual verifier Third-party verifier: Stephen Forson, Viridis Pride Ltd, S.Forson@viridispride.com Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD:

Tradstocks Ltd

Contact:

Peter Stewart, peter@tradstocks.co.uk

Description of the organisation:

Tradstocks was established in 1992 supplying a range of new and reclaimed natural stone materials for building and landscaping projects. The company has grown and evolved into one of the UK's largest specialist processors and suppliers of dimensional stone.

Currently providing skilled jobs for 65 people across two processing plants. Tradstocks have full in-house capabilities from procurement of raw materials, through production to delivery to project locations using purpose-built vehicles.

Tradstocks have focused on pioneering the processing of Achnaba Green Schist, effectively restarting an historic industry working this robust, durable and attractive material into a range of products for streetscapes throughout the UK. Tradstocks have achieved this by investing heavily in modern facilities and equipment in order to offer a range of high-quality products for the hard landscaping sector.

Product-related or management system-related certifications:

Not applicable

Name and location of production site(s):

Dunaverig,
Thornhill,
Stirling,
FK8 3QW
United Kingdom

Product information

Product name:

This EPD is based on a representative product (Schist Paving) which is based on the production volume. As the content for the declared unit does not change (1 tonne), this covers Schist setts which is also part of the product family”) to give the reader the context of which products are covered in the EPD:

- Tradstocks Achnaba Green Schist paving
- Tradstocks Achnaba Green Schist setts

Product identification:

- BS EN 1341 Slabs of natural stone for external paving
- BS EN 1342 Setts of natural stone for external paving

Product description:

Achnaba Stone is immensely old, with an origin some 600 million years ago making it one of Scotland's oldest exposed rocks. Volcanic in origin, this rock started as a basalt or dolerite, the same

type of rock commonly associated with the Isles of Mull and Staffa, and most famously in Northern Ireland at the Giants Causeway. Where this stone differs from 'common' basalt is as a result of subsequent metamorphism; it has been subjected to high pressures and temperatures during a geological process known as the Caledonian Orogeny around 400 million years ago, when the great mountain ranges of northern Europe were being formed, and this material had been deeply buried.

Table: Technical and functional specification

Apparent density	2870 kg/m ³
Compressive strength	150.0 MPa
Flexural strength: 3point	39.0 MPa
Open porosity	0.20 %
Water absorption by capillarity	0.20 kg/m ²
Frost Resistance Identification	Max 56 cycles (Pass)
Slip Resistance	72 (wet), 93 (dry) – Pendulum Test Value (PTV)



Figure 1 – Appearance of a whinstone product manufactured by Tradstocks

UN CPC code:

151 Monumental or building stone

Geographical scope:

The dataset used to model the production process is, whenever possible, based on specific United Kingdom data, since it is produced in this country, or whenever it is not possible, average European or Global data.

LCA information

Functional unit / declared unit:

1 tonne of Achnaba Green Schist products

Reference service life:

100+ years

Time representativeness:

LCA conducted in 2024 using data pertaining to 2023

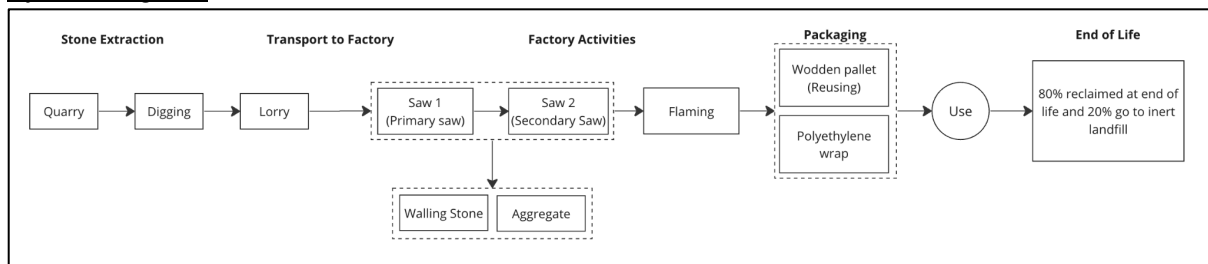
Database(s) and LCA software used:

Ecoinvent version 3.10 used with calculations based on spreadsheet

Description of system boundaries:

The system boundaries are Cradle to gate (A1-A3) with options, modules C1–C4 and module D (A1–A3 + C + D). The results of module A1-A3 shouldn't be used without considering the results of module C. The stage (B) is not assessed because there is no significant energy or resource use and so it was excluded.

System diagram:



A1: Raw Material Supply

Raw material, in the form of large boulders or quarry blocks are sourced on a campaign basis from a quarry close to Achnaba in Lochgilphead

Using the combination of a large excavator (with hydraulic hammer attachment if necessary), articulated dump truck and wheeled loader, individual stones for processing are selected by size and shape then inspected for quality prior to being loaded for transportation to Tradstocks processing facilities.

A2: Transportation

Transportation involves loading between 2 and 4 of previously selected large stones onto purpose built, steel bodied tipping trailers for the short journey to the processing site. HGV articulated vehicles are used to maximise the payload of 25 tonne and minimise the number of road journeys required.

A3: Manufacturing

Processing the stone involves cutting it into dimensioned/rectangular units with six sawn sides.

Industrial diamond tipped blades and/or wire is used to slice through the stone producing a smooth cut face. The faces that will be visible or trafficked then receive a textured finish by means of blistering with a high temperature flame gun or mechanical method.

It as a relatively low energy use process as the stone itself was formed many millions of years ago. All the factory is doing is cutting stones down to size and creating a finish to the surface.

Scottish government policy is to maximise renewable power supply. Tradstocks don't have control over the source but monitor how the power to the factory is generated. The biogenic carbon of any packaging material used in this process is balanced at this module.

C1: Deconstruction and Demolition

There is no energy use during deconstruction, it is performed with manual work.

C2: Transport

Average distance from the demolition site to the final disposal site is assumed to be 100 km. A 16-32 tonne HGV truck was assumed to transport the stone.

C3: Waste Processing

Material at the end of life is expected to be reclaimed and used again in construction projects in the future. 80% of the stone products are assumed to be directly reclaimed on-site. The remaining 20% of the stone is recycled as crushed stone forming aggregates – hence involving waste processing.

C4: Recycle - Disposal

None of the stone products go for disposal. Hence, there should be no requirement to landfill.

D: Resource Recovery Stage

Because of the large durability of the rock, blocks are assumed to be reclaimed at the end of the first use to be used in other construction projects. We have assumed that 80% of the blocks can be reclaimed, substituting new stone blocks. The system is credited with the avoided burden of extracting new rock.

More information:

Name and contact information of LCA practitioner: Dr Shashwat Ganguly, Looper Tech Ltd, Edinburgh, United Kingdom.

Cut off criteria and allocation methods:

The allocation method applied in this study adheres to the guidelines of PCR 2019:14 Version 1.3.4 and EN 15804. The stone processing factory produces products coming from two distinct stone types – Scottish Whinstone and Achnaba Green Schist. The environmental burdens associated with Whinstone and Achnaba Green Schist follow the cut-off approach as defined by the PCR.

The manufacturing plant produces Whinstone and Achnaba Green Schist products in batches, i.e., at a time only one type of product (Whinstone or Achnaba Green) is produced. For energy consumption, water consumption, consumables used, and emissions related to processing, physical allocation is applied based on the mass of actual usage per functional unit (1 tonne of Whinstone or Achnaba Green Schist product), as required by PCR 2019:14 Version 1.3.4.

However, in each batch, apart from the Whinstone and Achnaba Green Schist products, there are walling stone and aggregate products that are also obtained and sold as products but with a significant economic variation. An economic allocation methodology was used to define which input and output flows associated only to the production of the corresponding natural stone produced in the batch (Whinstone or Achnaba Green Schist).

The electricity is sourced from the UK national mix and the dataset used from Ecoinvent version 3.10 is "market for electricity, medium voltage; GB" with an emission factor of 0.251 kgCO₂/kWh (GWP-GHG). According to the dataset, the shares of electricity technologies on this market have been calculated based on statistics from Ecoinvent electricity modelling statistics as per PCR 2019:14 Version 1.3.4. These are detailed in Table 1.

Table 1: Electricity Grid mix for the Ecoinvent data point used in the study from Ecoinvent electricity modelling statistics

Energy Source in the mix	Percentage (%)
Coal	3.03
Natural gas	37.77
Nuclear	7.32
Hydro	0.31
Wind, solar, etc.	5.71
Biofuels and waste	10.06
Oil	35.80

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Constructi on process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	UK	-	-	-	-	-	-	-	-	-	UK	GLO	GLO	GLO	GLO
Specific data used	<40%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Content information

Product components	Weight (kg)	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Natural Stone	1000	0%	0%
TOTAL	1000	0%	0%
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Wood	8.69	0.87	4.29
Plastic (Polyethylene)	0.8	0.083	0.00
TOTAL	9.493	0.95	4.29

Dangerous substances from the candidate list of SVHC for Authorisation

No substances included in the Candidate List of Substances of Very High Concern for authorisation are present in the products above the threshold for registration with the European Chemicals Agency (more than 0.1% of the weight of the product).

**Disclaimer 1: There are no hazardous substances above the threshold for registration with the European Chemicals Agency present in the constituents based on substances included in the Candidate List of Substances of Very High Concern for authorisation, as per Section 8.2.3 of GPI 5.0 requiring adequate declaration of hazardous substances in the constituent*

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. The results of module A1-A3 shouldn't be used without considering the results of module C.

Mandatory impact category indicators according to EN 15804

Results per functional or declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	3.27E+01	3.12E+01	6.51E+01	1.29E+02	0.00E+00	1.90E+01	9.36E-02	0.00E+00	-3.87E+00
GWP-biogenic	kg CO ₂ eq.	-1.58E+01	0.00E+00	1.58E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-04
GWP-luluc	kg CO ₂ eq.	7.05E-03	1.04E-02	8.67E-02	1.04E-01	0.00E+00	6.32E-03	1.36E-04	0.00E+00	-2.39E-03
GWP-total	kg CO ₂ eq.	1.69E+01	3.12E+01	8.10E+01	1.29E+02	0.00E+00	1.90E+01	9.37E-02	0.00E+00	-3.87E+00
ODP	kg CFC 11 eq.	4.73E-07	6.20E-07	3.24E-06	4.33E-06	0.00E+00	3.78E-07	7.08E-10	0.00E+00	-4.11E-08
AP	mol H ⁺ eq.	1.12E-01	6.49E-02	1.86E-01	3.63E-01	0.00E+00	3.96E-02	4.56E-04	0.00E+00	-5.38E-02
EP-freshwater	kg P eq.	1.84E-03	2.11E-03	8.25E-03	1.22E-02	0.00E+00	1.29E-03	4.46E-05	0.00E+00	-7.87E-04
EP-marine	kg N eq.	4.37E-02	1.56E-02	5.11E-02	1.10E-01	0.00E+00	9.50E-03	9.08E-05	0.00E+00	-1.76E-02
EP-terrestrial	mol N eq.	4.78E-01	1.68E-01	5.66E-01	1.21E+00	0.00E+00	1.03E-01	9.04E-04	0.00E+00	-2.43E-01
POCP	kg NMVOC eq.	1.70E-01	1.08E-01	1.93E-01	4.70E-01	0.00E+00	6.58E-02	2.72E-04	0.00E+00	-5.52E-02
ADP-minerals&metals*	kg Sb eq.	2.78E-05	1.04E-04	2.09E-04	3.41E-04	0.00E+00	6.32E-05	1.13E-07	0.00E+00	-1.52E-05
ADP-fossil*	MJ	4.17E+02	4.38E+02	1.87E+03	2.72E+03	0.00E+00	2.67E+02	1.31E+00	0.00E+00	-4.73E+01
WDP*	m ³	2.26E+00	2.14E+00	1.89E+01	2.33E+01	0.00E+00	1.31E+00	2.38E-02	0.00E+00	-3.93E+00
Acronyms	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									

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Additional mandatory and voluntary impact category indicators

Results per functional or declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
GWP-GHG ¹	kg CO ₂ eq.	3.27E+01	3.12E+01	6.52E+01	1.29E+02	0.00E+00	1.90E+01	9.39E-02	0.00E+00	-3.88E+00

Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017

Resource use indicators

Results per functional or declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
PERE	MJ	4.84E+00	7.52E+00	5.17E+02	5.29E+02	0.00E+00	4.59E+00	1.86E-01	0.00E+00	-2.86E+00
PERM	MJ	1.19E+02	0.00E+00	-1.19E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.24E+02	7.52E+00	3.98E+02	5.29E+02	0.00E+00	4.59E+00	1.86E-01	0.00E+00	-2.86E+00
PENRE	MJ	4.17E+02	4.38E+02	1.69E+03	2.55E+03	0.00E+00	2.67E+02	1.31E+00	0.00E+00	-4.73E+01
PENRM	MJ	3.54E+01	0.00E+00	-3.54E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	4.52E+02	4.38E+02	1.65E+03	2.55E+03	0.00E+00	2.67E+02	1.31E+00	0.00E+00	-4.73E+01
SM	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
RSF	MJ	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
NRSF	MJ	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
FW	m ³	4.80E-02	5.89E-02	4.62E-01	5.69E-01	0.00E+00	3.59E-02	6.74E-04	0.00E+00	-9.34E-02
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water									

¹ This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO₂ is set to zero.

Waste indicators

Results per functional or declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	1.35E+00	6.39E-01	2.59E+00	4.58E+00	0.00E+00	3.90E-01	8.16E-03	0.00E+00	-2.48E-01
Non-hazardous waste disposed	kg	1.51E+01	6.72E+00	6.08E+01	8.27E+01	0.00E+00	8.23E+00	2.18E-01	0.00E+00	-4.46E+00
Radioactive waste disposed	kg	6.67E-05	1.41E-04	1.26E-02	1.28E-02	0.00E+00	8.61E-05	4.38E-06	0.00E+00	-5.26E-05

Output flow indicators

Results per functional or declared unit										
Indicator	Unit	A1	A2	A3	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E+02	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E+02	0.00E+00	0.00E+00
Materials for energy recovery	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
Exported energy, electricity	MJ	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
Exported energy, thermal	MJ	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

Additional environmental information

Typical Usage:

Quarried from Western Scotland, near Lochgilphead, its strength and durability make it most popular for setts and paving, however it is often used for other purposes such as benches, bollards, planters and memorials

References

General Programme Instructions of the International EPD® System. Version 5.0.

PCR 2019:14, Product Category Rules for Construction Products, Version 1.3.4

EN ISO 9001, Quality Management Systems - Requirements

EN ISO 14001, Environmental Management Systems - Requirements

ISO 45001, Occupational Health & Safety Management System - Requirements

ISO 14020:2000, Environmental Labels and Declarations - General principles

EN 15804:2012+A2:2019/AC:2021, Sustainability in construction works - Environmental Product Declarations - Core rules for the product category of construction products, 2014

ISO 14025:2006 Environmental labels and declarations - Type III environmental declarations - Principles and procedures

ISO 14040:2006, Environmental management - Life cycle assessment - Principles and framework

ISO 14044:2006, Environmental management - Life cycle assessment - Requirements and guidelines

Ecoinvent / Ecoinvent Centre, www.ecoinvent.org

