

# Environmental Product Declaration



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

## Penetron and Penetron Admix

from

**The Penetron Group**



Programme:	The International EPD® System, <a href="http://www.environdec.com">www.environdec.com</a>
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*An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at [www.environdec.com](http://www.environdec.com)*



## General information

### Programme information

<b>Programme:</b>	The International EPD® System
<b>Address:</b>	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
<b>Website:</b>	<a href="http://www.environdec.com">www.environdec.com</a>
<b>E-mail:</b>	<a href="mailto:info@environdec.com">info@environdec.com</a>

<b>Accountabilities for PCR, LCA and independent, third-party verification</b>
<b>Product Category Rules (PCR)</b>
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): <i>Construction Products, PCR 2019:14, version 1.3.3 and UN CPC code 375</i>
PCR review was conducted by: The Technical Committee of the International EPD® System., A full list of members is available on <a href="http://www.environdec.com">www.environdec.com</a> . The review panel may be contacted via <a href="mailto:info@environdec.com">info@environdec.com</a> . Chair of the PCR Review: Lars-Gunnar Lindfors
<b>Life Cycle Assessment (LCA)</b>
LCA accountability: Ms. Arati Bhosale, Greenex Environmental, Pune, India.
<b>Third-party verification</b>
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: Dr. Subramanian Senthilkannan Muthu, Hong Kong.  Approved by: The International EPD® System

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: The Penetron Group

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Description of the organisation: Founded in the late 1970s, PENETRON developed cementitious waterproofing products and additives to create an optimal crystalline technology. The know-how and experience gained over the past 40 years have enabled PENETRON to offer a broad range of concrete solutions, including crystalline waterproofing, water stops, and liquid sealers. The PENETRON system has been proven effective on countless major projects worldwide. The technical excellence of the products and a knowledgeable and dependable team of people have made the company the industry leader.

Name and location of production site(s):

The EPD refers to the production of PENETRON Products, namely Penetron and Penetron Admix in the manufacturing site, placed in East Setauket, US.

## **Product information**

Product name: Penetron

Product description: It is an integral crystalline waterproofing material applied to surfaces, serves the dual purpose of waterproofing and providing chemical protection, both above and below ground. It can be applied using a brush or spray, on either the positive or negative side of the concrete, and effectively penetrates the structure in the presence of moisture. It creates an impermeable crystalline barrier by reacting with microcracks, pores, and capillaries, effectively blocking water and water-borne chemicals, even under high hydrostatic pressure. Furthermore, any cracks that may emerge over the concrete's lifespan are automatically mended by PENETRON, resulting in lasting and permanent protection for the concrete.

UN CPC code of Penetron: 375

Product name: Penetron Admix

Product description: It is a powdered, non-toxic, third-generation crystalline admixture, is introduced into new concrete during the batching process. Once integrated into the concrete mix, it plays a pivotal role in reducing concrete permeability through the permanent self-repair of microcracks, pores, and capillaries. This action ensures effective safeguarding of the concrete against water infiltration and the detrimental effects of degradation, even in the presence of elevated hydrostatic pressure. PENETRON ADMIX equips construction projects with concrete that is both waterproof and long-lasting, possessing the unique ability to autonomously mend and seal cracks that may arise over the concrete's lifespan.

UN CPC code of Penetron Admix: 375

Geographical scope: Global

## LCA information

Declared unit: 1 kg of product including packaging

Reference service life: Not Applicable

Time representativeness: Information on the production of Penetron and Penetron Admix has been collected in Jan 2023 to Dec 2023, all generic data refer to the ecoinvent v3.8 database, including updated datasets.

Database(s) and LCA software used: Ecoinvent v.3.8 and SimaPro v 9.3.0.1.

The data sets used for products modelling have been updated within the last 10 years.

Description of system boundaries: Cradle to gate (A1- A3 modules)

Type D system boundary is selected as per the PCR guideline. A1 module includes the supply of raw materials reported in the “Content declaration” section. A2 Module includes the transportation of each raw material to the manufacturing site. A3 Module includes all the activities/processes taking place in the manufacturing site. Excluded lifecycle stages: Modules B, C and D are not considered as the requirements in the PCR for type D EPD are met.

System diagram:

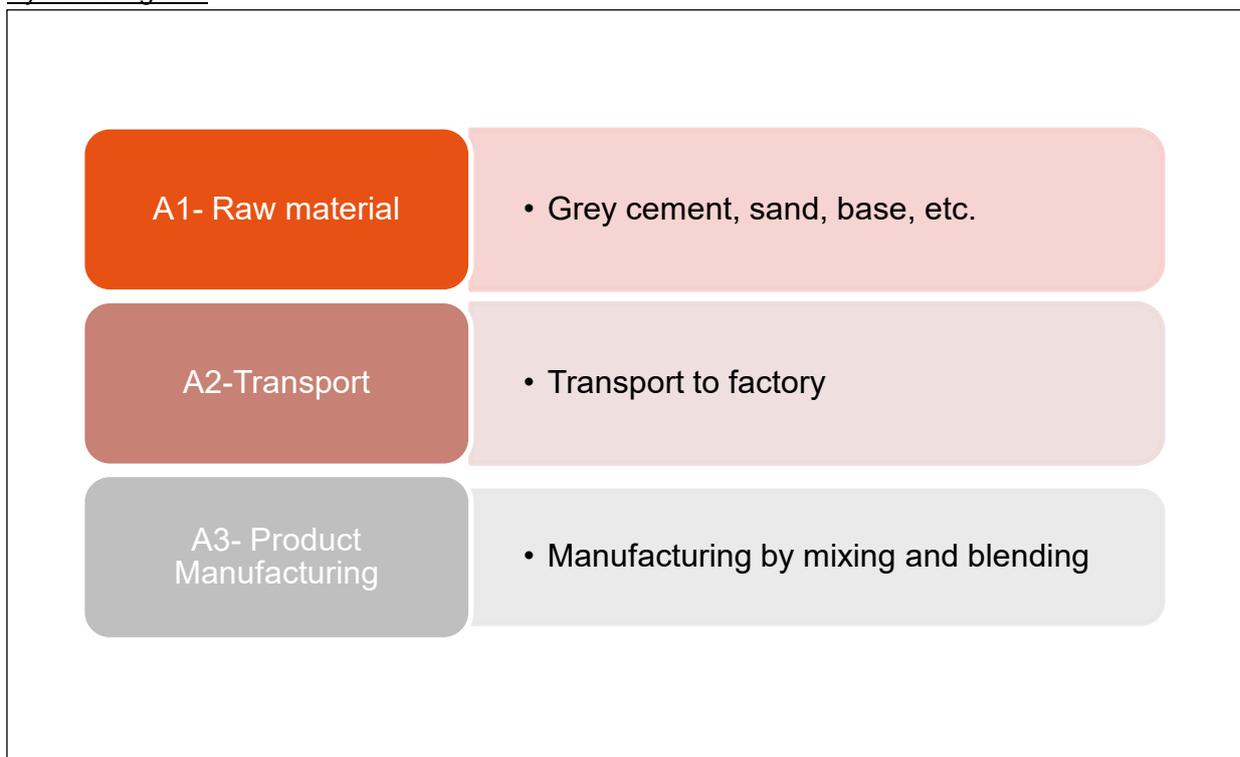


Figure 1 System diagram

**Manufacturing process:** The manufacturing process for the mentioned products i.e. Penetron and Penetron Admix primarily involves mixing and blending of the ingredients based on the order quantity and the composition for both the products is as mentioned in content information of this report.

Subsequently, the resulting mixture undergoes inspection. Upon receiving satisfactory inspection results, the product is then packed and prepared for dispatch. The process flow chart is given below. The products Penetron and Penetron Admix are used as waterproofing materials and are applied on the surface of the of the building. Penetron and Penetron Admix seamlessly integrate into concrete structures, providing comprehensive waterproofing and chemical resistance. Its deep-penetrating formula seals capillary tracts and shrinkage cracks, ensuring durability against high hydrostatic pressure. Cost-effective and easy to apply, Penetron enhances concrete strength and protects against various environmental factors. Certified non-toxic and zero VOC, it's safe for potable water applications and environmentally friendly.

### PROCESS FLOW CHART

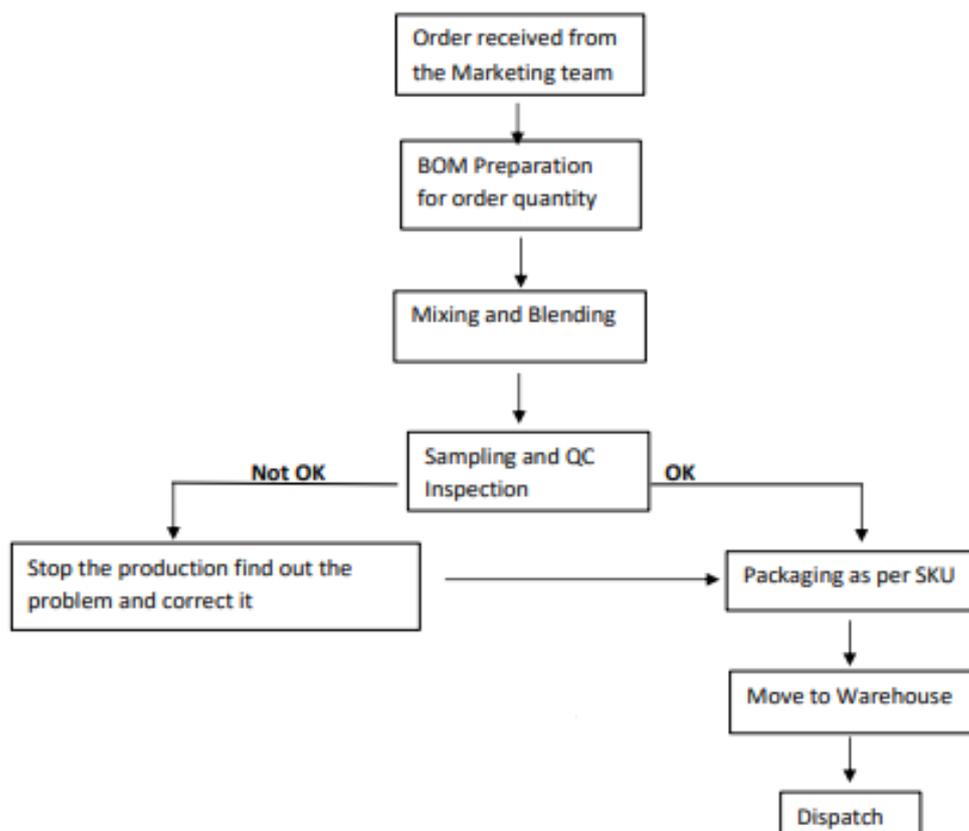


Figure 2 Process flow diagram of Penetron and Penetron Admix

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

	Product stage			Construction 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	ND	ND	ND	ND	ND
Geography	US	US	US	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Specific data used	>90%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-

(X- declared modules and ND- modules not declared)

Figure 3 Life cycle modules declared

**Allocation and Cut-off rules:**

According to the reference PCR, “**Construction Products (PCR 2019:14, Version 1.3.3)**” in Life Cycle Inventory, the minimum percentage of total mass and energy flows equal to 95% has been reported, considering the flows included in the modules A1-A3 of the system boundary. No allocations were made to the input or output data of PENETRON products since PENETRON does not report co-products nor reuse, recycling, or recovery of flows during its internal manufacturing processes.

**Assumptions:**

The following assumptions have been made in this EPD:

- It does not include the manufacturing processes of the capital goods or spare parts and/or maintenance.
- The environmental impact of infrastructure for general management, office and headquarters operations is not included.

- The impact caused by people (common activities, travel for work) is not considered. The processes associated with fuel production are intrinsically included in the indicators in Ecoinvent database used in carrying out the LCA.
- The environmental impact of external transport has been calculated using lorries from the Ecoinvent 3.8 database, EURO 6. These Lorries have been selected to reflect the most realistic scenario possible.
- Quartz sand is considered as silica sand.
- Silicate powder is considered as sodium silicate.
- Calcium hydroxide is considered as Limestone.
- Calcium magnesium hydroxide and calcium magnesium hydroxide oxide is considered as magnesium oxide.

**Exclusions:**

- Construction waste and packaging/ manufacturing waste is not considered.
- The database for fly ash does not exist in the database, hence excluded from the calculations.
- No other environmental, economic and social impacts are declared.

**Data collection:**

Specific data have been collected in **January 2024** for the data collection period from **Jan 2023 to Dec 2023**. The data was collected for the US site. The evidences for electricity, raw material purchase and raw material transportation were gathered from the bills and registers maintained on site during.

## Content information of Penetron

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Cement	0.55	0	0
Quartz sand	0.25	0	0
Silicate Powder	0.20	0	0
<b>TOTAL</b>	<b>1.00</b>	<b>0</b>	<b>0</b>

Packaging materials	Weight, gm	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Printed paper	0.00047	0	0
Paper sack	0.00712	0	0
<b>TOTAL</b>	<b>0.00759</b>	<b>0</b>	<b>0</b>

## Content information of Penetron Admix

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Cement	0.55	0	0
Sodium silicate	0.090	0	0
Magnesium oxide	0.1	0	0
Limestone	0.02	0	0
<b>TOTAL</b>	<b>1.00</b>	<b>0</b>	<b>0</b>

Packaging materials	Weight, gm	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Printed paper	0.00057	0	0
Paper sack	0.00854	0	0
<b>TOTAL</b>	<b>0.00911</b>	<b>0</b>	<b>0</b>

**Recycled material Provenience of recycled materials (pre-consumer or post-consumer) in the product:** Penetron and Penetron Admix components are made up of virgin raw materials. No recycled materials are used.

**Electricity details:**

The electricity from grid provided in US is the source of electricity for manufacturing which has the climate impact of 0.23098 kg CO<sub>2</sub> eq./ kWh.

**Properties of Penetron and Penetron Admix:**

The raw materials used for manufacturing the product do not have any hazardous properties but a direct exposure might cause skin irritation, eye irritation, respiratory irritation. Prolonged or repeated exposure might cause damage to organs.

## Results of the environmental performance indicators

### (a) Penetron

#### Mandatory impact category indicators according to EN 15804

Indicator	Unit	A1-A3
GWP-fossil	kg CO <sub>2</sub> eq.	0.706691
GWP-biogenic	kg CO <sub>2</sub> eq.	0.014715
GWP-luluc	kg CO <sub>2</sub> eq.	0.0006
GWP-total	kg CO <sub>2</sub> eq.	0.722296
ODP	kg CFC 11 eq.	3.09E-08
AP	mol H <sup>+</sup> eq.	0.002623
EP-freshwater	kg P eq.	0.000119
EP-marine	kg N eq.	0.000566
EP-terrestrial	mol N eq.	0.007024
POCP	kg NMVOC eq.	0.001626
ADP-minerals&metals*	kg Sb eq.	6.44E-06
ADP-fossil*	MJ	4.116599
WDP*	m <sup>3</sup>	0.11036
Acronyms	<p>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&amp;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</p>	

### Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3
GWP-GHG <sup>1</sup>	kg CO <sub>2</sub> eq.	0.701123
<i>Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017</i>	-	-

### Resource use indicators

Indicator	Unit	A1-A3
PERE	MJ	0.615322899
PERM	MJ	0
PERT	MJ	0.615322899
PENRE	MJ	4.156948223
PENRM	MJ	0
PENRT	MJ	4.156948223
SM	kg	0
RSF	MJ	0
NRSF	MJ	0
FW	m <sup>3</sup>	0.003310835
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	

## Waste indicators

Indicator	Unit	A1-A3
Hazardous waste disposed	kg	1.62758E-05
Non-hazardous waste disposed	kg	0.068086118
Radioactive waste disposed	kg	4.12251E-06

## Output flow indicators

Indicator	Unit	A1-A3
Components for re-use	kg	0
Material for recycling	kg	0
Materials for energy recovery	kg	0
Exported energy, electricity	MJ	0
Exported energy, thermal	MJ	0

### **(b) Penetron Admix**

#### Mandatory impact category indicators according to EN 15804

Indicator	Unit	A1-A3
GWP-fossil	kg CO <sub>2</sub> eq.	0.867445
GWP-biogenic	kg CO <sub>2</sub> eq.	0.009513
GWP-luluc	kg CO <sub>2</sub> eq.	0.000719
GWP-total	kg CO <sub>2</sub> eq.	0.877909
ODP	kg CFC 11 eq.	3.49E-08

AP	mol H <sup>+</sup> eq.	0.002502
EP-freshwater	kg P eq.	0.000118
EP-marine	kg N eq.	0.000619
EP-terrestrial	mol N eq.	0.00729
POCP	kg NMVOC eq.	0.001789
ADP-minerals&metals*	kg Sb eq.	5.18E-06
ADP-fossil*	MJ	4.282536
WDP*	m <sup>3</sup>	0.089179
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	

### Additional mandatory and voluntary impact category indicators

Indicator	Unit	A1-A3
GWP-GHG <sup>2</sup>	kg CO <sub>2</sub> eq.	0.861654
<i>Additional voluntary indicators e.g. the voluntary indicators from EN 15804 or the global indicators according to ISO 21930:2017</i>	-	-

### Resource use indicators

Indicator	Unit	A1-A3
PERE	MJ	0.693783656
PERM	MJ	0
PERT	MJ	0.693783656
PENRE	MJ	5.228580538

PENRM	MJ	0
PENRT	MJ	5.228580538
SM	kg	0
RSF	MJ	0
NRSF	MJ	0
FW	m <sup>3</sup>	0.002726034
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	

## Waste indicators

Indicator	Unit	A1-A3
Hazardous waste disposed	kg	2.0203E-05
Non-hazardous waste disposed	kg	0.067485977
Radioactive waste disposed	kg	5.22787E-06

## Output flow indicators

Indicator	Unit	A1-A3
Components for re-use	kg	0
Material for recycling	kg	0

Materials for energy recovery	kg	0
Exported energy, electricity	MJ	0
Exported energy, thermal	MJ	0

### Other environmental performance indicators

No other environmental performance indicators/ additional environmental information/ social & economic information/ information related to sector EPD/ difference between previous versions has been declared.

#### References

- EPD International (2017) General Programme Instructions for the InternationalEPD® System. Version 3.0, dated 2017-12-11. [www.environdec.com](http://www.environdec.com)
- ISO (2006a), ISO 14025:2006, Environmental labels and declarations – Type III-environmental declarations – Principles and procedures
- ISO (2006b), ISO 14040:2006, Environmental management – Life cycle assessment – Principles and framework
- ISO (2006c), ISO 14044: 2006, Environmental management – Life cycle assessment – Requirements and guidelines
- Emission Estimation Technique Manual, Version 1.1, National Pollutant Inventory, 2001.
- Construction Product PCR 2019:14 V 1.3.3
- [www.penetron.com](http://www.penetron.com)
- SimaPro software version 9.3.0.1
- Ecoinvent database version 3.8

