



CETCO®



Instytut Techniki Budowlanej

ENVIRONMENTAL PRODUCT DECLARATION TYPE III ITB NO. 132/2020

ISSUANCE DATE: 22.12.2020 | VALIDITY DATE: 22.12.2025

VOLTEX® • VOLTEX® DS

BENTONITE-GEOTEXTILE WATERPROOFING MEMBRANES



CETCO®

Owner of the EPD

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ITB is the verified member of
The European Platform
for EPD program
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MANUFACTURER

CETCO is the construction technologies business unit of Minerals Technologies Incorporated, established in 1992. Minerals Technologies Inc. is a global leader in minerals-based application technology with operations spanning over 30 countries and 158 locations. Our international team of clay mineralogists, chemists and polymer scientists, transforms ordinary minerals into extraordinary technology. CETCO-Poland, Cetco Sp. z o.o. S.K.A. is the Polish headquarter of the company located in Szczytno where, since 1998, the largest CETCO production plant in Europe and modern research and development laboratory have operated.

Passion for Innovation

Our multidisciplinary research and development team creates new products and provides the support our customers need. Our growing portfolio demonstrates our commitment to technological innovation across the markets that we serve.

BASIC INFORMATION

This declaration is the type III Environmental Product Declaration (EPD) based on PN-EN 15804 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment. Their aspects were verified by the independent body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to PN-EN 15804 (see point 5.3 of the standard).

Life cycle analysis (LCA):

A1-A3, C3, C4 and D according to PN-EN 15804
(Cradle to Gate with options)

The year of preparing the EPD:

2020

Service Life:

Predicted to be durable for a minimum of 25 years
in natural soils with $4 < \text{pH} < 9$ and soil temperature
 $< 25^{\circ}\text{C}$

PCR:

ITB-PCR A (PCR based on PN-EN 15804)

Declared unit:

1 m²

Reasons for performing LCA:

B2B

Origin:

Polish product



PRODUCT DESCRIPTION

VOLTEX®, VOLTEX® DS – bentonite – geotextile waterproofing membranes are composite of high strength geotextiles and min. 4.8 kg/sqm of sodium bentonite. The high swelling, low permeable sodium bentonite is encapsulated between a non-woven and woven geotextile. A proprietary needle punch process interlocks the geotextiles together forming an composite that maintains the equal coverage of bentonite, as well as, protects it from inclement weather and construction related damage.

VOLTEX DS is a version of VOLTEX with an integrally bonded polyethylene liner. Voltex CR and Voltex DSCR with contaminant resistant sodium bentonite was designed for projects where contaminated ground-water / soil exist. VOLTEX waterproofing membranes are designed for below-ground vertical and horizontal structural foundation surfaces. Typical cast-in-place concrete applications include backfilled concrete walls, earth-covered roofs, structural slabs, tunnels, and property line construction. Property line construction applications include soldier pile and lagging, secant/contiguous piling, steel sheet piling, shotcrete and stabilized earth retention walls. Applications may include structures under continuous or intermittent hydrostatic pressure.

The bentonite encapsulated between geotextiles is a naturally occurring mineral that is composed predominantly of the smectite. Most bentonites are formed by the alteration of volcanic ash in marine environments and occur as layers sandwiched between other types of rocks. The smectite in most bentonites is the mineral montmorillonite, which is a dioctahedral smectite. Sodium bentonite-based VOLTEX waterproofing membranes are designed to provide an effective waterproofing barrier against water from the ground. The swelling bentonite fills up cracks and porous in concrete structures and blocks the flow path of water, resulting in an excellent waterproofing barrier.

What makes CETCO VOLTEX®, VOLTEX® DS unique?

- **Durable needle-punched reinforcement** ensures that VOLTEX waterproofing barriers is durable on building sites. The high needlepunch density provides peel-adhesion to poured concrete.
- **Granular bentonite** creates less dust during installation than powdered bentonite. The high needlepunch density provides high peel-adhesion to poured concrete.
- **It can be custom engineered** to meet the project specific needs, in diversified environmental in both hydrostatic and non-hydrostatic conditions.

What are the advantages of a VOLTEX® waterproofing system?

Protection from Water Ingress:

- Can self-seal small cracks while forming watertight laps at the seams.
- Provides a mechanical bond to poured concrete.
- Proven effective in structures under continuous or intermittent hydrostatic pressure – tested up to 70 m (ASTM D 5385 mod.)

Installation Benefits and Features:

Fast and Easy:

- Overlapping seams with mechanical fasteners eliminates installation variables in the field.
- Its composite construction eliminates the need for concrete underblinding.

Versatility:

- Can be installed in virtually any weather condition, including freezing temperatures and damp conditions.
- Can be installed on green concrete without primers or adhesives.
- Proven effective in both vertical and horizontal applications – i.e., backfilled and property-line walls.

Delivery and Packaging

VOLTEX® waterproofing membranes are delivered in the form of rolls with standard dimensions:

1.15 m x 5 m, 2.5 m x 10m or 20 m, 5 m x 20 or 40 m. Other roll dimensions are available upon request. The rolls are packaged in a PE protective wrapping and marked with the manufacturer's label.

Placing on the market

EN 13491:2004 + EN 13491:2004/A1:2006 can be used as waterproofing barrier as per regulation EU number 305/2011 of 9 March 2011 applies for placing on the market within the European Harmonized Standards listed below.

- EN 13491:2004 + EN 13491:2004/A1:2006 Geosynthetic barriers – Characteristics required for use as a fluid barrier in the construction of tunnels and underground structures

LIFE CYCLE ASSESSMENT (LCA) – GENERAL RULES APPLIED

Allocation

The allocation rules used for this EPD are based on general ITB PCR A. Production of the VOLTEX WATERPROOFING BARRIERS is a line process in one factory of CETCO-Poland, Cetco Sp. zo.o. S.K.A. in Korpele (Poland). Allocation was done on product mass basis. All impacts from raw materials extraction are allocated in A1 module of the LCA. 74.87% Impacts from line production of CETCO-Poland, Cetco Sp. zo.o. S.K.A were inventoried and were allocated to the VOLTEX WATERPROOFING BARRIERS production. Utilization of packaging material was taken into consideration. Module A2 includes transport of raw materials from their suppliers to CETCO-Poland, Cetco Sp. zo.o. S.K.A. in Korpele. Municipal wastes were allocated to module A3. Energy supply, emissions and wastes were inventoried were allocated to module A3.

System Limits

The life cycle analysis of the declared products covers “Product Stage”, A1-A3, C3, C4 and D modules (Cradle to Gate with options) in accordance with PN-EN 15804+A1:2014-04 and ITB PCR A. The details of systems limits are provided in product technical report. All materials and energy consumption inventoried in factories were included in the calculations. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with PN-EN 15804+A1:2014-04, machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

A1 and A2 Modules:

Raw materials supply and transport geosynthetics, polymers and packaging materials come from both local and foreign suppliers. Bentonite used in the analyzing period of 2017 originated from Turkish and other resources. Means of transport include trucks with load: <10t, 10 – 16t and >16 and ships with load > 3000t. For calculation purposes Polish and European fuel averages are applied.

A3: Production

The production process of the VOLTEX WATERPROOFING BARRIERS by CETCO-Poland, Cetco Sp. z o.o. S.K.A. is presented in Fig. 2.

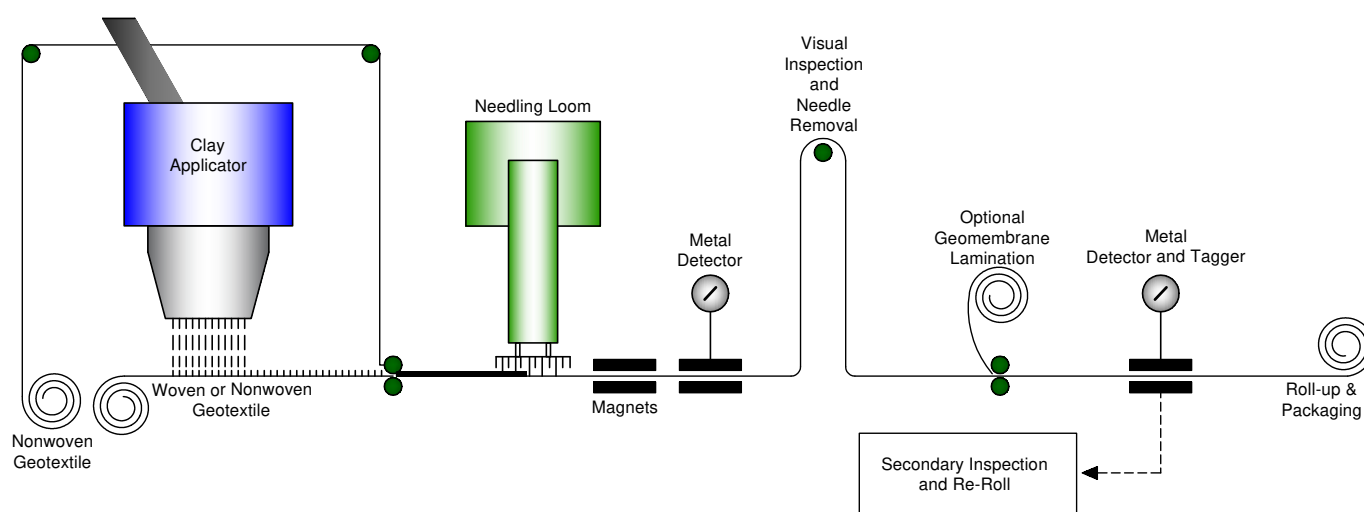


Fig 2. A scheme of manufacturing of VOLTEX WATERPROOFING BARRIERS by CETCO-Poland, Cetco Sp. zo.o. S.K.A..

C3, C4 and D Modules: End-of-Life

It is assumed that at the end of life bentonite-based mats remain underground, in the place of installation (100% of landfilling). Environmental burdens occurring in module C4 are associated with exchanges to process-specific burdens (energy, land use), emissions to air via landfill gas incineration and landfill leachate. Impacts of packaging materials that constitute less than 1.0% of the total system flows was not taken into consideration.

End-of-Life (modules C and D)

Material	Material Recovery	Landfilling
Bentonite	0%	100%
PP textile	0%	100%

LIFE CYCLE ASSESSMENT (LCA) – GENERAL RULES APPLIED

Data Collection Period

The data for manufacture of the declared products refer to a period between 01.01.2017 – 31.12.2017 (1 year). The life cycle assessments were prepared for Poland as reference area.

Data Quality

The values determined to perform the LCA analysis originate from verified CETCO-Poland, Cetco Sp. z o.o. S.K.A. inventory data.

Assumptions and Estimates

The impacts of the representative the VOLTEX WATERPROOFING MEMBRANES were aggregated using weighted average. Impacts were inventoried and calculated for all VOLTEX WATERPROOFING MEMBRANES.

Calculation Rules

LCA was done in accordance with ITB PCR A document.

Databases

The data for the processes come from the following databases: Ecoinvent v.3.6, specific EPDs, ITB-Data. Specific data quality analysis was a part of external ISO 14001 audit.

LIFE CYCLE ASSESSMENT (LCA) – RESULTS

Declared Unit

The declaration refers to declared unit (DU) – 1 m² of the VOLTEX WATERPROOFING MEMBRANES by CETCO-Poland, Cetco Sp. zo.o. S.K.A.

Environmental Assessment Information

(MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed)

Product stage	Raw material supply	A1	MD
	Transport	A2	MD
	Manufacturing	A3	MD
Construction process	Transport to construction site	A4	MNA
	Construction-installation process	A5	MNA
Use stage	Use	B1	MNA
	Maintenance	B2	MNA
	Repair	B3	MNA
	Replacement	B4	MNA
	Refurbishment	B5	MNA
	Operational energy use	B6	MNA
	Operational water use	B7	MNA
End of life	Deconstruction demolition	C1	MNA
	Transport	C2	MNA
	Waste processing	C3	MD
	Disposal	C4	MD
Benefits and loads beyond the system boundary	Reuse-recovery-recycling potential	D	MD

Table 1. System boundaries for the environmental characteristic the VOLTEX WATERPROOFING BARRIERS manufactured by CETCO-Poland, Cetco Sp. z o.o. S.K.A.

VOLTEX® WATERPROOFING BARRIERS

Environmental impacts: (DU) 1 m²

Indicator	Unit	A1	A2	A3	A1-A3	C3	C4	D
Global warming potential	kg CO ₂ eq.	3,47E+00	8,19E-01	8,87E-02	4,38E+00	0,00E+00	5,49E-02	0,00E+00
Depletion potential of the stratospheric ozone layer	kg CFC 11 eq.	4,73E-07	0,00E+00	0,00E+00	4,73E-07	0,00E+00	9,03E-09	0,00E+00
Acidification potential of soil and water	kg SO ₂ eq.	2,19E-02	1,13E-02	4,35E-04	3,37E-02	0,00E+00	2,01E-04	0,00E+00
Formation potential of tropospheric ozone	kg Ethene eq.	1,78E-03	2,79E-04	1,01E-05	2,07E-03	0,00E+00	2,61E-05	0,00E+00
Eutrophication potential	kg (PO ₄) ₃ - eq.	6,85E-03	1,95E-03	5,93E-05	8,87E-03	0,00E+00	4,97E-05	0,00E+00
Abiotic depletion potential (ADP-elements) for non-fossil resources	kg Sb eq.	8,08E-04	0,00E+00	3,29E-07	8,08E-04	0,00E+00	2,86E-07	0,00E+00
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	MJ	8,93E+01	3,84E+00	1,04E+00	9,42E+01	0,00E+00	7,89E-01	0,00E+00

Environmental aspects on resource use: (DU) 1 m²

Indicator	Unit	A1	A2	A3	A1-A3	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Use of renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	8,35E+00	3,59E-01	5,62E-02	8,77E+00	0,00E+00	1,62E-02	0,00E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	MJ	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ	9,38E+01	4,03E+00	1,09E+00	9,89E+01	0,00E+00	8,24E-01	0,00E+00
Use of secondary material	kg	3,36E-04	0,00E+00	0,00E+00	3,36E-04	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ	1,95E-09	2,01E-01	0,00E+00	2,01E-01	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ	2,20E-08	0,00E+00	0,00E+00	2,20E-08	0,00E+00	0,00E+00	0,00E+00
Net use of fresh water	m ³	INA	INA	INA	INA	INA	INA	INA

Other environmental information describing waste categories: (DU) 1 m²

Indicator	Unit	A1	A2	A3	A1-A3	C3	C4	D
Hazardous waste disposed	kg	5,44E-02	3,04E-04	7,46E-04	5,54E-02	0,00E+00	1,16E-06	0,00E+00
Non-hazardous waste disposed	kg	7,65E-01	2,82E-01	1,58E-01	1,20E+00	0,00E+00	5,12E+00	0,00E+00
Radioactive waste disposed	kg	1,24E-04	0,00E+00	0,00E+00	1,24E-04	0,00E+00	5,11E-06	0,00E+00
Components for re-use	kg	0,00E+00	0,00E+00	3,50E-05	3,50E-05	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	0,00E+00	0,00E+00	1,52E-03	1,52E-03	0,00E+00	0,00E+00	0,00E+00
Materials for energy recover	kg	6,99E-06	0,00E+00	0,00E+00	6,99E-06	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ per energy carrier	INA	INA	INA	INA	INA	INA	INA

Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930.

After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was PN-EN 15804 and ITB PCR A

Independent verification corresponding to ISO 14025 (subclause 8.1.3.)

• external

internal

External verification of EPD: Ph.D. Halina Prejzner

Input data verification, LCI audit, LCA: Ph.D. Eng. Justyna Tomaszewska, j.tomaszewska@itb.pl

Verification of LCA: Ph.D. Eng. Michał Piasecki, m.piasecki@itb.pl

Normative references

- ITB PCR A General Product Category Rules for Construction Products
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- PN-EN 15804+A1:2014-04 – Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- PN-EN 15804+A2:2020-03 – Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business
- KOBiZE Emissivity rates CO₂, SO₂, NO_x, CO and total dust for electricity, December 2018
- EN 13491:2004 + EN 13491:2004/A1:2006 Geosynthetic barriers – Characteristics required for use as a fluid barrier in the construction of tunnels and underground structures





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