

TYPE III ENVIRONMENTAL PRODUCT DECLARATION NO. 630/2024

ISSUANCE DATE: 24.04.2024 | VALIDITY DATE: 24.04.2029

SWELLTITE[®]

BENTONITE COMPOSITE WATERPROOFING SYSTEM



Owner of the EPD

CETCO – Poland, Cetco Sp. zo.o. S.K.A.

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EPD Program Operator

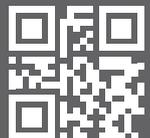
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ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 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 and their aspects verified by the independent body according to ISO 14025. Basically, comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.

Life cycle analysis (LCA): A1–A4, C1–C4 and D in accordance with EN 15804+A2

(Cradle-to-Gate with options)

The year of preparing the EPD: 2024

Product standard: EN 13967:2012; EN 13491:2004/A1:2006

Service Life: 25 years for standard product

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

Declared unit: 1 m²

Reasons for performing LCA: B2B

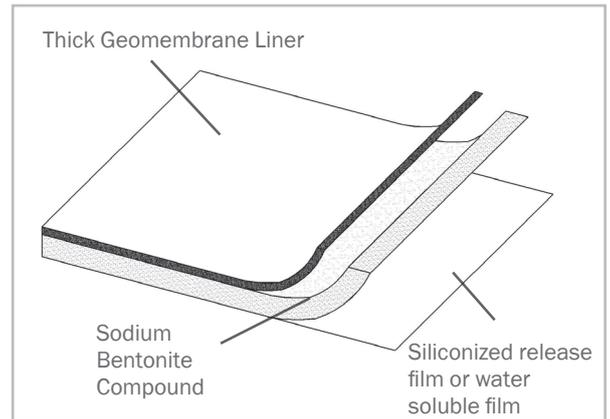
Representativeness: Polish, European

MANUFACTURER

CETCO is the construction technologies business unit of Minerals Technologies Incorporated, established in 1992. Minerals Technologies Inc. is a global producer of minerals-based application technology with operations spanning over 30 countries and 158 locations. An international team of clay mineralogists, chemists and polymer scientists, transforms ordinary minerals into CETCO 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.

PRODUCTS DESCRIPTION AND APPLICATION

SWELLTITE® is geosynthetic barrier for use as a fluid barrier in the construction tunnels and underground structures and is an effective waterproofing composite of sodium bentonite compound integrally bonded to a geomembrane liner. This composition combines the active waterproofing benefits of sodium bentonite with the strength and puncture resistance of a thick geomembrane liner. **SWELLTITE®** is an advancement in waterproofing membrane technology. Unlike other membrane systems, **SWELLTITE®**'s reactive bentonite compound can expand to seal small punctures in the membrane. **SWELLTITE®** is manufactured at a factory controlled thickness of 2.0 mm (80 mils) assuring the specifier, contractor, and owner of consistent material application. This engineered composite consists of a thick geomembrane liner and bentonite compound with a clear release film attached. Product contains zero VOC, can be installed to green concrete, and most importantly, has proven effective for more than 20 years. **SWELLTITE®** is designed for below-grade vertical and horizontal structural foundation surfaces, as well as, above grade split-slab construction. Typical below-grade applications include backfilled concrete walls, masonry block walls, earth-covered roofs, and tunnel roofs. Typical above grade split-slab construction applications include plaza decks, parking decks, and balconies. Additionally, **SWELLTITE®** can be used for interior split-slab applications for mechanical rooms, kitchens, and laboratory facilities. Applications may include structures under continuous or intermittent hydrostatic pressure.



SWELLTITE® Composite



LIFE CYCLE ASSESSMENT (LCA) – GENERAL RULES APPLIED

Unit

The declared unit is 1 m² of SWELLTITE®. Product roll size is 1.0m (40”) wide by 11.5m (37’ 9”) long; 11.5 sq m (125 square feet) per roll. The approximate weight of the product is 3.1 kg/m².

Allocation

The allocation rules used for this EPD are based on general ITB PCR A (2023). Production of SWELLTITE® is a line process conducted in the factory of CETCO – Poland, Cetco Sp. z o.o. S.K.A. in Korpele (Poland). Allocation was done on product mass basis. All impacts from raw materials extraction and processing are allocated in module A1 of the LCA. Impacts from the global line production of CETCO – Poland, Cetco Sp. z o.o. S.K.A were inventoried and allocated to SWELLTITE® production. Water and energy consumption, associated emissions and generated wastes are allocated to module A3.

System limits

The life cycle analysis (LCA) of the declared products covers: product stage – modules A1–A3, end of life – modules C3, C4 and benefits and loads beyond the system boundary – module D (cradle-to-gate with options) in accordance with EN 15804 and ITB PCR A. Energy and water consumption, emissions as well as information on generated wastes were inventoried and 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 EN 15804, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Modules A1 and A2: Raw materials supply and transport

Raw materials supply and transport of bentonite (75%), geosynthetics, polymer based inputs (15%) come from both local and foreign suppliers. 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.

Module A3: Production

The production process of SWELLTITE® by CETCO – Poland, Cetco Sp. z o.o. S.K.A. is presented in Fig. 1.

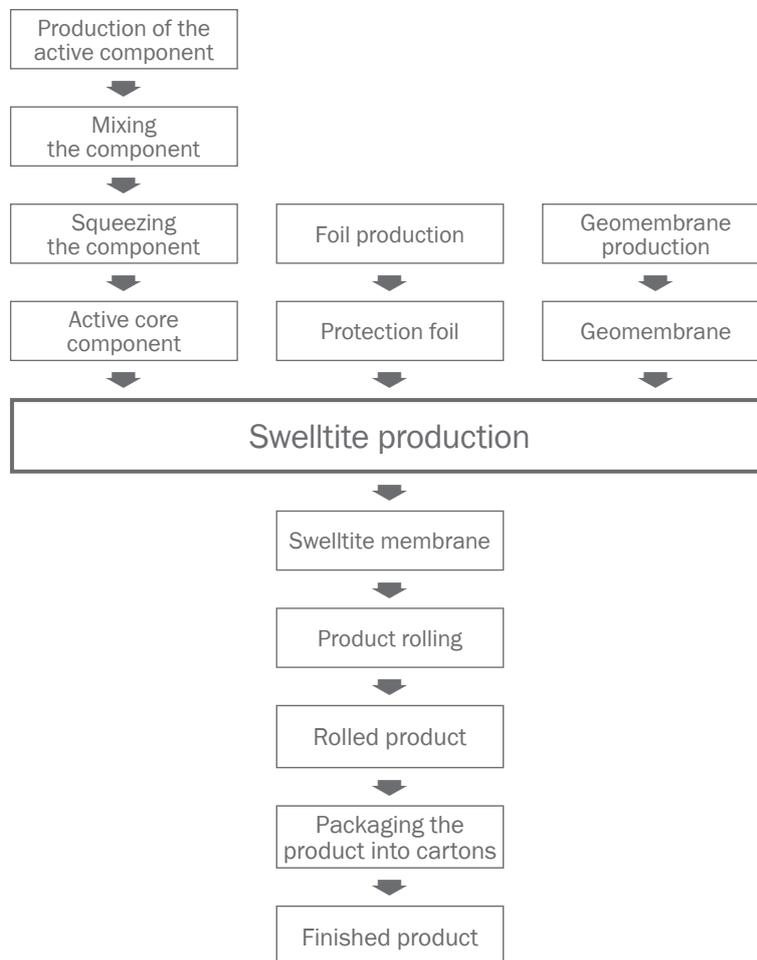


Fig. 1. A scheme of manufacturing process by CETCO – Poland, Cetco Sp. z o.o. S.K.A.

Modules C3, C4 and D: End-of-life (EoL)

The end-of-life scenario for all products has been generalized based on actual state of the art. It is assumed that in the end of life stage (C1), the mechanical energy is needed to remove products from installation place, the transport distance for waste to waste processing plant (C2) is approx.100 km on > 10t loaded lorry with 100% capacity utilization and fuel consumption of 20 l per 100 km. At the end of life, the polymer based elements of membrane are dismantled and the rest of materials recycled according to the national treatment practice of waste what is presented in Table 1. It is assumed that 50% of the mineral part of product can be recovered (crushed) in the recycling process. The remaining 50% goes for landfill. The reuse, recovery and recycling benefits are considered beyond the system boundaries (D) (reuse of mineral part). The end of life scenario for at end-of-life (module C) has been modelled using an average Polish electricity mix as the location where the product reaches end-of life is unknown. Environmental burdens occurring in module C4 are associated with waste-specific short-term emissions to air via landfill gas incineration and landfill leachate, burdens from treatment of short-term leachate (0–100a) in wastewater treatment plant and long-term emissions from landfill to groundwater. Impacts of packaging materials that constitute less than 1.0% of the total system flows was not taken into consideration.

Material	Material recovery	Landfilling
Bentonite	50%	50%
Polymers/plastcis	0%	100%

Table 1. End-of-life scenario for SWELLTITE® by CETCO – Poland, Cetco Sp. z o.o. S.K.A.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by manufacturer and verified. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency is judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.10 (polymers, rubber, bentonite, foils, textiles, iron oxide, addons). Specific (LCI) data quality analysis was a part of the input data verification. Where no background data was available, data gaps were complemented by manufacturer information and literature research.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN 15804+A2. Emission of greenhouse gases was calculated using the IPCC 2013 GWP method with a 100-year horizon. Emission of acidifying substances, Emission of substances to water contributing to oxygen depletion, Emission of gases that contribute to the creation of ground-level ozone, Abiotic depletion, and ozone depletion emissions where all calculated with the CML-IA baseline method.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2022 – 31.12.2022 (1 year). The life cycle assessments were prepared for Poland and Europe as reference area.

Assumptions and estimates

The impacts of the representative of SWELLTITE® were aggregated using weighted average. Impacts were inventoried and calculated for all system products.

Databases

The data for the processes come from the following databases: Ecoinvent 3.10, specific EPDs, ITB-Database. Specific data quality analysis was a part of external ISO audit.

Additional information

Polish electricity (Ecoinvent v 3.9.1 supplemented by actual national KOBiZE data) emission factor used is 0.698 kg CO₂/kWh. As a general rule, no particular environmental or health protection measures other than those specified by law are necessary.

LIFE CYCLE ASSESSMENT (LCA) – RESULTS

Declared unit

The declaration refers to declared unit (DU) – 1 m² of SWELLTITE® manufactured by CETCO – Poland, Cetco Sp. z o.o. S.K.A.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
MD	MD	MD	MD	MND	MND	MND	MND	MND	MND	MND	MND	MD	MD	MD	MD	MD

Table 2. System boundaries for the environmental characteristic of SWELLTITE®XP produced by CETCO – Poland

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO ₂	2.91E+00	2.14E-01	2.10E-01	3.33E+00	5.14E-02	6.98E-02	5.14E-02	2.57E-02	1.64E-02	-1.90E-02
Greenhouse potential – fossil	eq. kg CO ₂	2.91E+00	2.13E-01	2.05E-01	3.32E+00	5.12E-02	6.98E-02	5.12E-02	2.56E-02	1.62E-02	-1.90E-02
Greenhouse potential – biogenic	eq. kg CO ₂	4.43E-03	7.27E-04	5.42E-03	1.06E-02	1.75E-04	2.00E-03	1.75E-04	8.75E-05	1.64E-04	-1.14E-06
Global warming potential – land use and land use change	eq. kg CO ₂	1.06E-03	8.35E-05	6.35E-05	1.20E-03	2.01E-05	2.40E-05	2.01E-05	1.00E-05	1.64E-05	-8.71E-05
Stratospheric ozone depletion potential	eq. kg CFC 11	4.66E-08	4.92E-08	4.90E-09	1.01E-07	1.18E-08	1.40E-09	1.18E-08	5.92E-09	4.93E-09	-3.57E-09
Soil and water acidification potential	eq. mol H+	9.80E-03	8.64E-04	1.99E-03	1.27E-02	2.08E-04	7.60E-04	2.08E-04	1.04E-04	1.37E-04	-7.98E-04
Eutrophication potential – freshwater	eq. kg P	3.63E-04	1.43E-05	3.39E-04	7.16E-04	3.44E-06	1.30E-04	3.44E-06	1.72E-06	4.71E-06	-2.90E-05
Eutrophication potential – seawater	eq. kg N	1.99E-03	2.61E-04	3.08E-04	2.56E-03	6.27E-05	1.10E-04	6.27E-05	3.14E-05	4.72E-05	-7.09E-05
Eutrophication potential – terrestrial	eq. mol N	2.01E-02	2.84E-03	2.45E-03	2.54E-02	6.84E-04	9.30E-04	6.84E-04	3.42E-04	5.13E-04	-9.52E-04
Potential for photochemical ozone synthesis	eq. kg NMVOC	9.30E-03	8.71E-04	7.41E-04	1.09E-02	2.10E-04	2.60E-04	2.10E-04	1.05E-04	1.48E-04	-2.29E-04
Potential for depletion of abiotic resources – non-fossil resources	eq. kg Sb	1.19E-05	7.54E-07	8.83E-07	1.36E-05	1.81E-07	3.34E-07	1.81E-07	9.07E-08	5.49E-08	-5.67E-06
Abiotic depletion potential – fossil fuels	MJ	6.83E+01	3.16E+00	3.19E+00	7.47E+01	7.60E-01	1.16E+00	7.60E-01	3.80E-01	3.74E-01	-6.68E-01
Water deprivation potential	eq. m ³	1.61E+00	1.46E-02	6.69E-02	1.69E+00	3.51E-03	2.40E-02	3.51E-03	1.76E-03	2.18E-03	-4.94E-02

Table 3. Environmental impacts: (DU) 1 m²

Indicator	Unit	A1-A3	A4	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA

Table 4. Life cycle assessment (LCA) results for specific product – additional impacts indicators (DU: 1 m²)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Consumption of renewable primary energy – excluding renewable primary energy sources used as raw materials	MJ	8.02E-01	4.53E-02	2.24E-01	1.07E+00	1.09E-02	8.60E-02	1.09E-02	5.45E-03	0.00E+00	-7.67E-02
Consumption of renewable primary energy resources used as raw materials	MJ	0.00E+00									
Total consumption of renewable primary energy resources	MJ	1.29E+00	4.53E-02	2.24E-01	1.56E+00	1.09E-02	8.60E-02	1.09E-02	5.45E-03	6.58E-03	-7.67E-02
Consumption of non-renewable primary energy – excluding renewable primary energy sources used as raw materials	MJ	3.47E+01	3.16E+00	3.03E+00	4.09E+01	7.60E-01	1.16E+00	7.60E-01	3.80E-01	0.00E+00	-6.68E-01
Consumption of non-renewable primary energy resources used as raw materials	MJ	1.83E+01	0.00E+00	0.00E+00	1.83E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	6.96E+01	3.16E+00	3.22E+00	7.60E+01	7.60E-01	1.16E+00	7.60E-01	3.80E-01	4.05E-01	-6.68E-01
Consumption of secondary materials	kg	3.95E-03	1.06E-03	2.94E-04	5.31E-03	2.55E-04	1.06E-04	2.55E-04	1.27E-04	0.00E+00	-4.04E-04
Consumption of renew. secondary fuels	MJ	2.24E-03	1.17E-05	1.58E-06	2.25E-03	2.81E-06	5.91E-07	2.81E-06	1.40E-06	0.00E+00	-2.46E-05
Consumption of non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	2.44E-03	2.44E-03	0.00E+00	9.39E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m ³	3.20E-02	3.97E-04	1.82E-03	3.42E-02	9.56E-05	3.15E-04	9.56E-05	4.78E-05	5.84E-05	-1.21E-03

Table 5. Life cycle assessment (LCA) results for specific product – the resource use (DU: 1 m²)

Indicator	Unit	A1	A2	A3	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	1.63E-01	3.54E-03	2.69E-03	1.70E-01	8.53E-04	1.20E-05	8.53E-04	4.26E-04	5.90E-07	-4.66E-03
Non-hazardous waste	kg	7.06E-01	6.29E-02	1.29E-02	7.82E-01	1.51E-02	6.24E-04	1.51E-02	7.57E-03	1.54E+00	-1.30E-01
Radioactive waste	kg	2.84E-05	2.36E-07	2.30E-06	3.09E-05	5.67E-08	8.70E-07	5.67E-08	2.84E-08	2.28E-06	-1.76E-06
Components for re-use	kg	0.00E+00									
Materials for recycling	kg	1.08E-03	9.78E-06	2.23E-02	2.34E-02	2.35E-06	1.20E-06	2.35E-06	1.18E-06	0.00E+00	-9.04E-06
Materials for energy recovery	kg	1.16E-06	7.91E-08	2.80E-08	1.27E-06	1.90E-08	1.05E-08	1.90E-08	9.51E-09	0.00E+00	-8.39E-07
Exported Energy	MJ	3.00E-02	0.00E+00	9.20E-03	3.92E-02	0.00E+00	3.46E-03	0.00E+00	0.00E+00	0.00E+00	-1.81E-03

Table 6. Life cycle assessment (LCA) results for specific product – waste categories (DU: 1 m²)

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 EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 (subclause 8.1.3.) <input checked="" type="checkbox"/> external <input type="checkbox"/> internal
External verification of EPD: PhD. Eng. Halina Prejzner LCI audit, LCA and input data verification: PhD. D.Sc. Eng. Michał Piasecki, m.piasecki@itb.pl

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the for the information provided and contained I EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: Note: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform – Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products (2023, v1.6)
- 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
- EN 15804:2012+A1:2013 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
- Department for Business, Energy & Industrial Strategy. Calorific values and density of fuels, 2021. <https://www.gov.uk/>
- KOBiZE Wskaźniki emisyjności CO₂, SO₂, NO_x, CO i pyłu całkowitego dla energii elektrycznej. Grudzień 2023
- EN 13967:2012 Flexible sheets for waterproofing – Plastic and rubber damp proof sheets including plastic and rubber basement tanking sheet – Definitions and characteristics
- 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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Thermal Physics, Acoustics and Environment Department
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CERTIFICATE № 630/2024 of TYPE III ENVIRONMENTAL DECLARATION

Products:

SWELLTITE® WATERPROOFING SYSTEM BASED ON BENTONITE COMPOSITE

Manufacturer:

CETCO POLAND, CETCO SP. Z O.O. S.K.A.

Korpele nr 13A - Strefa, 12-100 Szczytno, Poland

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.

Environmental product declarations.

Core rules for the product category of construction products.

This certificate, issued on 24th April 2024 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics
and Environment Department


Agnieszka Winkler-Skałna, PhD



Deputy Director
for Research and Innovation


Krzysztof Kuczyński, PhD

Warsaw, April 2024



Owner of the EPD

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ITB is the verified member of The European Platform for EPD program operators and LCA practitioner www.eco-platform.org

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