ENVIRONMENTAL PRODUCT DECLARATION (EPD) ACCORDING TO STANDARD SN EN 15804+A2:2019

swissporBIKUPLAN ECO, bituminous waterproofing membranes based on recycled sheets

The SN EN 15804+A2 [1] standard serves as PCR[a)]
Independent verification of the declaration and data according to EN ISO 14025:2010 [2]
☐ internal ☒ external
Verification by an independent third party: Martina Alig Intep Integrale Planung GmbH Pfingstweidstrasse 16 CH – 8005 Zürich
[a)] *Product category rules*

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The French version of this Environmental Product Declaration is authoritative. No responsibility is taken for the correctness of the translations.

DECLARATION OF GENERAL INFORMATION

Name and address of the manufacturer

Vaparoid AG / swisspor Management AG
Fabrikstrasse
CH-3946 Turtmann

For any information regarding the information contained in this Environmental Product Declaration (EPD), please contact swisspor Management AG (info@swisspor.com).

Application of the product

The main function of geomembranes is to protect structures from moisture and thus prevent damage caused by the penetration of steam or water into a part of the structure (mold growth, poor housing hygiene, premature wear, etc.). The number and type of layers that make up the thickness of a geomembrane determine the specific use of the product in a building.

Product identification

The waterproofing membranes consist of bituminous tapes (bituminous sheets) rolled out on flat surfaces (roof, clean layer, etc.), as shown in the adjacent photo.

swissporBIKUPLAN ECO is an average product derived from all commercialized products listed below:

swissporBIKUPLAN ECO
swissporBIKUPLAN ECO EGV3
swissporBIKUPLAN ECO EGV3.5 v flam
swissporBIKUPLAN ECO LL VARIO v

Declared unit

The declared unit is 1 kg of packed geomembrane. The geomembrane has an average density of 1,267 kg/m^3. The average density was calculated according to the produced quantities of the individual commercialized products on which the average product is based. The packaging material was taken into account in the LCA.

Description of the main components

The geomembranes investigated consist of a carrier layer, a bituminous coating compound and a surface finish that varies depending on the product and application.
The carrier liner is a strip of flexible material and, in the case of the geomembranes investigated, consists of glass fibre mesh fleece.
The bituminous surfacing compound is a free-flowing mixture that is heated at the beginning of geomembrane manufacture. It consists of bitumen, styrene-butadiene-styrene (SBS) and filler. Bitumen is a mixture of fossil hydrocarbons. SBS is a copolymer of fossil origin in the form of a non-cohesive white or slightly colored granulate. The filler consists of pulverized phonolite. In the case of the products summarized in the average product swissporBIKUPLAN ECO, the bitumen mixture consists of 50% recycled waste generated during the production or installation of the geomembranes and 50% processed primary raw materials.
The surface finish covers the bottom and the top of the geomembrane. In the case of the geomembranes studied, it consists of polypropylene fleece or film, a silicone film and synthetic resin.

Program holder

The program holder of the EPD is the company swisspor Management AG.

Considered phases

The following life cycle phases were considered:

- the manufacturing phase up to the factory gate (phases A1 to A3);
- the transport and waste treatment phase at the end of the life cycle (phases C1 to C4);
- the benefits and impacts across system boundaries (Module D).

EPDs of construction products are not comparable if they do not comply with the SN EN 15804+A2:2019 standard [1].

Variability of results (average product)

The variability of the summarized commercial products is very low, since the main product is the same and contains the same proportion of recycled bitumen.[1]

Declaration of the material product content according to the candidate list for an authorization by the European Chemicals Agency (REACH Regulation)

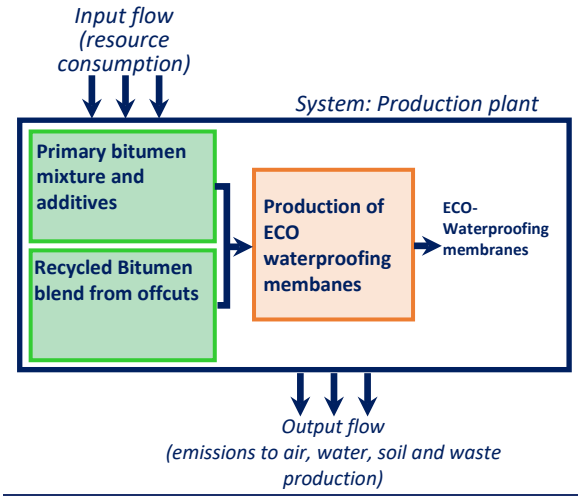
Substances included in the Candidate List for Authorization of Substances of Very High Concern by the European Chemicals Agency account for less than 0.1 % by mass (max. 22 ppm PAH, including benzo[a]pyrene) of the bituminous waterproofing products swissporBIKUPLAN ECO.

[1] As a point of reference: The variations for the fossil global warming and non-renewable primary energy indicators therefore remain systematically below ± 40%, the maximum value established in a national annex to the EN 15804+A2 standard in France as a benchmark for reporting impacts for these two indicators for an average product resulting from an aggregation of commercial products and/or manufacturers (otherwise, if the aggregation of products results in a variability of more than ± 40%, this annex obliges to report the maximum impacts or the maximum with 95% confidence for these two indicators.

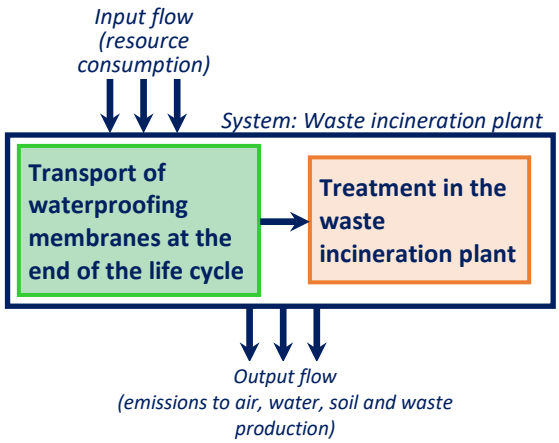
DECLARATION OF ENVIRONMENTAL PARAMETERS FROM THE LIFE CYCLE ASSESSMENT

General information

The following figures show the flowcharts of the processes covered in the LCA for each of the life cycle phases considered.



Simplified representation of the processes in the manufacturing phase of ECO waterproofing membranes
(phases A1 -> A3)



Simplified representation of the processes in the disposal phase of ECO waterproofing membranes
(Phases C2 -> C4)

Rules for the declaration of information from the LCA by module

This is an EPD of the "cradle to gate" type with modules C1-C4 and module D, issued by the company swisspor Management AG.

Information on the system boundaries (X = included in the LCA; NDM = non-declared module)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Construction/installation process	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	B7	C1	C2	C3	C4	D
X	X	X	NDM	NDM	NDM	NDM	NDM	NDM	NDM	NDM	NDM	X	X	X	X	X

Parameters for the description of environmental impacts

1. environmental impact indicators

Indicator	unit	Product stage A1–A3	End of life stage C1 (Demolition)	End of life stage C2 (Transport)	End of life stage C3 (Waste processing)	End of life stage C4 (Disposal)	Module D
Global Warming Potential – total (GWP-total)	kg CO2 eq.	0,61	6,83E-3	1,14E-3	1,57E-3	2,32	-1,6E-1
Global Warming Potential – fossil fuels (GWP-fossil)	kg CO2 eq.	0,62	6,82E-3	1,13E-3	1,52E-3	2,32	8,02E-2
Global Warming Potential – biogenic (GWP-biogenic)	kg CO2 eq.	-1,02E-2	9,48E-6	3,74E-6	5,25E-5	5,37E-4	-2,4E-1
Global Warming Potential – luluc (GWP-luluc)	kg CO2 eq.	3,42E-4	1,13E-6	4,64E-6	2,79E-6	5,61E-5	-3,77E-4
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	2,67E-8	1,03E-10	3,56E-11	1,67E-10	3,83E-9	-2,51E-8
Acidification potential, Accumulated Exceedance (AP)	mol H+ eq.	3,21E-3	3,25E-5	4,23E-6	4,53E-6	7,97E-4	1,31E-3
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	1,3E-4	3,03E-7	9,32E-8	9,4E-7	1,3E-5	-1,36E-4
Eutrophication potential - marine (EP-marine)	kg N eq.	5,04E-4	1,24E-5	1,38E-6	1,5E-6	2,48E-4	6,32E-5
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	4,45E-3	1,34E-4	1,39E-5	1,43E-5	2,12E-3	4,99E-4
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.	3,71E-3	4,25E-5	5,17E-6	4,47E-6	5,69E-4	1,48E-3
Abiotic depletion potential - non-fossil resources (ADPE)[2]	kg Sb eq.	3,74E-6	3,09E-9	2,79E-9	2,29E-9	9,77E-8	-5,51E-7
Abiotic depletion potential - non-fossil resources (ADPF)[2]	MJ	19,78	8,53E-2	1,57E-2	6,93E-2	0,73	5,45
Water (user) deprivation potential (WDP)[2]	m^3 world eq. deprived	95,29	0,18	6,36E-2	3,27	5,66	-4,99E+2
Potential incidence of disease due to PM emissions (PM)	Disease incidence	1,91E-8	1,53E-10	9,43E-11	3,82E-11	4,91E-9	-2,62E-8
Potential Human exposure efficiency relative to U235 (IRP)[3]	kBq U235-eq.	6,1E-2	2,16E-4	9,88E-5	5,86E-3	9,35E-3	-9,09E-1
Potential Comparative Toxic Unit for ecosystems (ETP-fw)[2]	CTUe	16,41	7,59E-2	1,73E-2	2,2E-2	0,79	9,79
Potential Comparative Toxic Unit for humans - cancer effects (HTP-c)[2]	CTUh	2,88E-10	4,05E-12	3,55E-13	7,81E-13	6,3E-11	-1,4E-10
Potential Comparative Toxic Unit for humans - non-cancer effects (HTP-nc)[2]	CTUh	9,6E-9	5,98E-11	1,95E-11	1,15E-11	2,91E-9	-6,99E-10
Potential Soil quality index (SQP)[2]	dimensionless	1,92	4,39E-3	-2,46E-3	1,22E-2	0,17	-1,21E+1

[2] Disclaimer 1: Results for these environmental impact categories should be used with caution due to high uncertainties in these results or limited experience with this indicator.
[3] Disclaimer 2: This impact category mainly concerns the possible effects on human health of low-dose ionizing radiation from the nuclear fuel cycle. It does not consider the consequences of possible nuclear accidents, occupational exposure, or disposal of radioactive waste in underground facilities. This indicator also does not measure potential ionizing radiation from soil, radon, and certain building materials.

2. indicators to describe the use of resources.

Indicator	unit	Product stage A1–A3	End of life stage C1 (Demolition)	End of life stage C2 (Transport)	End of life stage C3 (Waste processing)	End of life stage C4 (Disposal)	Module D
Use of renewable primary energy as energy carrier (PERE)	MJ	0,75	8,24E-4	8,06E-4	1,74E-2	3,33E-2	-6,15E+0
Use of renewable primary energy resources used as raw materials (PERM)	MJ	0	0	0	0	0	0
Total use of renewable primary energy (PERT)	MJ	0,75	8,24E-4	8,06E-4	1,74E-2	3,33E-2	-6,15E+0
Use of non renewable primary energy as energy carrier (PENRE)	MJ	-3,85E+0	8,53E-2	1,58E-2	6,93E-2	0,73	5,45
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	23,63	0	0	0	0	0
Total use of non-renewable primary energy resource (PENRT)	MJ	19,78	8,53E-2	1,58E-2	6,93E-2	0,73	5,45
Use of secondary material (SM)	kg	0,48	0	0	0	0	0
Use of renewable secondary fuels (RSF)	MJ	0	0	0	0	0	0
Use of non-renewable secondary fuels (NRSF)	MJ	0	0	0	0	0	0
Net use of fresh water (FW)	m^3	2,23	4,15E-3	1,49E-3	7,61E-2	0,13	-1,16E+1

3. environmental information describing categories of waste

Indicator	unit	Product stage A1–A3	End of life stage C1 (Demolition)	End of life stage C2 (Transport)	End of life stage C3 (Waste processing)	End of life stage C4 (Disposal)	Module D
Hazardous waste disposed (HWD)	kg	2,32E-2	9,5E-5	2,44E-5	1,85E-5	0,39	1,74E-3
Non harzardous waste disposed (NHWD)	kg	0,10	1,79E-4	1,32E-4	3,55E-4	3,52E-2	-6,4E-2
Radioactive waste disposed (RWD)	kg	8,68E-6	3,05E-8	1,29E-8	7,1E-7	1,31E-6	-1,1E-4

4. environmental information to describe output flows

Indicator	unit	Product stage A1–A3	End of life stage C1 (Demolition)	End of life stage C2 (Transport)	End of life stage C3 (Waste processing)	End of life stage C4 (Disposal)	Module D
Components for re-use (CRU)	kg	0	0	0	0	0	0
Materials for recycling (MFR)	kg	9,72E-5	0	0	0	0	0
Materials for energy recovery (MER)	kg	7,49E-5	0	0	0	0	0
Exported electrical energy (EEE)	MJ	6,13E-3	0	0	0	3,78	0
Exported thermal energy (EET)	MJ	1,18E-2	0	0	0	7,34	0

The results of the environmental impact indicators in Figure 1 were calculated using the characterization factors of the environmental impact assessment methods included in the EN 15804+A2 standard and implemented in the Simapro version 9.1 software (see the accompanying report to this EPD)[3].
The phases of transport to disposal (C2) and waste treatment before disposal (C3) represent minimal impacts (less than 0.5%) compared to the phases of production (A1- A3) and disposal of the product (C4). For most indicators, the production process is more harmful than disposal (about 80% to 100% of the summed impacts A1-A3 and C2-C4), except for global warming potential, where the disposal process accounts for about 80% of the summed impacts. This is due to the method of disposal (incineration) and the high bitumen content in the material (high fossil carbon content).

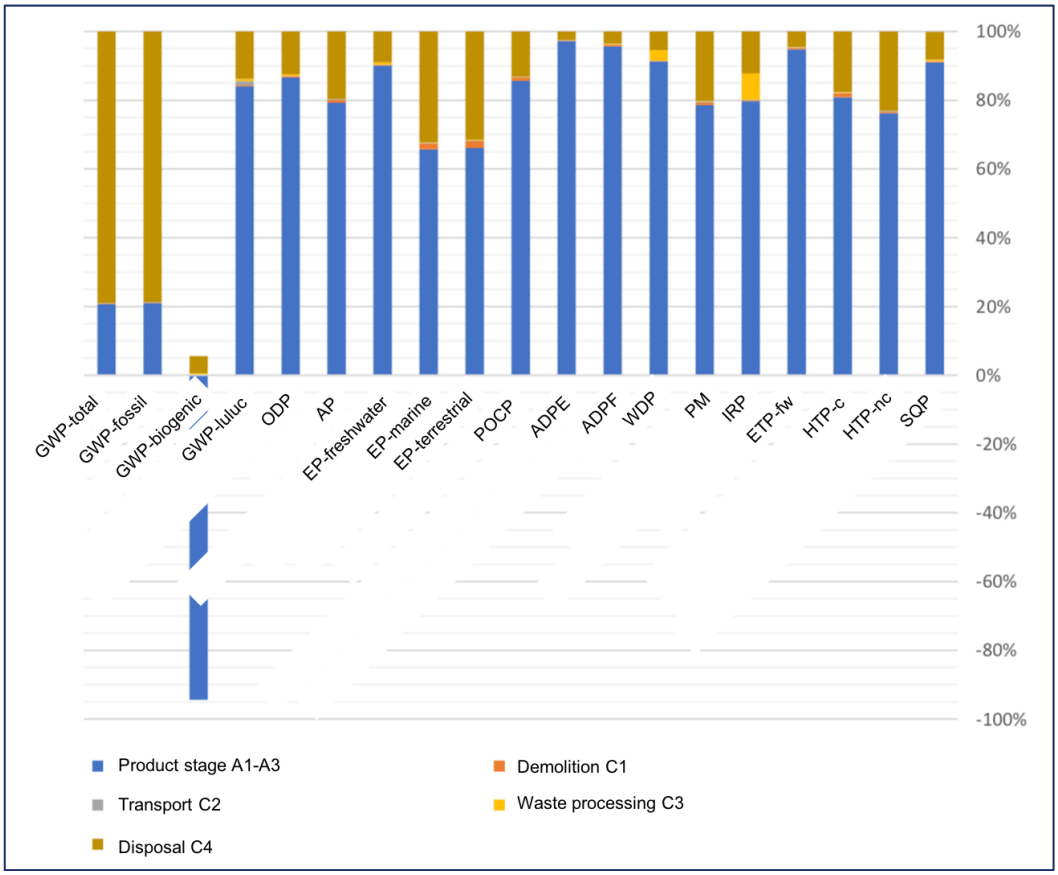


Figure 1: Contributions of life cycle phases to impacts by category.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Disposal

The end-of-life disposal scenario for the swissporBIKUPLAN ECO materials corresponds to the average disposal processes identified in Switzerland in the KBOB database. This average scenario includes 97.65% municipal incineration with energy recovery and 2.35% landfilling of waste. The energy recovery efficiency reported in the KBOB database is 28.51% for heat and 15.84% for electricity. According to the SN EN 15804+A2:2019 standard, the overall efficiency is less than 60%, so it cannot be assumed that the material is intended for energy recovery. However, the energy recovered during combustion is still counted in the calculation of module D.

Process	Unit (per declared unit)	End of life stage C1–C4
Collection method specified by type	kg collected separately	0,00
	kg collected as mixed construction waste	1,00
Retrieval method specified by type	kg for reuse	0,00
	kg for recycling	0,00
	kg for energy recovery	0,00
Disposal, specified by type	kg Product or material for final disposal, incineration	0,977
	kg Product or material for final disposal, landfill	0,023
Efficiency of energy recovery during combustion, specified by type	% Heat	28,51%
	% Electricity	15,84%

Other impact indicators

The method report [3] served as the methodological basis for calculating the environmental impact indicators required by the SN EN 15804+A2:2019 standard as well as the indicators commonly used in Switzerland for construction products. These additional indicators correspond to the KBOB list 2009/1:2022:

- Environmental impact points (UBP) according to the ecological scarcity method 2021;
- Global warming potential;
- non-renewable primary energy
- renewable primary energy

The table below contains the impact data verified by Martina Alig according to KBOB recommendation 2009/1:2022:

Indicator	unit	Product stage A1–A3	End of life stage C1–C4
Environmental impact points (ecological scarcity method 2021)	UBP	1080	2430
Greenhouse gas emissions	kg CO2 eq.	0,59	2,32
Primary energy, non-renewable	kWh	5,86	0,24
Energetically recovered (production)	kWh	2,40	
Recycled as material (production)	kWh	3,46	
Primary energy, renewable	kWh	0,21	0,014
Energetically recovered (production)	kWh	0,21	
Recycled as material (production)	kWh	0	
Biogenic carbon content	kg C	0	0

LITERATURE

[1] SN EN 15804+A2:2019, "Sustainability of construction works - Environmental product declarations - Basic rules for the product category construction products" 2019.
[2] SN EN ISO 14025:2010-8, "Environmental labels and declarations - Type III Environmental declarations - Principles and procedures" 2010.
[3] M. Frossard, G. Talandier, und S. Lasvaux, „Rapport méthodologique d'écobilan de produits swisspor en lés d'étanchéité bitumineux selon les règles de la plate-forme d'écobilan KBOB 2009/1:2022 et de la norme SN EN 15804+A2:2019," Yverdon-les-Bains, Switzerland, 2022.