

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

**swissporBIKUTOP, bituminous waterproofing
membranes (incl. swissporBIKUPLAN,
swissporBIKUVAP, swissporBIKUTOP,
swissporBIKUTOP WF)**

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

Owner and publisher of the Environmental Product Declaration	swisspor Management AG CH-6312 Steinhausen www.swisspor.ch
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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 (e.g. presence of root protection for green roofs).

Product identification

swissporBIKUTOP is an average product derived from all the commercialized products listed below: The waterproofing membranes consist of bituminous tapes (bituminous membranes) rolled out on flat surfaces (roof, sub-base, etc.) as shown in the adjacent photo.



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

swissporBIKUTOP		
swissporBIKUPLAN	swissporBIKUPLAN EGV3 swissporBIKUPLAN EGV3 speed swissporBIKUPLAN EGV3.5 flam/flam swissporBIKUPLAN EGV3.5 v flam	swissporBIKUPLAN LL VARIO v swissporBIKUPLAN LL VARIO Stria swissporBIKUPLAN LL VARIO flam swissporBIKUPLAN LL VARIO Reno swissporBIKUPLAN LL VARIO ts swissporBIKUPLAN LL Multi GG4 swissporBIKUPLAN LL Multi GG4 flam
swissporBIKUVAP	swissporBIKUVAP LL EVA flam swissporBIKUVAP LL EVA	swissporBIKUVAP LL KS Alu
swissporBIKUTOP	swissporBIKUTOP EP4 flam swissporBIKUTOP EP4 S flam swissporBIKUTOP EP4 v swissporBIKUTOP EP5 flam swissporBIKUTOP EP5 S flam swissporBIKUTOP PRO AQUA	swissporBIKUTOP LL SPEED swissporBIKUTOP LL FORTE swissporBIKUTOP LL RENO swissporBIKUTOP LL EP5 swissporBIKUPONTE VIA
swissporBIKUTOP WF	swissporBIKUTOP EP4 WF flam swissporBIKUTOP EP4 WF S flam swissporBIKUTOP EP5 WF flam swissporBIKUTOP EP5 WF S flam	swissporBIKUTOP LL TERRA swissporBIKUTOP LL SPEED WF swissporBIKUTOP LL VERTE swissporBIKUTOP LL PLATINUM

Declared unit

The declared unit is 1 kg of packed geomembrane. The geomembrane has an average density of 1,270 kg/m³. 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 life cycle assessment.

Description of the main components

The geomembranes investigated consist of a carrier liner, a bituminous surfacing compound and a surface finish that varies depending on the product and the area of application. The carrier liner is a strip of flexible material and, in the case of the geomembranes investigated, can consist of glass nonwoven, glass nonwoven, polyester nonwoven or a combination of PET nonwoven and aluminum foil. The bituminous surfacing compound is a flowable mixture that is heated at the beginning of geomembrane manufacture. It consists of bitumen, styrene-butadiene-styrene (SBS) and filler. Some geomembranes also contain a root protection product. 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. The surface finish covers the bottom and top of the carrier liner in most geomembranes. Various materials are used: Talc scattering, polypropylene non-woven, polypropylene film, aluminum foil, slate flake, silicone film.

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 results is low because the main product of each commercial reference is the same, only the coatings differ. As an example: the combined products (swissporBIKUPLAN, swissporBIKUVAP, swissporBIKUTOP, swissporBIKUTOP WF) show impact differences of maximum approx. $\pm 5\%$ for the fossil greenhouse gas emissions.¹

¹ As an indication, the deviations for the fossil global warming and non-renewable primary energy indicators therefore remain systematically below $\pm 40\%$, the maximum value established in a national annex to the EN 15804+A2 standard in France as a benchmark for indicating impacts for these two indicators for an average product resulting from a summary of commercial products and/or manufacturers.

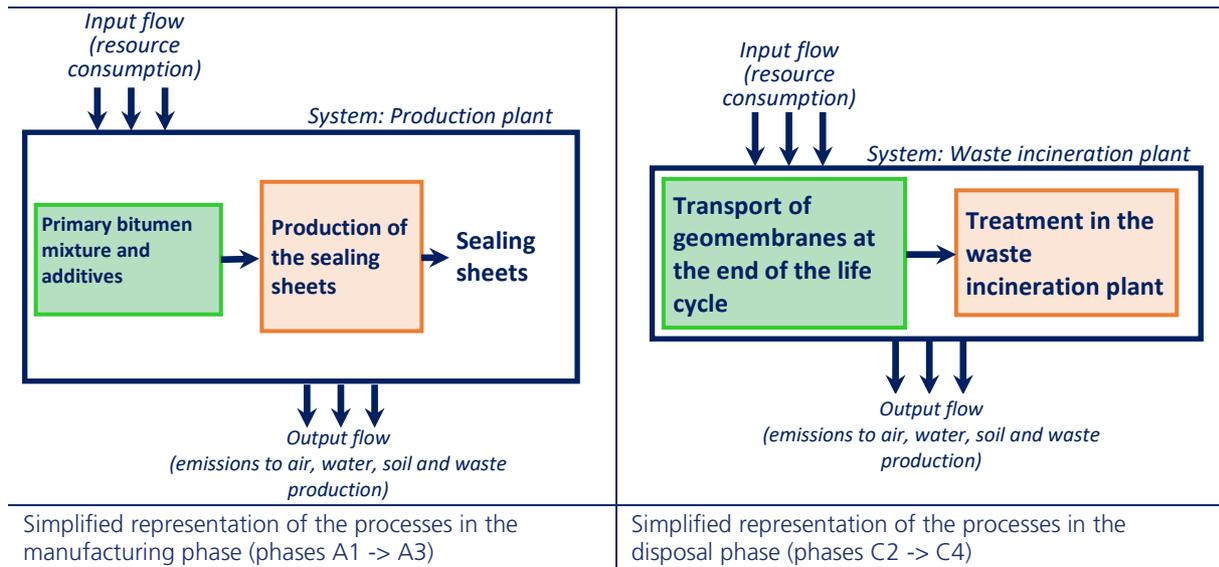
Declaration of the material product content according to the candidate list for an authorization by the European Chemicals Agency (REACH Regulation)

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 swissporBIKUTOP.

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.



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			Product stage		Product stage							Product stage				Product stage
Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply	Raw material supply
A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1	A1
X	X	X	X	X	X	X	X	X	X	X	X	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.	0,95	6,83E-3	1,14E-3	1,57E-3	2,32	-2,28E-1
Global Warming Potential – fossil fuels (GWP-fossil)	kg CO2 eq.	0,96	6,82E-3	1,13E-3	1,52E-3	2,32	-2,63E-1
Global Warming Potential – biogenic (GWP-biogenic)	kg CO2 eq.	-8,16E-3	9,48E-6	3,74E-6	5,25E-5	5,37E-4	3,51E-2
Global Warming Potential – luluc (GWP-luluc)	kg CO2 eq.	4,78E-4	1,13E-6	4,64E-6	2,79E-6	5,61E-5	-3,52E-4
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	3,28E-8	1,03E-10	3,56E-11	1,67E-10	3,83E-9	-3,58E-8
Acidification potential, Accumulated Exceedance (AP)	mol H+ eq.	4,96E-3	3,25E-5	4,23E-6	4,53E-6	7,97E-4	-7,6E-4
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	1,58E-4	3,03E-7	9,32E-8	9,4E-7	1,3E-5	-1,18E-4
Eutrophication potential - marine (EP-marine)	kg N eq.	6,87E-4	1,24E-5	1,38E-6	1,5E-6	2,48E-4	-2,53E-4
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	6,36E-3	1,34E-4	1,39E-5	1,43E-5	2,12E-3	-2,59E-3
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.	5,42E-3	4,25E-5	5,17E-6	4,47E-6	5,69E-4	-8,31E-4
Abiotic depletion potential - non-fossil resources (ADPE) ²	kg Sb eq.	4,0E-6	3,09E-9	2,79E-9	2,29E-9	9,77E-8	-3,73E-7
Abiotic depletion potential - non-fossil resources (ADPF) ²	MJ	33,86	8,53E-2	1,57E-2	6,93E-2	0,73	-9,64E+0
Water (user) deprivation potential (WDP) ²	m ³ world eq. deprived	111,04	0,18	6,36E-2	3,27	5,66	-4,03E+2
Potential incidence of disease due to PM emissions (PM)	Disease incidence	2,88E-8	1,53E-10	9,43E-11	3,82E-11	4,91E-9	-3,45E-8
Potential Human exposure efficiency relative to U235 (IRP) ³	kBq U235-eq.	7,94E-2	2,16E-4	9,88E-5	5,86E-3	9,35E-3	-7,23E-1
Potential Comparative Toxic Unit for ecosystems (ETP-fw) ²	CTUe	27,10	7,59E-2	1,73E-2	2,2E-2	0,79	-2,61E+0
Potential Comparative Toxic Unit for humans - cancer effects (HTP-c) ²	CTUh	3,45E-10	4,05E-12	3,55E-13	7,81E-13	6,3E-11	-1,85E-10
Potential Comparative Toxic Unit for humans - non-cancer effects (HTP-nc) ²	CTUh	1,1E-8	5,98E-11	1,95E-11	1,15E-11	2,91E-9	-2,8E-9
Potential Soil quality index (SQP) ²	dimensionless	2,16	4,39E-3	-2,46E-3	1,22E-2	0,17	-1,23E+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	0,82	8,24E-4	8,06E-4	1,74E-2	3,33E-2	-5,62E+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	0,82	8,24E-4	8,06E-4	1,74E-2	3,33E-2	-5,62E+0
Use of non renewable primary energy as energy carrier (PENRE)	MJ	11,54	8,53E-2	1,58E-2	6,93E-2	0,73	-9,64E+0
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	22,32	0	0	0	0	0
Total use of non-renewable primary energy resource (PENRT)	MJ	33,86	8,53E-2	1,58E-2	6,93E-2	0,73	-9,64E+0
Use of secondary material (SM)	kg	0	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	2,60	4,15E-3	1,49E-3	7,61E-2	0,13	-9,38E+0

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	3,08E-2	9,5E-5	2,44E-5	1,85E-5	0,39	-3,19E-3
Non hazardous waste disposed (NHWD)	kg	0,11	1,79E-4	1,32E-4	3,55E-4	3,52E-2	-5,48E-2
Radioactive waste disposed (RWD)	kg	1,12E-5	3,05E-8	1,29E-8	7,1E-7	1,31E-6	-8,77E-5

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].

Figure 1 shows the contribution of the life cycle phases to the results by impact category. The phases of transport to disposal (C2) and waste treatment prior to disposal (C3) represent minimal impacts compared to the manufacturing phase (A1-A3) and disposal of the product (C4). For most indicators, the production process is more harmful than disposal (about 80-100% of the summed environmental impacts A1-A3 and C2-C4), except for the GHG potential indicator, where the disposal step accounts for about 75% of the summed impacts. This is due to the type of disposal (incineration) and the high bitumen content in the material (high fossil carbon content).

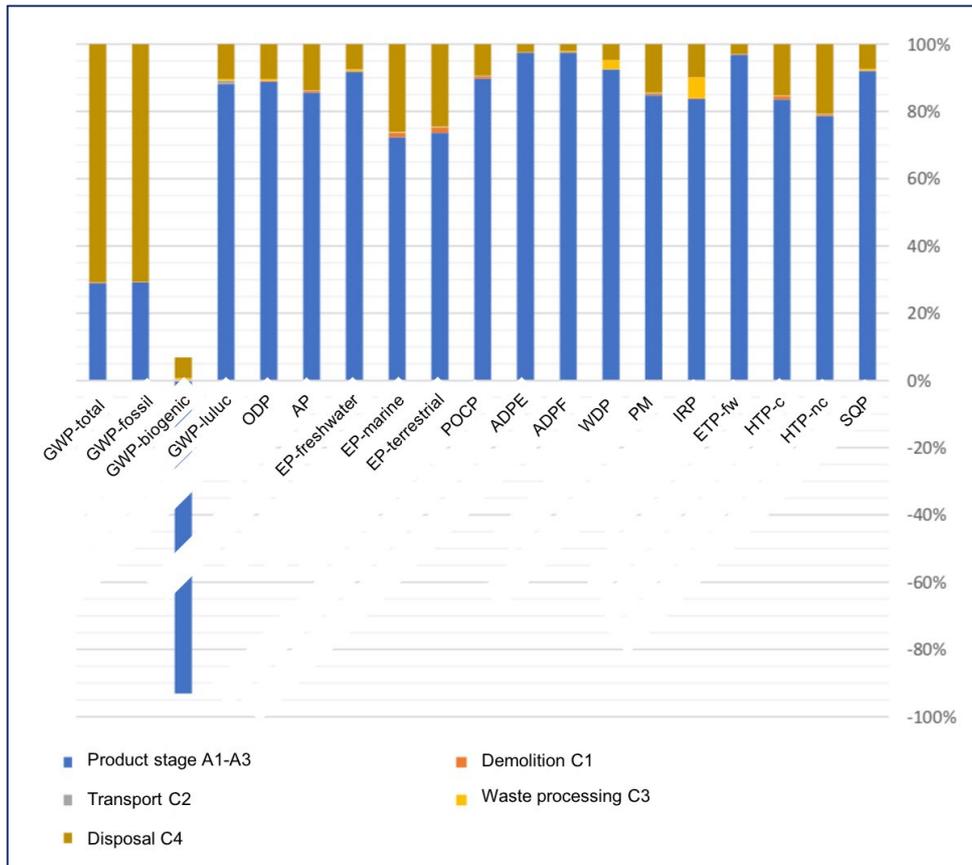


Figure 1: Contributions of life cycle phases to impacts by category.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Disposal

The end-of-life disposal scenario for swissporBIKUTOP 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	1630	2430
Greenhouse gas emissions	kg CO2 eq.	0,91	2,32
Primary energy, non-renewable	kWh	10,0	0,24
Energetically recovered (production)	kWh	3,50	
Recycled as material (production)	kWh	6,53	
Primary energy, renewable	kWh	0,23	0,014
Energetically recovered (production)	kWh	0,23	
Recycled as material (production)	kWh	0	
Biogenic carbon content	kg C	0	0

LITERATUR

- [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.