

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

swissporTERA (incl. swissporTERA, swissporTERA White)

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:

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^{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

swisspor Romandie SA / swisspor Management AG

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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 swissporTERA products are used for thermal insulation of a new or renovated building with an application of the type plastered external insulation (ETICS) for swissporTERA White and for other applications for swissporTERA, allowing lower energy consumption for heating needs. The thermal conductivity of the material determines the thickness of the panels to be installed according to the targeted thermal performance of the building.

Product identification

The swissporTERA insulation products are rigid panels of structural foam that are attached to the facade. The dimensions of the swissporTERA are variable, as is their color shade. The swissporTERA product under study is a grouping of two boards with a thermal conductivity of 0.032 W/(m.K), which differ in the way they are applied. It is created from the totality of the following commercial references:

swissporTERA	
swissporTERA	swissporTERA White
	

swissporTERA is suitable for the treatment of individual points, terminations and facade details and swissporTERA White for the production of uniform facade surfaces up to 30 m high.

Declared unit

The unit specified is 1 kg of TERA panels, where the panel has a density of 29 kg/m³. The average product is represented almost exclusively by swissporTERA White, as it represents 99%

of the total production of both products in 2022 and the average difference in impact value between the two products is less than 2%. The packaging materials of the components and the reference products are considered in the LCA.

Description of the main components

The swissporTERA board consists of a structured foam called TERA. The swissporTERA White also has a coating of expanded polystyrene insulation board on one side and corresponds to the swissporEPS product manufactured in the same plant.

The polystyrene is supplied in the form of loose, non-adherent beads, 60% of which are made of recycled polystyrene (swissporALPOR). The beads contain pentane, a solvent commonly used in organic chemistry. The polystyrene is foamed into beads by the action of steam, which are mixed with a structuring resin. The whole is formed into a block, which is cut into panels of different thicknesses. swissporTERA White contains an additional step in which a swissporEPS insulation panel is thermally bonded to the swissporTERA main panel. The final product contains approximately 33% recycled material.

Polystyrene is a material derived from non-renewable fossil resources and the resin is chemically produced from non-renewable resources.

The packaging of 1 kg of the reference product consists on average of 13.9 g of low-density polyethylene plastic 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 in results between the products reported within this EPD is very low. Across all indicators, the average difference in impact between the two products is 1%.¹ The highest differences are 25% for the indicators "water demand" and "net use of freshwater".

¹ As a point of reference: The variations 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 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 $\pm 40\%$, this annex obliges to report the maximum impacts or the maximum with 95% confidence for these two indicators).

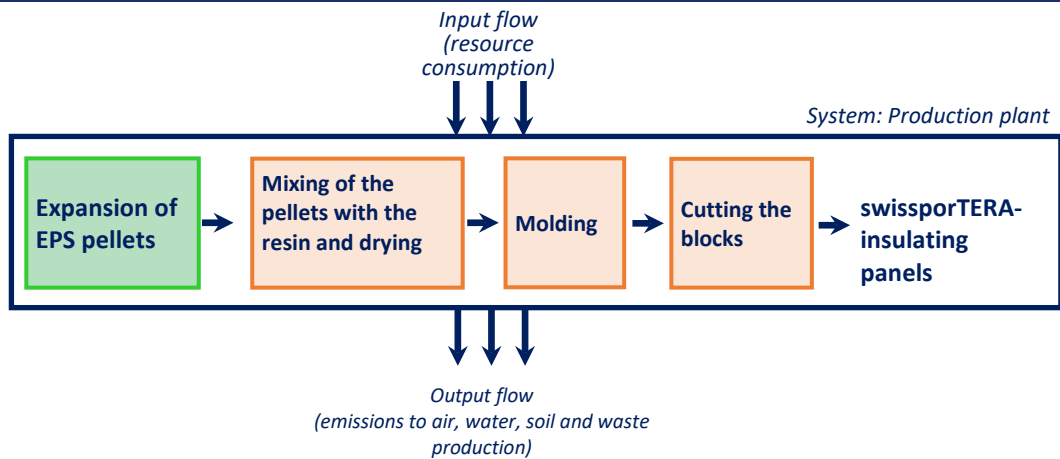
Declaration of the material product content according to the candidate list for an authorization by the European Chemicals Agency (REACH Regulation)

The company certifies that its swissporTERA products are free of substances included in the European Chemicals Agency's candidate list for approval.

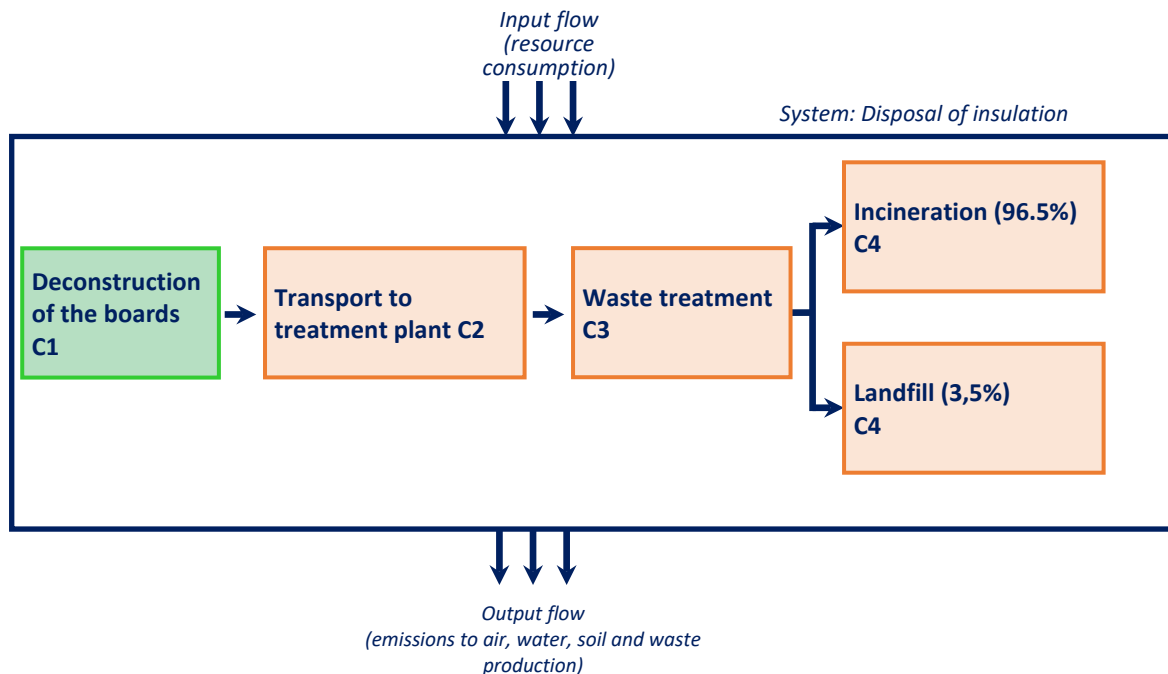
DECLARATION OF ENVIRONMENTAL PARAMETERS FROM THE LIFE CYCLE ASSESSMENT

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 (phases A1 -> A3)



Simplified scheme of the disposal processes (phases C1 -> 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.	3,24	6,83E-3	1,7E-3	2,34E-3	3,09	0,86
Global Warming Potential – fossil fuels (GWP-fossil)	kg CO2 eq.	3,23	6,82E-3	1,69E-3	2,26E-3	3,09	0,80
Global Warming Potential – biogenic (GWP-biogenic)	kg CO2 eq.	6,9E-3	9,48E-6	5,58E-6	7,83E-5	2,79E-4	5,72E-2
Global Warming Potential – luluc (GWP-luluc)	kg CO2 eq.	1,35E-3	1,13E-6	6,91E-6	4,15E-6	3,64E-5	-5,16E-4
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	1,03E-7	1,03E-10	5,3E-11	2,49E-10	3,26E-9	-3,28E-8
Acidification potential, Accumulated Exceedance (AP)	mol H+ eq.	1,08E-2	3,25E-5	6,3E-6	6,75E-6	3,99E-4	2,88E-3
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	6,15E-4	3,03E-7	1,39E-7	1,4E-6	3,87E-6	-1,19E-4
Eutrophication potential - marine (EP-marine)	kg N eq.	1,79E-3	1,24E-5	2,06E-6	2,24E-6	2,25E-4	2,66E-4
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	1,84E-2	1,34E-4	2,07E-5	2,13E-5	1,99E-3	3,09E-3
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.	1,38E-2	4,25E-5	7,71E-6	6,66E-6	5,03E-4	2,32E-3
Abiotic depletion potential - non-fossil resources (ADPE) ²	kg Sb eq.	4,87E-6	3,09E-9	4,15E-9	3,41E-9	4,99E-8	-4,2E-7
Abiotic depletion potential - non-fossil resources (ADPF) ²	MJ	72,96	8,53E-2	2,34E-2	0,10	0,47	11,56
Water (user) deprivation potential (WDP) ²	m ³ world eq. deprived	639,50	0,18	9,47E-2	4,87	2,18	-5,47E+2
Potential incidence of disease due to PM emissions (PM)	Disease incidence	8,43E-8	1,53E-10	1,4E-10	5,69E-11	2,15E-9	-4,47E-9
Potential Human exposure efficiency relative to U235 (IRP) ³	kBq U235-eq.	0,62	2,16E-4	1,47E-4	8,73E-3	2,66E-3	-9,71E-1
Potential Comparative Toxic Unit for ecosystems (ETP-fw) ²	CTUe	28,07	7,59E-2	2,58E-2	3,27E-2	15,82	-2,96E+0
Potential Comparative Toxic Unit for humans - cancer effects (HTP-c) ²	CTUh	5,22E-9	4,05E-12	5,28E-13	1,16E-12	1,93E-10	-3,18E-11
Potential Comparative Toxic Unit for humans - non-cancer effects (HTP-nc) ²	CTUh	2,14E-8	5,98E-11	2,91E-11	1,71E-11	7,91E-9	-9,25E-10
Potential Soil quality index (SQP) ²	dimensionless	2,03	4,39E-3	-3,66E-3	1,82E-2	4,4E-2	-1,39E+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	3,71	8,24E-4	1,2E-3	2,59E-2	1,36E-2	-6,67E+0
Use of renewable primary energy resources used as raw materials (PERM)	MJ	2,84E-3	0	0	0	0	0
Total use of renewable primary energy (PERT)	MJ	3,71	8,24E-4	1,2E-3	2,59E-2	1,36E-2	-6,67E+0
Use of non renewable primary energy as energy carrier (PENRE)	MJ	44,35	8,53E-2	2,35E-2	0,10	0,47	11,56
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	28,61	0	0	0	0	0
Total use of non-renewable primary energy resource (PENRT)	MJ	72,96	8,53E-2	2,35E-2	0,10	0,47	11,56
Use of secondary material (SM)	kg	5,06E-5	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	14,89	4,15E-3	2,22E-3	0,11	5,09E-2	-1,27E+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	0,12	9,5E-5	3,63E-5	2,75E-5	4,71E-2	8,62E-3
Non hazardous waste disposed (NHWD)	kg	0,25	1,79E-4	1,97E-4	5,29E-4	4,25E-2	-7,13E-2
Radioactive waste disposed (RWD)	kg	8,47E-5	3,05E-8	1,93E-8	1,06E-6	3,58E-7	-1,17E-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	1,94E-2	0	0	0	0	0
Materials for energy recovery (MER)	kg	2,54E-3	0	0	0	0	0
Exported electrical energy (EEE)	MJ	0,23	0	0	0	3,93	0
Exported thermal energy (EET)	MJ	0,45	0	0	0	7,60	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 steps of deconstruction (C1), transport to disposal (C2) and waste treatment before disposal (C3) represent only minor impacts compared to the steps of production (A1-A3) and disposal of the product (C4). For all indicators, the production process is more harmful than the disposal process (more than 50% to 100% of the total impacts excluding module D). The result of the step of disposal of the product according to the global warming potential indicator of (C4) is slightly less than 50% of the total results outside module D, because the disposal is mainly by incineration and the main materials have a high content of fossil carbon. Other indicators where the disposal of the product (C4) accounts for more than 10% of the total impact outside module D are freshwater ecotoxicity (35%) and non-carcinogenic human toxicity (25%), marine aquatic eutrophication (12%) and terrestrial eutrophication (10%).

According to EN 15804+A2: "Module D recognizes the concept of "design for reuse, recycling and recovery" for buildings by demonstrating the potential benefits associated with reduced further use of primary materials and fuels, while considering the pressures associated with recycling and recovery processes across system boundaries." Module D results for TERA products show environmental benefits associated primarily with energy recovery from the combustion of insulation materials in the disposal phase and, to a lesser extent, from the combustion of waste resins in the production phase. The benefits of recycling component packaging during the production process and the amount of recycled material in this packaging are low.

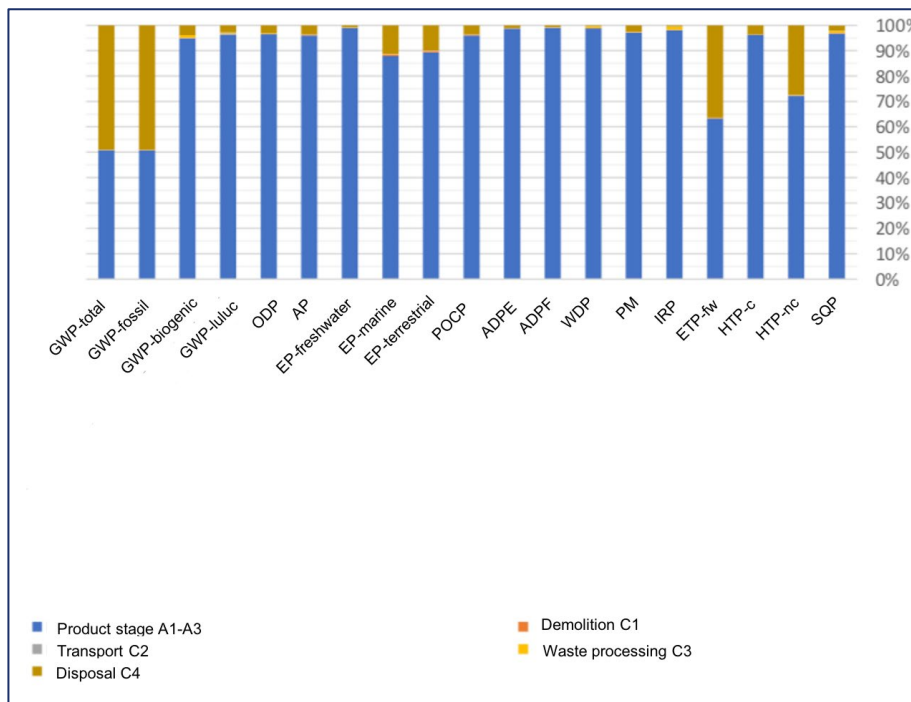


Figure 1: Contributions of life cycle phases to impacts by category.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Disposal

The end-of-life disposal scenario for the swissporTERA and swissporTERA White insulation materials corresponds to the average disposal processes identified in Switzerland in the KBOB database. This average scenario includes 96.5% municipal incineration with energy recovery and 3.5% 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 total 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	0,965
	kg Product or material for final disposal, landfill	0,035
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	5320	3280
Greenhouse gas emissions	kg CO2 eq.	3,12	3,09
Primary energy, non-renewable	kWh	21,7	0,19
Energetically recovered (production)	kWh	14,8	
Recycled as material (production)	kWh	6,95	
Primary energy, renewable	kWh	1,03	0,011
Energetically recovered (production)	kWh	1,03	
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.