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

swissporPIR Facade, insulation products made of polyurethane and expanded polystyrene (incl. swissporPIR TOP 023 and swissporPIR VENTO)

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

Alporit AG/ swisspor management AG
Industriestrasse 559
CH-5623 Boswil

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

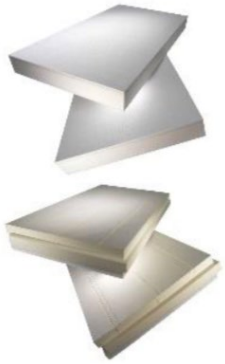
The function of polyurethane (PIR) products is to provide thermal insulation for new or renovated buildings, thus reducing heating energy consumption. The thickness of the insulation boards to be installed depends on the thermal conductivity of the building materials and the desired thermal performance of the building.

Product identification

The product swissporPIR facade is an established average product of the following trade references:

- swissporPIR TOP 023
- swissporPIR VENTO

It is offered in the form of rigid boards, which are applied to the facade with plastered external insulation or ventilated facade. The thermal conductivity of the boards is between 0.023 W/(m.K) and 0.025 W/(m.K).



Declared unit

The declared unit is 1 kg of insulation board with an average density of 35 kg/m^3. The average density is calculated in relation to the produced quantities of the individual trade references included in the product swissporPIR Facade. The packaging material is taken into account in the life cycle assessment.

Description of the main components

The swissporPIR facade panels investigated essentially consist of polyurethane, a mineral coating on one side and an expanded polystyrene insulation board on the other. The swissporPIR VENTO product in particular undergoes an additional processing step.

Rigid polyurethane foam is created by a chemical reaction between isocyanate and polyols, which, when mixed together and then placed between the face sheets, swell and cure to form the solid board. The isocyanate and polyols come from non-renewable resources (petroleum industry). Additives, also from non-renewable sources, are added to promote the reaction (pentane, ethylene glycol).
The expanded polystyrene insulation board is swissporEPS, which is delivered from another company site. It is made from expanded polystyrene spheres that are agglomerated in a mold by adding pentane and exposing them to steam.
Mineral glass nonwoven consists of glass fibers obtained from mineral resources.

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 (polyurethane), only the PIR VENTO product goes through an additional processing step.

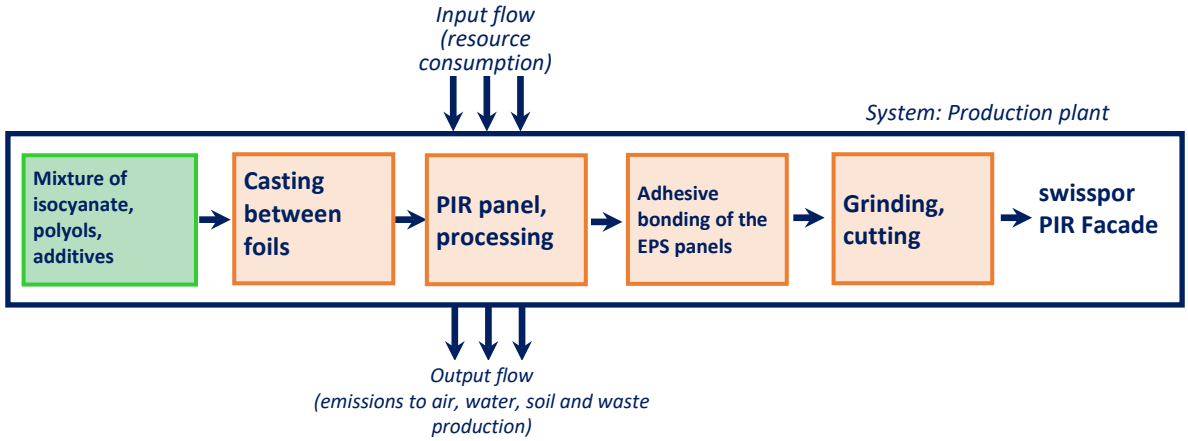
Declaration of the material product content according to the candidate list for an authorization by the European Chemicals Agency (REACH Regulation)

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

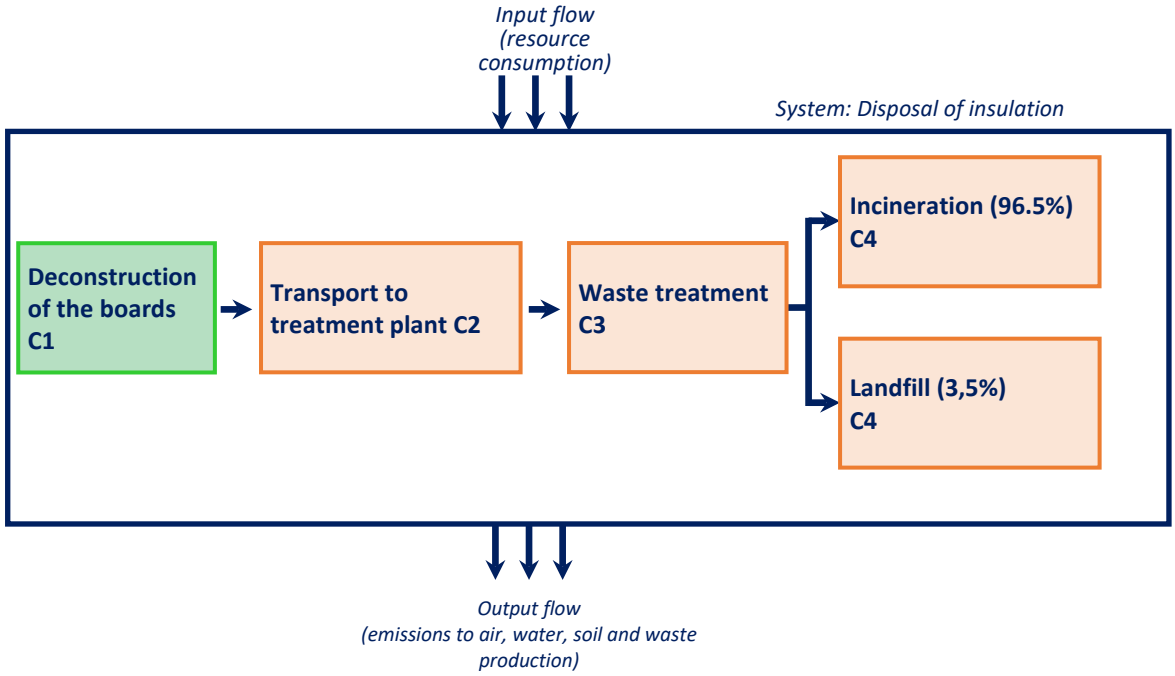
DECLARATION OF ENVIRONMENTAL PARAMETERS FROM THE LIFE CYCLE ASSESSMENT

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.	5,31	6,83E-3	1,7E-3	2,34E-3	2,67	-5,03E-1
Global Warming Potential – fossil fuels (GWP-fossil)	kg CO2 eq.	5,25	6,82E-3	1,69E-3	2,26E-3	2,67	-5,34E-1
Global Warming Potential – biogenic (GWP-biogenic)	kg CO2 eq.	6,38E-2	9,48E-6	5,58E-6	7,83E-5	4,48E-4	3,14E-2
Global Warming Potential – luluc (GWP-luluc)	kg CO2 eq.	3,86E-4	1,13E-6	6,91E-6	4,15E-6	4,48E-5	-4,83E-4
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC-11 eq.	5,23E-8	1,03E-10	5,3E-11	2,49E-10	1,83E-8	-3,95E-8
Acidification potential, Accumulated Exceedance (AP)	mol H+ eq.	2,27E-2	3,25E-5	6,3E-6	6,75E-6	2,24E-3	-2,15E-3
Eutrophication potential - freshwater (EP-freshwater)	kg P eq.	5,01E-4	3,03E-7	1,39E-7	1,4E-6	9,46E-6	-1,6E-4
Eutrophication potential - marine (EP-marine)	kg N eq.	4,31E-3	1,24E-5	2,06E-6	2,24E-6	2,47E-3	-4,96E-4
Eutrophication potential - terrestrial (EP-terrestrial)	mol N eq.	4,1E-2	1,34E-4	2,07E-5	2,13E-5	1,2E-2	-4,82E-3
Photochemical Ozone Creation Potential (POCP)	kg NMVOC eq.	1,69E-2	4,25E-5	7,71E-6	6,66E-6	2,93E-3	-1,68E-3
Abiotic depletion potential - non-fossil resources (ADPE)[1]	kg Sb eq.	4,68E-6	3,09E-9	4,15E-9	3,41E-9	1,02E-7	-5,34E-7
Abiotic depletion potential - non-fossil resources (ADPF)[1]	MJ	106,82	8,53E-2	2,34E-2	0,10	2,04	-1,44E+1
Water (user) deprivation potential (WDP)[1]	m^3 world eq. deprived	273,84	0,18	9,47E-2	4,87	6,29	-4,05E+2
Potential incidence of disease due to PM emissions (PM)	Disease incidence	3,82E-7	1,53E-10	1,4E-10	5,69E-11	7,21E-9	-5,25E-8
Potential Human exposure efficiency relative to U235 (IRP)[2]	kBq U235-eq.	0,41	2,16E-4	1,47E-4	8,73E-3	7,1E-3	-7,52E-1
Potential Comparative Toxic Unit for ecosystems (ETP-fw)[1]	CTUe	192,66	7,59E-2	2,58E-2	3,27E-2	6,54	-1,11E+1
Potential Comparative Toxic Unit for humans - cancer effects (HTP-c)[1]	CTUh	1,7E-9	4,05E-12	5,28E-13	1,16E-12	2,21E-10	-3,42E-10
Potential Comparative Toxic Unit for humans - non-cancer effects (HTP-nc)[1]	CTUh	1,19E-7	5,98E-11	2,91E-11	1,71E-11	9,16E-9	-8,63E-9
Potential Soil quality index (SQP)[1]	dimensionless	2,12	4,39E-3	-3,66E-3	1,82E-2	0,10	-1,24E+1

[1] 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.
[2] 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	4,01	8,24E-4	1,2E-3	2,59E-2	3,46E-2	-6,03E+0
Use of renewable primary energy resources used as raw materials (PERM)	MJ	4,62E-3	0	0	0	0	0
Total use of renewable primary energy (PERT)	MJ	4,02	8,24E-4	1,2E-3	2,59E-2	3,46E-2	-6,03E+0
Use of non renewable primary energy as energy carrier (PENRE)	MJ	75,64	8,53E-2	2,35E-2	0,10	2,04	-1,44E+1
Use of non renewable primary energy resources used as raw materials (PENRM)	MJ	31,18	0	0	0	0	0
Total use of non-renewable primary energy resource (PENRT)	MJ	106,82	8,53E-2	2,35E-2	0,10	2,04	-1,44E+1
Use of secondary material (SM)	kg	5,02E-4	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	6,38	4,15E-3	2,22E-3	0,11	0,15	-9,43E+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	0,11	9,5E-5	3,63E-5	2,75E-5	5,84E-2	-2,15E-2
Non harzardous waste disposed (NHWD)	kg	0,14	1,79E-4	1,97E-4	5,29E-4	4,54E-2	-1,54E-1
Radioactive waste disposed (RWD)	kg	5,22E-5	3,05E-8	1,93E-8	1,06E-6	9,78E-7	-9,23E-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	9,77E-2	0	0	0	0	0
Materials for energy recovery (MER)	kg	2,39E-3	0	0	0	0,97	0
Exported electrical energy (EEE)	MJ	2,95E-2	0	0	0	3,79	0
Exported thermal energy (EET)	MJ	5,83E-2	0	0	0	7,41	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 deconstruction (C1), transport to disposal (C2), and waste treatment prior to disposal (C3) steps represent minimal impacts on all impact categories compared to the production step (A1-A3) and, to a lesser extent, the product disposal step (C4) (see Figure 1).

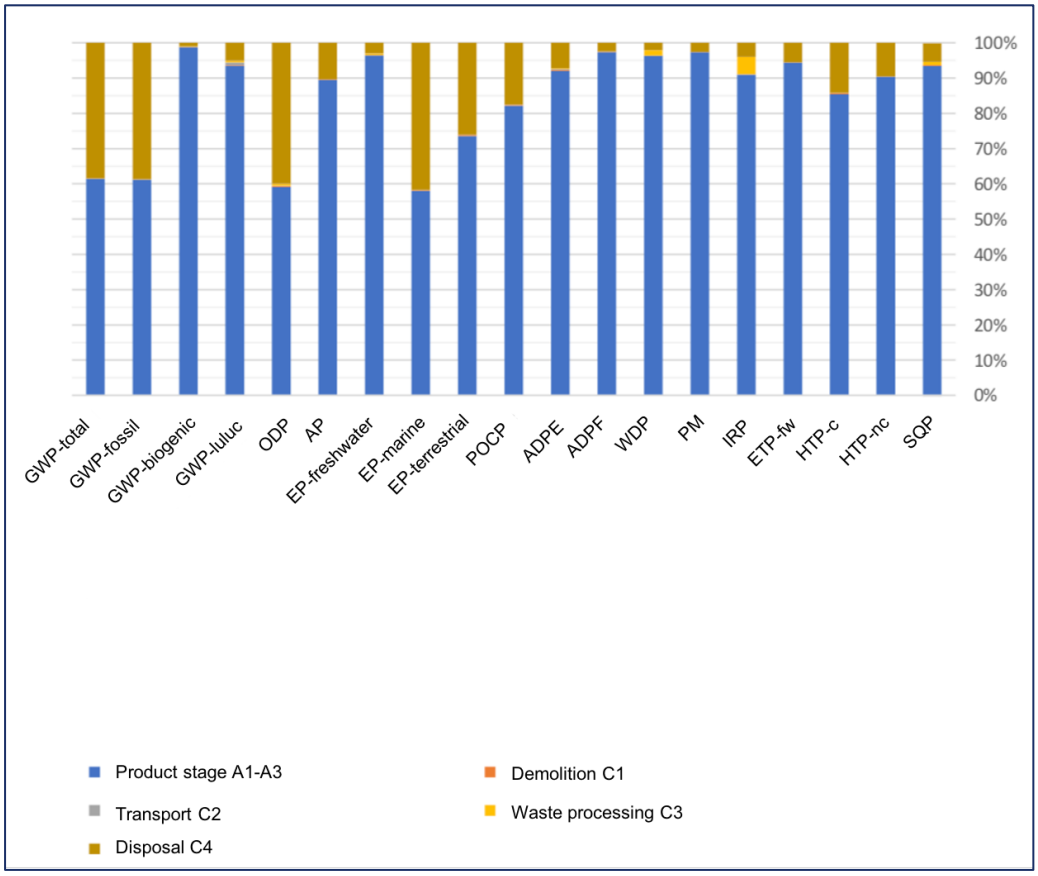


Figure 1: Contributions of life cycle phases to impacts by category.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

Disposal

The end-of-life disposal scenario for swissporPIR facade insulation materials corresponds to the average disposal processes identified in Switzerland in the KBOB database for polyurethane insulation materials. 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 data 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	0,965
	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	7890	2920
Greenhouse gas emissions	kg CO2 eq.	5,02	2,65
Primary energy, non-renewable	kWh	31,8	0,68
Energetically recovered (production)	kWh	23,6	
Recycled as material (production)	kWh	8,28	
Primary energy, renewable	kWh	1,12	0,017
Energetically recovered (production)	kWh	1,12	
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.