ENVIRONMENTAL PRODUCT DECLARATION

as per *ISO 14025* and *EN 15804+A2*

Owner of the Declaration	Sioen Industries NV
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
Declaration number	EPD-SIO-20220324-IBJ1-EN
Issue date	18.04.2023
Valid to	17.04.2028

1m² of Type II technical textile

Sioen Industries NV

Institut Bauen und Umwelt e.V.

ECO PLATFORM EPD VERIFIED

www.ibu-epd.com | https://epd-online.com

1. General Information

Sioen Industries NV

Programme holder

IBU – Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

Declaration number

EPD-SIO-20220324-IBJ1-EN

This declaration is based on the product category rules:

Plastic and elastomer roofing and sealing sheet systems,
01.08.2021
(PCR checked and approved by the SVR)

Issue date

18.04.2023

Valid to

17.04.2028

Dipl.-Ing. Hans Peters
(Chairman of Institut Bauen und Umwelt e.V.)

Florian Pronold
(Managing Director Institut Bauen und Umwelt e.V.)

1m² of Type II technical textile

Owner of the declaration

Sioen Industries NV
Fabriekstraat 23
8850 Ardooie
Belgium

Declared product / declared unit

1m² of Type II technical textile (T2121E)

Scope:

This EPD covers the product Type II Technical Textile, more specifically the T2121E as representative product. This product is a technical textile made out of a combination of a polyester (PET) fabric and polyvinylchloride (PVC) coating with a polyvinyl fluoride (PVDF) and acrylic lacquer finish. The fully coated fabric weight is 900 g/m². The calculations are based on average yearly production data for 2019.
The producing company is Sioen Industries NV. The above named products are produced at the production sites of Mouscron (BE) and Flixecourt (FR).
The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR
Independent verification of the declaration and data according to ISO 14025:2011
☐ internally ☒ externally

Dr. Matthew Fishwick,
(Independent verifier)

2. Product

2.1 Product description/Product definition

The product is a technical textile made from a polyester (PET) fabric, coated with PVC and a finishing lacquer.
The base fabric is a woven textile based on high-tenacity multifilament polyester (PET) yarns. Each side of the fabric is coated with a well-impregnated adhesion layer, a main layer consisting largely of PVC, UV stabilizers, flexing additives and other additives, and a thin acrylic and PVDF lacquer top coat which allows for a better cleaning ability, improved UV resistance and perfect weldability. The declared product has an average weight of 900 g/m². For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) Regulation (EU) No. 305/2011 (CPR) applies.

2.2 Application

These products are (mainly) applied in tensile architecture. Tensile structures typically consist of 3 main components: a primary structure, connectors, and tensioned fabric, such as the Type II technical textile.

These structures may be stand-alone or integrated with (existing) regular buildings. Many different construction forms are possible, such as façade coverings, sun-shading elements, roof coverings,... either for permanent or temporary use.

The standard lifetime of the fabrics used in tensile architecture ranges from 15 to over 30 years. For lightweight Type II fabrics, the lifetime is typically 15 years.
This EPD (and the underlying LCA) has been made to allow customers to quantify the ecological impact of their constructions, as well as to allow comparison with other material types.

2.3 Technical Data

The technical specifications of the declared product is given in the table below.

Constructional data

Name	Value	Unit
Fabric material	PES material	
Thickness	0.75	mm
Total weight ISO 2286-2	900	g/m²
Breaking strength ISO 1421-1 – warp/weft	4300/4200	N/5cm
Tear strength DIN 53363 – warp/weft	600/500	N/5cm
Adhesion ISO 2411	120	N/5cm
Temperature resistance EN 1876-1	-30/+70	°C
Fire retardancy DIN 4102-1	B1	
U-value ISO 6946 – vertical/horizontal airflow	5.5/4.6	W/(m².K)

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no CE-marking).

2.4 Delivery status

The coated textile material is delivered on rolls of different lengths and widths. For the width, there are different standard widths available. The amount of fabric (length) on each roll can be determined by the customer.

2.5 Base materials/Ancillary materials

The main constituents of the product are:

- PVC: 30 wt%
- DINP: 25 wt%
- PET: 30 wt%
- additives such as titanium oxide, flame retardants,..:15 wt%

This product/article/at least one partial article contains substances listed in the candidate list (date: 10.06.2022) exceeding 0.1 percentage by mass: no.
This product/article/at least one partial article contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the candidate list, exceeding 0.1 percentage by mass: no Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the (EU) *Ordinance on Biocide Products No. 528/2012*): yes (Dichloroctylisothiazolinon; DCOIT) The plasticizer used is diisononyl phthalate (DINP; CAS 28553-12-0)

2.6 Manufacture

The production of the PVC-coated fabric starts with the production of a woven fabric made from polyester (polyethylene terephthalate, PET) yarn. This is done by beaming, followed by weaving to the desired width in the weaving plant in Mouscron, Belgium. After quality control, the woven fabrics are transported to the coating site in Flixecourt, France.
At Flixecourt the PVC plastisol is made from PVC powder, DINP, pigments and additives. The plastisol is knife-coated onto the fabric in several steps with gelation occurring by intermediate (and a final) heating step(s). The first coated layer differs in composition to achieve optimal adhesion. After complete coating and gelation, the lacquer layers (based on acrylics and PVDF) are applied.

The consumed solvents are quantitatively evaporated from the material. The resulting vapours are treated at post-combustion to harmless gasses and water.

The produced material is inspected and tested according to *ISO 9001:2015*

2.7 Environment and health during manufacturing

Sioen actively commits to keeping their employees safe. Regular measurements of noise and air quality are done. The results are below the legal requirements.
Prescribed safety garments and safety devices are provided where neccessary, e.g. when employees are exposed to powder or solvents.
Production employees undergo mandatory health checks on regular occasions.

2.8 Product processing/Installation

Processing of the technical textiles and handling are under the control of the customer.

The technical textile is developed to be easily processed via high-frequency welding (radio frequency) or via heat welding. The weld produced in this fashion is equally strong as the surrounding base material.

In order to achieve a good lifetime, proper structure design (and material selection) is required.

After construction, regular inspection of the technical textile is

recommended, as damage may occur by faulty design, inappropriate clamping and other sources of high local loads. Excessive localized loads may lead to damage, which upon load redistribution results in tear propagation.

2.9 Packaging

The technical textiles are rolled on paper/cardboard roll cores, wrapped in foil and fixed by tape. Rolls can be pyramidically stacked on pallets for transport. To ensure the rolls stay in place and no damage occurs to the material during transportation, plastic strappings and additional cardboard can be used.

2.10 Condition of use

No changes occur in the material composition over the service life of the product and/or regarding environmentally relevant material inherent properties over the service life of the product.

2.11 Environment and health during use

When the products are used as designated and according to the current state of knowledge, there are no hazards to water, air and soil.
When used normally and in accordance with the designated purpose, no health risks or restrictions are to be anticipated.

2.12 Reference service life

Not the entire life cycle is declared in this EPD, so no RSL is required. Nevertheless, the lightweight Type II technical textile has an average lifetime of 15 years. This lifetime is higher for the heavier fabrics. The product service life may vary due to application, grade of user know-how, location and maintenance.

2.13 Extraordinary effects

Fire

The reaction to fire is determined according to *EN 13501-1* (B-s2,d0) and *DIN 4102-1* (B1).

Fire protection

Name	Value
Building material class	B
Burning droplets	d0
Smoke gas development	s2

Water

The technical textile is developed for long-term exterior use. Therefore, the products have good weatherabilty and water has no influence.

Mechanical destruction

Mechanical destruction doesn't lead to a change in chemical composition.

2.14 Re-use phase

Sioen Industries NV is conscious of its responsibility for acting in an environmentally compatible manner. The company is involved in a range of activities related to recycling, such as in-house and external recycling systems and sustainable production methods. Sioen Industries actively supports the commitment of the Vinyl Plus Committee to significantly increase PVC recycling volumes and is a member of the *Industrieverband Kunststoffbahnen e.V.* (IVK Europe). Post-consumer PVC coated fabric is recyclable. The material can be shredded and processed into the recyclate (plastic granulate), which can be applied in the production of e.g. windows, riding mats, pipes and foils.

2.15 Disposal

Construction waste of PVC-coated polyester fabrics falls under the category of the *European Waste Code EWC* 17 02 03

2.16 Further information

Further information about PVC coating polyester fabrics and other technical textiles can be found on the homepage of Sioen Industries.

3. LCA: Calculation rules

3.1 Declared Unit

In this study, only the production, transport to the construction and the EoL of the PVC-coated textile is included. Therefore the reference unit is a declared unit: 1 m² PVC coated polyester textile Type II (T2121E) with a mass of 0,9 kg

Declared unit and mass reference

Name	Value	Unit
Grammage	0.9	kg/m^2
Declared unit	1	m^2

3.2 System boundary

This EPD is cradle to gate with options, modules C1-C4, and module D:
The analysis of the product life cycle includes production of the basic materials, transport of the basic materials and manufacture of the product, which are declared in modules A1-A3.
In module A4, the burden of transporting the manufactured product to the customer is declared.
The deconstruction and demolition stage C1 has not been included, since this is largely dependent on the specific project. Also, the C1 stage has been assumed immaterial.
One scenario of the end-of-life (EoL) stage is considered. It is the incineration of the technical textiles in the incineration plant. This is taken into account in module C4.
The transport of the used product to the final disposal was also modelled (module C2).
Potential credits for electricity and thermal energy resulting from the waste incineration plant are declared in module D.

3.3 Estimates and assumptions

Module A2: All of the raw materials are supplied by truck to the site of Sioen. For most of the raw materials the distance from the supplier to Sioen was used to add transport. In the LCA calculation 313 kgkm/m^2 is used Module A3: There are several emissions into air as a result of the production process. These are mainly caused by the incineration of natural gas. However some emissions are to be expected from the combustion of some of the solvents evaporating from the fabric. For emissions that are measured, the measured value is used instead of the literature values in the *Ecoinvent* process for natural gas emissions.
Module A4: In this LCA the transport of the finished product is included informatively based on average application 'somewhere in Europe'), and the transport distance is assumed to be 1500 km Module C2: In this study, we expect that the PVC-coated fabric is transported to a waste incineration plant where it is incinerated. Module C3: Since the average waste incineration plant is expected to have an efficiency below 60% the incineration process is assigned to module C4. Module D:

The benefit of the recuperation of electricity and heat that often occurs in waste incineration plants was included in module D. For the electrical and thermal efficiency of the waste-to-energy plant we calculated 18% and 31% respectively. For the heat of combustion of PET and PVC, the lower heating value was used:
1. PET: 22,95 MJ/kg
2. PVC: 21,51 MJ/kg

3.4 Cut-off criteria

Several flows (raw materials) were excluded from the LCA study. All excluded flows pass the cut-off criteria: they represent less than 1% and are summing up to less than 5% of the total input (mass) and impact of renewable and non-renewable primary energy usage of mandatory modules (A1-A3). Machines and facilities required during production are neglected

3.5 Background data

For background processes, the *Ecoinvent* database v3.6 (allocation cut-off) has been used.

3.6 Data quality

Sioen Industries collected data on the production of the PVC-coated polyester fabric and the intermediate products (PET yarn and PET fabric). More specifically:

- Raw material use and transport to the production location
- Sioen contacted important suppliers if primary data was available for their product.
- Energy use
- Emissions
- Production waste

3.7 Period under review

Data sets are based on 1 year averaged data (time period: January 2019 to December 2019).

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product´s lifespan: Europe

3.9 Allocation

The product is produced in 2 plants. Mouscron (BE) for warping & weaving, Flixecourt (FR) for coating & lacquering. Warping & weaving: the process data is allocated based on the length of products produced A variety of fabrics of different widths are produced in the same plant on the same machines. The difference between 2 fabrics of a different width in the required production time and energy is assumed insignificant. Therefore, allocation based on weight or surface area is incorrect and thus allocation is based on fabric lengths. Coating & lacquering: the process data is allocated based on the surface of products produced (m²). Some 'waste' products arise from the process such as cutting losses, lower grade/off-spec products etc. Since all of these materials are sold these haven't been treated as waste in the LCA calculations. This is a worst case approach for the product since a small part of the burdens and raw materials could have been allocated to these co-products.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively the product-specific characteristics of performance, are taken into account. For this study, the *Ecoinvent* database v3.6 (reference year 2016) was used. The data fulfill the required *EN 15804*.

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Since the biogenic carbon content is (much) lower than 5% of the total mass, the declaration of biogenic carbon content may be omitted.

Transport to the building site (A4)

Name	Value	Unit
Transport distance	1500	km

Module A4: In this LCA the transport of the finished product is included informatively based on average application 'somewhere in Europe"), the transport distance is assumed to be 1500 km

Reference lifetime

The reference lifetime of the product is 15 years.

End of life (C1-C4)

Name	Value	Unit
Collected separately waste type waste type	0.9	kg

Module C2: In this study we expect that the PVC-coated fabric is transported to a waste incineration plant where it is incinerated.
Module C4: Since the average waste incineration plant is expected to have an efficiency below 60% the incineration process is assigned to module C4.
The following processes were used to model the waste incineration process:
1. PET part, Waste polyethylene terephthalate {RoW}| treatment of waste polyethylene terephthalate, municipal incineration | Cut-off
2. PVC part, Waste polyvinylchloride {RoW}| treatment of waste polyvinylchloride, municipal incineration | Cut-off

5. LCA: Results

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; ND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	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	X	MND	MND	MND	MNR	MNR	MNR	MND	MND	MND	X	MND	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² Type II technical textile (T2121E)

Parameter	Unit	A1	A2	A3	A4	C2	C4	D
GWP-total	kg CO_2 eq	4.13E+00	1.18E-01	4.04E-01	1.78E-01	1.19E-02	2.13E+00	-8.24E-01
GWP-fossil	kg CO_2 eq	4.25E+00	1.18E-01	4.04E-01	1.78E-01	1.18E-02	1.89E+00	-8.24E-01
GWP-biogenic	kg CO_2 eq	-2.44E-01	1.43E-05	6.23E-07	1.08E-04	7.19E-06	2.44E-01	-2.15E-04
GWP-luluc	kg CO_2 eq	1.3E-01	6.3E-05	2.42E-07	6.29E-05	4.19E-06	1.32E-04	-2.34E-05
ODP	kg CFC11 eq	7.42E-07	2.53E-08	5.62E-10	4.09E-08	2.73E-09	4.41E-08	-1.07E-07
AP	mol H^+ eq	3.31E-02	2.36E-03	3.36E-03	1.01E-03	6.75E-05	1.11E-03	-6.74E-04
EP-freshwater	kg P eq	6.24E-04	7.1E-07	1.2E-08	1.46E-06	9.75E-08	4.9E-06	-8.88E-07
EP-marine	kg N eq	7.47E-03	6.16E-04	1.76E-03	3.62E-04	2.41E-05	3.01E-04	-2.02E-04
EP-terrestrial	mol N eq	7.73E-02	6.83E-03	1.93E-02	3.99E-03	2.66E-04	3.25E-03	-2.22E-03
POCP	kg NMVOC eq	2.24E-02	1.8E-03	4.95E-03	1.14E-03	7.61E-05	8.77E-04	-7.34E-04
ADPE	kg Sb eq	6.42E-02	1.89E-06	4.77E-09	4.6E-06	3.06E-07	7.05E-06	-2.18E-07
ADPF	MJ	9.75E+01	1.65E+00	3.68E-02	2.73E+00	1.82E-01	2.12E+00	-1.38E+01
WDP	m^3 world eq deprived	3.6E+00	3.76E-03	6.38E-05	8.37E-03	5.58E-04	1.9E+00	-5.99E-02

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential)

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² Type II technical textile (T2121E)

Parameter	Unit	A1	A2	A3	A4	C2	C4	D
PERE	MJ	8.09E+00	1.75E-02	2.25E-04	3.91E-02	2.61E-03	1.86E-01	-2.92E-02
PERM	MJ	0	0	0	0	0	0	0
PERT	MJ	8.09E+00	1.75E-02	2.25E-04	3.91E-02	2.61E-03	1.86E-01	-2.92E-02
PENRE	MJ	1.04E+02	1.75E+00	3.91E-02	2.9E+00	1.93E-01	2.26E+00	-1.53E+01
PENRM	MJ	0	0	0	0	0	0	0
PENRT	MJ	1.04E+02	1.75E+00	3.91E-02	2.9E+00	1.93E-01	2.26E+00	-1.53E+01
SM	kg	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0
FW	m^3	8.86E-02	1.37E-04	2.34E-06	3.09E-04	2.06E-05	5.75E-02	-7.94E-04

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA – WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² Type II technical textile (T2121E)

Parameter	Unit	A1	A2	A3	A4	C2	C4	D
HWD	kg	1.91E-03	2.89E-06	7.75E-08	6.97E-06	4.65E-07	3.9E-06	-1.74E-05
NHWD	kg	6.61E-01	5.41E-02	6.37E-05	1.69E-01	1.13E-02	3.6E-01	-5.53E-03
RWD	kg	2.32E-04	1.13E-05	2.46E-07	1.85E-05	1.24E-06	9.99E-06	-6.58E-06
CRU	kg	0	0	0	0	0	0	0
MFR	kg	0	0	2.09E-01	0	0	0	0
MER	kg	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	3.5574552	0
EET	MJ	0	0	0	0	0	6.1267284	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional: 1 m² Type II technical textile (T2121E)

Parameter	Unit	A1	A2	A3	A4	C2	C4	D
PM	Disease incidence	2.53E-07	6.9E-09	7.78E-09	1.6E-08	1.07E-09	7.76E-09	-1.91E-09
IR	kBq U235 eq	2.29E-01	7.14E-03	1.52E-04	1.19E-02	7.95E-04	8.22E-03	-4.43E-03
ETP-fw	CTUe	5.97E+02	1.2E+00	2.69E-02	2.21E+00	1.48E-01	7.3E+01	-7.98E-01
HTP-c	CTUh	5.79E-09	6.01E-11	2E-11	7.88E-11	5.26E-12	2.75E-10	-5.19E-11
HTP-nc	CTUh	2.22E-07	1.23E-09	1.45E-10	2.64E-09	1.76E-10	2.2E-08	-7.35E-10
SQP	SQP	3.26E+01	8.3E-01	4.9E-03	2.33E+00	1.56E-01	1.18E+00	-1.98E-01

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

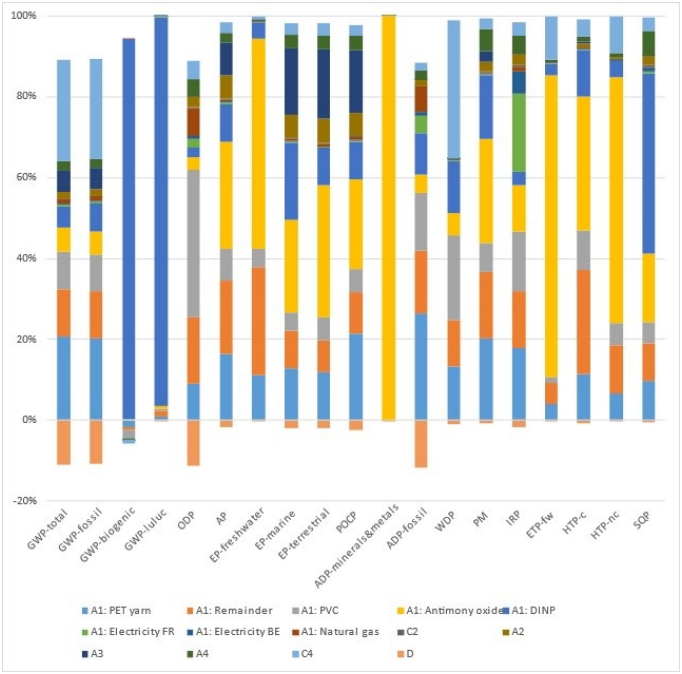
Disclaimer 1 – for the indicator "Potential Human exposure efficiency relative to U235". This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators "abiotic depletion potential for non-fossil resources", "abiotic depletion potential for fossil resources", "water (user) deprivation potential, deprivation-weighted water consumption", "potential comparative toxic unit for ecosystems", "potential comparative toxic unit for humans – cancerogenic", "Potential comparative toxic unit for humans - not cancerogenic", "potential soil quality index". The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

Major contribution analysis

To visualize which materials and processes give the largest contribution to the environmental indicators a major contributions analysis has been included. In the graph below the total value of each indicator has been set to 100%. The colours indicate which part of the environmental effects are caused by the different materials and processes in the life cycle of the PVC-coated fabric.



The production-related materials and processes give the most significant contributions to all environmental indicators. For most indicators the production of PET and PVC are clearly visible, however, sometimes the production of additives gives the most significant contribution. This especially holds for the production of antimony oxide, and plasticizer (DINP).
Sioen's own emissions of NOx and to a lesser extent SOx contribute to acidification potential (AP). The NOx emissions also contribute to the eutrophication (EP) indicators. VOC emissions of Sioen contribute to photochemical oxidation potential (PCOP).
The waste treatment processes (incineration, C4) also gives a significant contribution to GWP (total, fossil and biogenic).

Sensitivy analysis

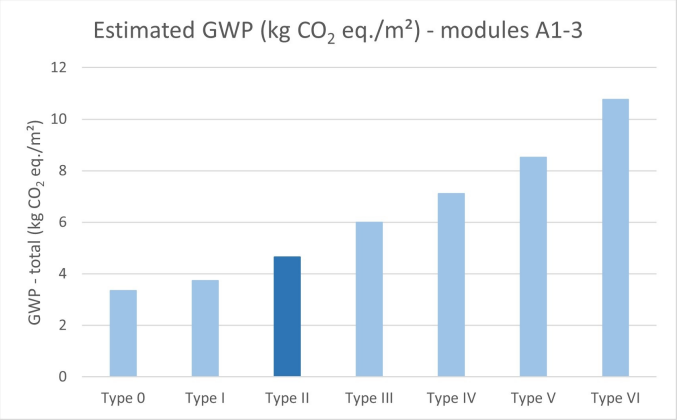
Separate indicators for PET- and PVC part of the product

The environmental profiles have been calculated for the PET fabric part of the calculation and the PVC coating part of the calculation separately. Many production variants exist and regarding the production process only the amount and ratio between PET and PVC significantly affects the environmental results for these products.
The GWP-total results for the production A1-A3 for 1 m² are given below:

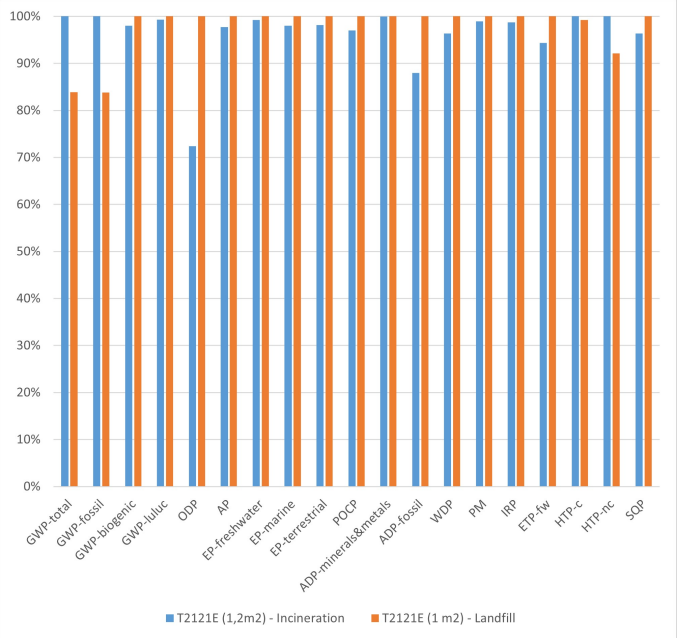
- PET fabric: 1.69 kg CO_2 eq.
- Fabric coating: 2.97 kg CO_2 eq.

Using these environmental profiles an estimation can be given on the environmental indicators for these product variants.

The GWP score estimates of the production (modules A1-3) for the product family are given in the chart below.



Final waste treatment - landfill
A sensitivity analysis has been performed for the waste treatment scenario since the fabric also could be landfilled (instead of incineration or recycling). The result of the comparison (with end-of-life: incineration) is shown graphically. In the figure below the environmental score of the variant with the largest impact is set to 100%. The variant with the lower score is shown relative to the variant with the highest score. For GWP fossil, and human toxicity potential non carcinogenic effects (nc) incineration at the end of life results in higher environmental burdens. For ozone layer depletion potential and abiotic depletion potential the landfill variant shows larger environmental burdens. Largely, this is not directly related to the landfill process but due to the effect that there are no environmental benefits in the landfill situation (no energy recuperation in the landfill situation).



7. Requisite evidence

Information on the used raw materials is acquired from the technical datasheets and Material Safety Data Sheets from the supplier.

The vapor generated in the coating ovens is directly treated by post-combustion. Emissions are measured on a regular basis and are below the legal limitations.

VOC emissions of the product are not relevant, since the PVC-coated polyester fabric is applied outside.

8. References

Standards

DIN 4102-1
DIN 4102-1 Fire behaviour of building materials and elements Part 1: Classification of building materials Requirements and testing

DIN 53363
DIN 53363, Testing of plastic films - Tear test using trapezoidal test specimen with incision

EN 13501-1
EN 13501-1:2018, Fire classification of construction products and building elements - Part 1: Classification using data from reaction to fire tests

EN 1402-1
EN 1402-1:2004, Unshaped Refractory Products - Part 1: Introduction And Classification

EN 15804
EN 15804:2012+A2:2019, Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products, 2019

EN 1876-1
EN 1876-1, Rubber- or plastics-coated fabrics - Low-temperature tests - Part 1: Bending test

ISO 14025
ISO, ISO 14025:2006 Environmental labels and declarations — Type III environmental declarations — Principles and procedures, 2006.

ISO 14040
ISO, ISO 14040:2006 Environmental management — Life cycle assessment — Principles and framework, 2006

ISO 14044
ISO, ISO 14044:2006 Environmental management — Life cycle assessment — Requirements and guidelines, 2006.

ISO 1421-1
ISO 1421:1998 Determination of Tensile Strength and Elongation at Break

ISO 21930
ISO, ISO 21930:2017 Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services, 2017.

ISO 2286-2
ISO 2286-2: 2017-01: Rubber- or plastics┐coated fabrics - Determination of roll characteristics – Part 2: Methods for determination of total mass per unit area, mass per unit area of coating and mass per unit area of substrate

ISO 2411
ISO 2411:2017, Rubber- or plastics-coated fabrics — Determination of coating adhesion

ISO 6946
ISO 6946:2017, Building components and building elements — Thermal resistance and thermal transmittance — Calculation methods

ISO 9001
ISO 9001:2015, Quality management systems – Requirements

Further References

Ecoinvent database

Ecoinvent database v3.6, reference year 2016

European Waste Code (EWC)
2000/532/EC European Waste Catalogue / Ordinance on European List of Wastes

IBU 2021
Institut Bauen und Umwelt e.V.: General Instructions for the EPD programme of Institut Bauen und Umwelt e.V., Version 2.0, Berlin: Institut Bauen und Umwelt e.V., 2021 http://www.ibu-epd.

Industriesverband Kunststoffbahnen e.v.
IVK Europe, the plastic sheets and films association (https://www.ivk-europe.com/)

Ordinance on Biocide Products No. 528/2012
Biocidal Products Regulation (EU) No 528/2012 of the European Parliament and of the Council of 22 May 2012 concerning the making available on the market and use of biocidal products (current consolidated version: 2022-04)

PCR Part A
Institut Bauen und Umwelt e.V., Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019

PCR Part B
Institut Bauen und Umwelt e.V., Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for Technical Textiles

REACH candidate list
Candidate List of substances of very high concern for Authorisation, published in accordance with Article 59(10) of the REACH Regulation, ECHA, www.echa.europa.eu/candidate-list-table

Publisher

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Programme holder

Institut Bauen und Umwelt e.V.
Hegelplatz 1
10117 Berlin
Germany

+49 (0)30 3087748- 0
info@ibu-epd.com
www.ibu-epd.com

Author of the Life Cycle Assessment

SGS INTRON
Dr. Nolenslaan 126
6136GV Sittard
Netherlands

+31 88 214 52 04
nl.intron@sgs.com
www.sgs.com/intron

Owner of the Declaration

Sioen Industries NV
Fabriekstraat 23
8850 Ardooie
Belgium

+3251740900
info@sioen.com
https://sioen.com/en