

MOLL

Environmental Product Declaration



In accordance with ISO 14025:2006, EN 15804:2012+A2:2019/AC:2021 and ISO 21930:2017 for

CONSTIVAP 18 PLUS, airtightness and vapour check membrane

from

MOLL bauökologische Produkte GmbH



Programme:
Programme operator:

The International EPD® System, www.environdec.com:

Box 21060
SE-10031 Stockholm, Sweden

EPD registration number:
Publication date:
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EPD type:

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16/09/2024
16/09/2029
EPD of a specific product

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

General information

Programme information

Programme: The International EPD® System
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Box 210 60
SE-100 31 Stockholm, Sweden
Website: www.environdec.com
E-mail: info@environdec.com

Product Category Rules (PCR)

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product category rules (PCR): Construction Products, PCR 2019:14, Version 1.3.4

UN CPC code: No. 36330: Plates, sheets, film, foil and strip, of plastics, not self-adhesive, non-cellular and not reinforced, laminated, supported or similarly combined with other materials

PCR review was conducted by: The Technical Committee of the International EPD® System. See www.environdec.com for a list of members.
Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact

Life Cycle Assessment (LCA)

LCA accountability: Jannik Schulz, María Díaz Cáceres
brands & values GmbH, info@brandsandvalues.com

Third-party verification

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

Third party verifier: Jan Weinzettel, weinzettel@seznam.cz

Approved by: The International EPD® System

Procedure for follow-up of data during EPD validity involves third-party verifier:

Yes No

The EPD owner has the sole ownership, liability, and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Description of the differences versus the previous version:

The product image, company logo, EPD International logo and Eco platform logo were changed to higher resolution versions in the cover page and headings of the EPD.

Company information

Owner of the EPD

MOLL bauökologische Produkte GmbH
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T: +49 (0) 62 02 – 27 82.0; info@moll-group.eu

Contact

Michael Förster: michael.foerster@moll-group.eu

Description of the organisation

MOLL bauökologische Produkte GmbH is the pioneer of intelligent sealing of the building envelope. The company develops and sells professional systems for achieving maximum protection against structural damage and mould:

- Humidity-variable Hydrosafe high-performance vapour retarding and airtightness membranes for interior sealing in new buildings and renovation projects.
- Roof underlays and wall lining membranes with active moisture transport for permanently secure exterior sealing of roofs and walls.
- Special adhesives and waterproof tapes.
- Sealing grommets as detailed solutions.

Highest quality for perfect function

- The system is manufactured using state-of-the-art production processes in the leading production facilities in Germany. Produced under the highest quality standards, it ensures insulation that is protected against moisture damage and mould.
- Highest effectiveness of thermal insulation.
- Reduction of heating costs due to optimal air sealing.
- Dry insulation materials.
- Best possible protection against structural damage and mould.
- Comfortable interior in summer and winter.
- Healthy indoor climate.
- Highest ecological value.

Together towards a successful future

People are the focus of every decision at Moll bauökologische Produkte, advancing building culture – that is the core of the company's idea. To this end, systems have been developed for over 30 years that are consistently geared to the health and comfort needs of users. Much of what began as pioneering new developments is now state of the art. Today, products are successfully used in over 40 countries worldwide.

Name and location of production site(s)

MOLL bauökologische Produkte GmbH in Schwetzingen, Germany.

Product-related or management system-related certifications

All production sites are ISO 9001 certified.

Product information

Product name

CONSTIVAP 18 PLUS, airtightness and vapour check membrane

Product identification

Airtightness and vapour control layer following the requirements of EN 13984 (Flexible sheets for waterproofing – Plastic and rubber vapour control layers – Definitions and characteristics; 2013)

Product description

CONSTIVAP 18 PLUS airtightness and vapour check membrane consists of a grid-reinforced film and a non-woven polypropylene fabric. With airtight bonding of all membrane overlaps and connections to adjacent building components, it enables a reduction in heat loss from buildings, prevents structural damage and supports a comfortable indoor climate in winter as well as in summer.

UN CPC code

No. 36330: Plates, sheets, film, foil and strip, of plastics, not self-adhesive, non-cellular and not reinforced, laminated, supported or similarly combined with other materials

Products covered by the EPD

CONSTIVAP 18 PLUS (width: 1.5 m / length: 50 m): GTIN 4026639168375

Geographical Scope

Global

Technical specifications

Reinforced vapour control layer, suitable for all fibre insulation materials.

Applications

Protection of thermal insulation from indoor humidity. Making the building envelope airtight.

Properties

Vapour control layer, tear-resistant, high durability.

Technical specifications	Product stage
Width	1.5 m
Length	50 m
Colour	white, printing blue
Weight: approx.	0.098 kg/m ²
sd-value (EN 1931)	18 m
Fire rating (EN 13501-1)	E
Tensile strength MD / CD (EN 13859-1 [A])	350 N/5 cm / 290 N/5
Elongation MD / CD (EN 13859-1 [A])	15 % / 15 %
Nail tear resistance MD / CD (EN 13859-1 [B])	240 N / 200 N
Durability after artificial ageing (EN 1931 / EN 1296)	passed
Temperature resistance	permanent -40 °C to 80 °C

LCA information

The EPD conducted is for the specific product CONSTIVAP 18 PLUS.

Declared unit: 1 m² CONSTIVAP 18 PLUS, airtightness and vapour check membrane

Conversion factor to mass: 0.121 kg/m² (Product with packaging)

Grammage of product: 0.098 kg/m² (Product without packaging)

Reference service life: 50 years

Time representativeness: Based on yearly manufacturing data from 01/01/2020 until 31/12/2020.

Description of the manufacturing processes

The production of the CONSTIVAP, airtightness and vapour check membrane, is done by bonding and laminating the polymers, the scrim and the non-woven together to create large rolls. After printing and confection, the large rolls are cut into sale units. The products are then packed and sent for storage and distribution, first within Germany to the central warehouse, and then all over Europe for further sale.

Database and LCA software used

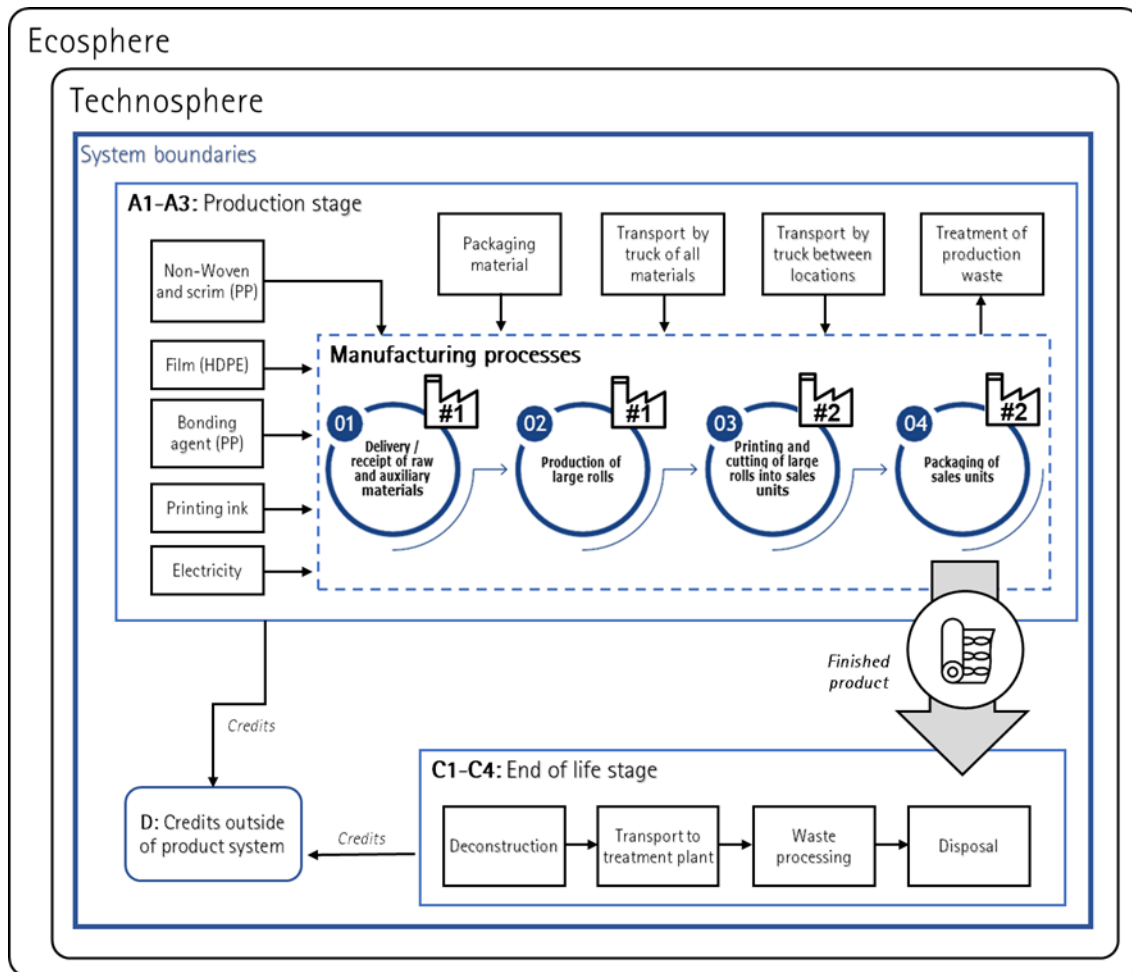
For the LCA model, the software system for holistic balancing (LCA for Experts) version 10.7 was used. Background data sets from the current version of the LCA for experts (GaBi) databases (Service pack 2023.2) were used entirely.

Description of system boundaries

a) Cradle to gate with modules C1–C4 and module D (A1–A3 + C + D)

- As module A5 is not declared, the results of modules A1–A3 include the biogenic C of the product packaging and the balancing out of the biogenic carbon flows from module A5.
- Infrastructure and capital goods are excluded from the system boundaries.
- All processing steps and locations are balanced within the system boundaries.
- The LCI data manufacturing data was gathered for the specific declared product, and no co-product allocation was necessary.
- The allocation of waste follows the polluter-pays principle. The system boundary to the next product system is set when the waste reaches the end-of-waste state. The impacts of waste treatment from production are included in Module A3. The impacts of waste treatment during end-of-life are included in Module C, where the product reaches the end-of-waste status.
- All the LCI data in Modules A1–A3 corresponds to primary data collected from the manufacturing plant and contracted suppliers, including material and energy inputs, and waste and emission outputs.

System diagram



Each processing step within the system boundaries is marked with an icon and number (#1, #2, etc.), indicating the specific production site where it occurs. The system boundaries cover the following modules:

A1. Raw Material Supply

- Extraction and processing of raw materials required for manufacturing the defined airtightness and vapour check membrane: Non-woven (PP), scrim (PP), film (HDPE), bonding agent (PP), bonding agent (PE) and printing ink.
- Extraction and processing of raw materials required for packaging the 1 m² of finished product, airtightness, and vapour check membrane: Cardboard, film (PE) and wood pallet.
- Extraction and processing of raw materials of internal packaging, used for transportation between all production locations. Internal packaging includes film (PE), cardboard and wood pallet.
- Generation of electricity from primary energy resources to supply the production sites with energy.

A2. Transport

- Transportation of the raw materials was modelled based on the providers specific locations and transportation via truck to the production location #1 in Germany. All materials are procured from providers within less than 800 km.
- After production, the large rolls are transported to the production location #2 for cutting of the large rolls into sales units, printing, individual packaging and labelling of the sales units. The sales units are then packed with film (PE) for transportation on pallets. The transportation of raw materials for packaging as well as the transportation of the large rolls from the production location #1 for finishing manufacturing in the production location #2 is modelled in Module A2.

A3. Manufacturing

- Manufacturing of the defined airtightness and vapour check membrane construction product occurs in Germany.
- The production of the large roll of CONSTIVAP is done in the production location #1, by bonding and laminating the polymers, the scrim and the non-woven. The rolls are cut into sale units, after printing and confection in the production location #2. The products are then packed on pallets for further transportation.

- Treatment of waste generated from the manufacturing processes is included in the model. Processing up to the end-of waste status or disposal of final residues including any packaging not leaving the factory gate with the product was modelled in module A3. Resulting credits are assigned to module D.
- Electricity for production in module A3 is modelled with the German Residual electricity mix.

C1-C4. End of Life

- The airtightness and vapour check membrane required for installation are treated as waste in module C3 by means of incineration with energy recovery.
- Module C2 contains the environmental impact of transportation of the product to the waste treatment plant.
- Module C3 contains the necessary processes for waste treatment at the end of the product life cycle. The loads for waste treatment are mapped here until the end of the waste property is reached.
- Emissions are assigned to module C3. Resulting credits are assigned to module D.

D. Reuse, recovery, recycling potential

- This product has no considerable benefits due to reuse, but considerable benefits from material and energy recovery.
- The value flows resulting from the treatment of production waste in module A3 and C3, which can potentially serve as material or energy input for a downstream product system in the form of the energy recovered from the waste-to-energy treatment and material recovery, are accounted for completely in module D as credits outside of product system.

More information

- Additional information can be found by contacting MOLL bauökologische Produkte GmbH at info@moll-group.eu
- LCA practitioner: brands & values GmbH, info@brandsandvalues.com
- Electricity in A1-A3 accounts for less than 30% of the GWP-GHG results of modules A1-A3. The energy requirements for production were modelled using the Residual electricity mix of the electricity supplier on the market. In this case the LCA for Experts dataset of Residual grid mix; AC, technology mix; consumption mix, to consumer; <1kV in Germany from the reference year 2020. The climate impact of the selected German Residual grid mix is 0.674 kg CO₂ eq./kWh, using the GWP-GHG indicator as defined in the PCR.

Modules declared, geographical scope, share of specific data (in GWP-GHG indicator) and data variation:

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	DE	DE	DE										GLO	GLO	GLO	GLO	GLO
Specific data used	0%																
Variation – products	0%																
Variation – sites	0%																

Modules declared: (X = included; ND = not declared).

Content information

Product components	Weight, kg	Post-consumer material, weight-%	Biogenic material, weight-% and kg C/kg
Non-woven and scrim (PP)	0.072	0.0%	0.0% - 0 kg C/kg
Film (HDPE)	0.018	0.0%	0.0% - 0 kg C/kg
Bonding agent (PP & PE)	0.006	0.0%	0.0% - 0 kg C/kg
Printing ink	0.002	0.0%	0.0% - 0 kg C/kg
Total product	0.098	0.0%	
Packaging materials	Weight, kg	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
Film (PE)	0.002	1.7%	0.000 kg C/kg
Cardboard	0.005	4.4%	0.002 kg C/kg
Pallet	0.016	13.2%	0.007 kg C/kg
Total packaging	0.023	19.4%	0.009 kg C/kg
TOTAL Product with packaging	0.121		

The biogenic carbon content of product and packaging is 0.035 kg CO₂ eq. per declared unit.

Dangerous substances from the candidate list of SVHC for Authorisation	EC No.	CAS No.	Weight-% per functional or declared unit
None	Not applicable	Not applicable	Not applicable

Environmental information

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks. According to the EN 15804 standard, the characterization factors of EU-JRC must be applied. Version EF 3.1. of the characterization factors was used. The characterization factors are available at the following internet connection: <http://eplca.jrc.ec.europa.eu/LCDN/developerEF.xhtml>

Disclaimer: The use of the results of modules A1-A3 is discouraged without considering the results of modules C1-C4

Potential environmental impact – mandatory indicators according to EN 15804

Results per 1 m ² CONSTIVAP 18 PLUS airtightness and vapour check membrane							
Indicator	Unit	Tot. A1-A3	C1	C2	C3	C4	D
GWP-fossil	kg CO ₂ eq.	2.52E-01	0.00E+00	7.07E-04	3.02E-01	0.00E+00	-1.39E-01
GWP-biogenic	kg CO ₂ eq.	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO ₂ eq.	1.48E-04	0.00E+00	6.53E-06	3.36E-07	0.00E+00	-9.28E-06
GWP-total	kg CO ₂ eq.	2.52E-01	0.00E+00	7.13E-04	3.02E-01	0.00E+00	-1.39E-01
ODP	kg CFC 11 eq.	8.25E-13	0.00E+00	9.17E-17	1.46E-14	0.00E+00	-1.13E-12
AP	mol H ⁺ eq.	4.72E-04	0.00E+00	1.25E-06	3.06E-05	0.00E+00	-1.74E-04
EP-freshwater	kg P eq.	5.19E-07	0.00E+00	2.58E-09	3.56E-09	0.00E+00	-2.34E-07
EP-marine	kg N eq.	1.53E-04	0.00E+00	4.98E-07	6.59E-06	0.00E+00	-5.12E-05
EP-terrestrial	mol N eq.	1.64E-03	0.00E+00	5.70E-06	1.44E-04	0.00E+00	-5.48E-04
POCP	kg NMVOC eq.	5.38E-04	0.00E+00	1.12E-06	1.95E-05	0.00E+00	-1.42E-04
ADP-minerals&metals	kg Sb eq.	2.32E-08	0.00E+00	4.67E-11	1.35E-10	0.00E+00	-1.02E-08
ADP-fossil ¹	MJ	8.20E+00	0.00E+00	9.60E-03	3.66E-02	0.00E+00	-2.57E+00
WDP	m ³	2.74E-02	0.00E+00	8.51E-06	2.80E-02	0.00E+00	-1.30E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption						

¹Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Potential environmental impact – additional mandatory and voluntary indicators

Results per functional or declared unit							
Indicator	Unit	Tot. A1-A3	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq.	2.52E-01	0.00E+00	7.13E-04	3.02E-01	0.00E+00	-1.39E-01
PM	Disease incidence	ND	ND	ND	ND	ND	ND
IR	kBq U235 eq.	ND	ND	ND	ND	ND	ND
ETP-fw	CTUe	ND	ND	ND	ND	ND	ND
HTP-c	CTUh	ND	ND	ND	ND	ND	ND
HTP-nc	CTUh	ND	ND	ND	ND	ND	ND
SQP	dimensionless	ND	ND	ND	ND	ND	ND
Acronyms	GWP-GHG = This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO ₂ is set to zero; PM = Particulate matter emissions; IR = Ionizing radiation, human health; ETP-fw = Eco-toxicity - freshwater; HTP-c = Human toxicity, cancer effect; HTP-nc = Human toxicity, non-cancer effects; SQP = Land use related impacts/Soil quality						

Use of resources

Results per functional or declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
PERE	MJ	2.31E-01	0.00E+00	6.99E-04	9.31E-03	0.00E+00	-7.59E-01
PERM	MJ	3.82E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	6.13E-01	0.00E+00	6.99E-04	9.31E-03	0.00E+00	-7.59E-01
PENRE	MJ	3.98E+00	0.00E+00	9.64E-03	4.17E+00	0.00E+00	-2.57E+00
PENRM	MJ	4.23E+00	0.00E+00	0.00E+00	-4.14E+00	0.00E+00	0.00E+00
PENRT	MJ	8.21E+00	0.00E+00	9.64E-03	3.67E-02	0.00E+00	-2.57E+00
SM	kg	5.18E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.34E-05
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m ³	1.16E-03	0.00E+00	7.65E-07	6.55E-04	0.00E+00	-6.01E-04
Acronyms	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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water						

The indicator value for PENRM in C3 is negative, as the non-renewable primary energy resources used as raw materials leave the product system.

Waste production and output flows

Waste production

Results per functional or declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Hazardous waste disposed	kg	2.24E-09	0.00E+00	2.98E-14	8.36E-13	0.00E+00	-1.35E-10
Non-hazardous waste disposed	kg	2.93E-03	0.00E+00	1.47E-06	1.45E-03	0.00E+00	-1.27E-03
Radioactive waste disposed	kg	1.18E-04	0.00E+00	1.80E-08	2.19E-06	0.00E+00	-1.96E-04

Output flows

Results per functional or declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	4.85E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	1.87E-02	0.00E+00	0.00E+00	6.43E-01	0.00E+00	0.00E+00
Exported energy, thermal	MJ	4.30E-02	0.00E+00	0.00E+00	1.14E+00	0.00E+00	0.00E+00

Additional environmental information

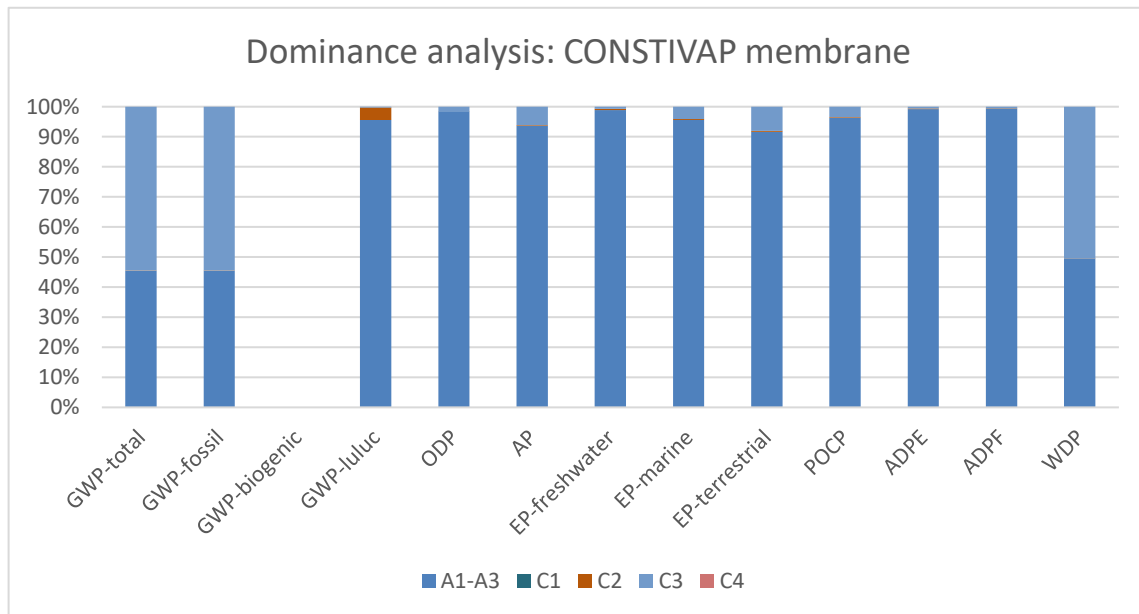
TRACI Indicators

The following TRACI indicators v 2.1 were calculated to comply with US Market requirements. The declared specific product complies with the ISO 21930:2017 Standard.

Results per functional or declared unit							
Indicator	Unit	A1-A3	C1	C2	C3	C4	D
Eutrophication	kg N eq.	3.89E-05	0.00E+00	1.23E-07	1.59E-06	0.00E+00	-1.64E-05
Global Warming Potential, air, excl. biogenic CO2	kg CO2 eq.	2.49E-01	0.00E+00	7.05E-04	3.02E-01	0.00E+00	-1.39E-01
Global Warming Potential, air, incl. biogenic CO2	kg CO2 eq.	2.49E-01	0.00E+00	7.05E-04	3.02E-01	0.00E+00	-1.39E-01
Ozone Depletion, air	kg CFC 11 eq.	1.71E-14	0.00E+00	1.92E-18	3.07E-16	0.00E+00	-2.39E-14
Resources, Fossil Fuels	MJ surplus energy	1.09E+00	0.00E+00	1.37E-03	3.81E-03	0.00E+00	-2.56E-01
Smog Air	kg O3 eq.	8.89E-03	0.00E+00	2.28E-05	3.87E-04	0.00E+00	-3.06E-03
Acidification	kg SO2 eq.	4.34E-04	0.00E+00	1.11E-06	2.35E-05	0.00E+00	-1.77E-04
Ecotoxicity	CTUe	3.06E-02	0.00E+00	6.63E-05	5.79E-05	0.00E+00	-5.32E-04
Human Health Particulate Air	kg PM2.5 eq	2.66E-05	0.00E+00	6.66E-08	7.12E-07	0.00E+00	-8.72E-06
Human toxicity, cancer	CTUh	2.94E-10	0.00E+00	4.10E-13	2.56E-12	0.00E+00	-5.89E-11
Human toxicity, non-canc.	CTUh	2.66E-08	0.00E+00	6.47E-11	8.65E-11	0.00E+00	-2.07E-09

Interpretation

The following dominance analysis show the individual impact categories and explore them in depth.



The environmental impacts were analysed using the example of global warming potential (GWP total) to identify the responsible sources along the life cycle. Module C3 (54.4%) has dominant influence followed by Modules A1-A3 (45.4%) on GWP total and fossil. In module C3 the incineration of the non-woven and the scrim and in modules A1-A3 the extraction of the non-woven and the scrim are the main responsibility.

Transportation of raw materials to and between the manufacturing sites (A2) and disposal transportation of the product in EoL (C2) are not very relevant in terms of GWP total.

Modules A1-A3 are the main ones responsible for the impact in all other core indicators – the only exceptions are the GWP fossil and the WDP indicator, where module C3 is the main one.

The non-woven has the largest contribution to the impacts of the indicators ODP, AP, EP, POCP and ADPF, the truck transport for GWP luluc, the scrim for ADPE and the incineration of non-woven and scrim for WDP.

The data quality of the relevant generic datasets used is classified as very good, good or satisfactory. Relevant data sets are defined as data sets that together account for at least 80% of the absolute impact of each core indicator included in the EPD across the declared modules with the exception of Module D.

References

EPD International. General Programme Instructions of the International EPD® System. Version 4.0. 2021.

EPD International. PCR 2019:14 Construction products and construction services, version 1.3.4. 2024.

DIN EN 1296, Flexible sheets for waterproofing – Bitumen, plastic and rubber sheets for roof waterproofing – Method for artificial ageing by long term exposure to elevated temperature; Deutsches Institut für Normung DIN, 2000.

DIN EN 1931, Bitumen, plastic and rubber sheets for roof waterproofing – Determination of water vapour transmission properties, Deutsches Institut für Normung DIN, 2001.

DIN EN 12311-2, Flexible sheets for waterproofing-- Determination of tensile properties-- Part-2: Plastic and rubber sheets for roof waterproofing, Deutsches Institut für Normung DIN, 2013.

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