



## ENVIRONMENTAL PRODUCT DECLARATION

Product names:

**Air. wind and water barrier membranes  
and Vapor control layers**

Site Plants:

**Cortaccia (BZ)**

[TRASPIR 110- TRASPIR EVO UV 210- CLIMA CONTROL 80- TRASPIR  
EVO 160- TRASPIR EVO 300- TRASPIR WELD EVO 360- VAPOR 225-  
TRASPIR NET 160- VAPOR IN GREEN 200]

in compliance with ISO 14025 and EN 15804:2012+A2:2019

Program Operator	EPDIItaly
Publisher	EPDIItaly

Declaration Number	2021M20141
Registration Number	EPDITALY0141

Issue Date	22/07/2021
Valid to	22/07/2026



## General information

<b>EPD OWNER:</b>	ROTHO BLAAS SRL
<b>PLANT INVOLVED in the declaration:</b>	ROTHO BLAAS SRL Via dell'Adige N. 2/1 - I-39040. Cortaccia (BZ)
<b>SCOPE OF APPLICATION:</b>	This Environmental Product Declaration (EPD) is valid for Air, wind and water barrier membranes and Vapor control layers designed by Rothoblaas in Europe. The type of declaration is related to 9 specific products by Rothoblaas. The life cycle assessment (LCA) is representative for the products introduced in the declaration for the given system boundaries.
<b>PROGRAM OPERATOR:</b>	EPDITALY. via Gaetano De Castillia 10. 20124 Milano. Italia.
<b>INDIPENDENT CHECK:</b>	<p>This declaration has been developed referring to EPDItaly, following the General Program Instruction; further information and the document are available at: <a href="http://www.epditaly.it">www.epditaly.it</a>. This EPD document is valid within the following geographical area: worldwide according to sales market conditions.</p> <p>CEN standard EN 15804 served as the core PCR (PCR ICMQ-001/15 rev 3.0). PCR review was conducted by Michele Paleari. Contact via <a href="mailto:info@epditaly.it">info@epditaly.it</a></p> <p>Independent verification of the declaration and data, according to EN ISO 14025:2010.</p> <p>Third party verifier: ICMQ SpA. via De Castillia. 10 20124 Milano (<a href="http://www.icmq.it">www.icmq.it</a>)</p> <p><input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)</p> <p><b>Accredited by: Accredia</b></p>
<b>CPC CODE:</b>	<b>3699-</b> Articles of plastics n.e.c.
<b>CORPORATE CONTACT:</b>	info@rothoblaas.com
<b>TECHNICAL SUPPORT:</b>	Sphera <a href="https://www.sphera.com">https://www.sphera.com</a> 
<b>COMPARABILITY:</b>	Environmental statements published within the same product category, but from different programs, may not be comparable. In particular, EPDs of construction products may not be comparable if they do not comply with EN 15804+A2.
<b>ACCOUNTABILITY:</b>	ROTHO BLAAS SRL relieves EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence;



	EPDItaly declines all responsibility for the manufacturer's information, data and results of the life cycle assessment.
<b>REFERENCE DOCUMENT:</b>	This declaration has been developed following the General Program Instruction document of EPDItaly, available at <a href="http://www.epditaly.it">www.epditaly.it</a> .
<b>PRODUCT CATEGORY RULES (PCR):</b>	PCR ICMQ-001/15 rev 3.0 EN 15804+A2 is the framework reference for PCRs.

## Company



Rothoblaas is a multinational Italian company that has made innovative technology its mission, making its way to the forefront for timber buildings and construction safety in just a few years. Thanks to its comprehensive product range and the technically-prepared and widespread sales network, the company promotes the transfer of its knowhow to the customers and aims to be a prominent and reliable partner in developing and innovating products and building methods. All of this contributes to a new culture of sustainable construction, focused on increasing comfortable living and reducing CO<sub>2</sub> emissions.

ROTHOBLAAS provides a complete range of solutions:



**Fixing systems**



**Systems for air sealing and waterproofing**



**Noise reduction systems**



**Fall Protection Systems**



**Machinery and equipment for woodworking**



**Specific, tailored services and design support**

More information about the product can be found in the product technical sheets (<https://www.rothoblaas.com/>).

## Company Certifications



# CERTIFICATE

Management system as per  
**ISO 9001 : 2015**

In accordance with TÜV NORD CERT procedures, it is hereby certified that

**ROTHO BLAAS S.r.l.**  
Via dell'Adige, 2/1  
39040 Cortaccia (BZ)  
Italy



Solutions for Building Technology

applies a management system in line with the above standard for the following scope

**Design, production and sale of fastening systems, iron and other metal products, fall protection equipment for height working, building materials, electrical, electronic machines and sale of chemicals; training courses and professional refresher courses. Procedures for conducting weighing activities to determine the <<verified gross container mass>> (VGM) in accordance with Method 2 provided for in the amendments to Chapter VI Regulation 2 of SOLAS 74 as amended.**

Certificate Registration No. 44 100 17410004  
Audit Report No. 19471/2019

Valid from 08-01-2020  
Valid until 07-01-2023  
Initial certification 09-01-2008



Stefan Paul  
Enite di Certificazione  
del TÜV NORD CERT GmbH

Bologna, 29-01-2021

This certification was conducted in accordance with the TÜV NORD CERT auditing and certification procedures and is subject to regular surveillance audits.

TÜV NORD CERT GmbH      Langemarckstraße 20      45141 Essen      www.tuev-nord-cert.com



## Product Certifications

TRASPIR 110:



TRASPIR EVO UV 210:



CLIMA CONTROL 80:



TRASPIR EVO 160:



TRASPIR EVO 300:



TRASPIR WELD EVO 360:



VAPOR 225:



TRASPIR NET 160:



VAPOR IN GREEN 200:



## Goal and scope of EPD

The entire life cycle of the product is considered (Type of EPD: cradle to grave) and the modules described below are declared in this EPD:

Modules **A1-A3** include processes that provide energy and material input for the product manufacturing, including production wastes (A1), transport up to the Rothoblaas site (A2), wastes processing linked to warehouses activities and additional packaging from Rothoblaas (A3).

Module **A4** includes the transport from the Rothoblaas plant to the customer or to the point of product installation.

Module **A5** considers all membranes installation steps (including auxiliaries production such as clips or adhesive bands, solvent and electrical consumption) also packaging waste processing (recycling, incineration, disposal). Credits from energy substitution are declared in module D. During this phase a membrane overlap of 10% is considered.

Module **B1** considers the use of the installed product. During the use of membranes, a scenario of zero impact is considered.

Module **B2** includes the maintenance of the product. A scenario of zero impact is considered.

Modules **B3-B4-B5** are related to the repair, replacement and refurbishment of the products. If the products are properly installed no repair, replacement or refurbishment processes are necessary. A scenario of zero impact is then considered.

Modules **B6-B7** consider energy use and operational water to operate building integrated technical systems. No operational energy or water use are considered. A scenario of zero impact is then considered.

Module **C1** considers deconstruction, including dismantling or demolition of the product from the building site. The energy consumption related to shredding activities is considered.

Module **C2** considers transportation of the discarded membrane to a recycling or disposal process.

Module **C3** considers waste processing for products recycling and incineration.

Module **C4** includes all waste disposal processes, including pre-treatment and management of the disposal site.

Module **D** includes benefits from all net flows in the end-of-life stage that leave the product boundary system after having passed the end-of-waste stage. Benefits from packaging incineration (electricity and thermal energy) are declared within module D.

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	X	X	X	X	X	X	X	X	X	X	X	X	X

X = modules included in the study



According to the PCR ICMQ-001/15 rev. 3.0. the EPD is based on a “cradle to grave” Life Cycle Assessment (LCA) study.

It is an EPD for 9 membranes products designed by Rothoblaas s.r.l. plant located in Bolzano (BZ) and sold worldwide. All data refer to 2019 production and sales. Modules included are A1. A2. A3. A4. A5. B. C and D. All manufacturing activities and energy production are in A1 as the producer is a supplier. while additional packaging and manufacturing activities linked to warehousing are in module A3. The transport from the supplier to Rothoblaas is in A2. Transport to clients (A4) and installation (A5) are included together with end of life scenarios (benefits and loads included according to D module).

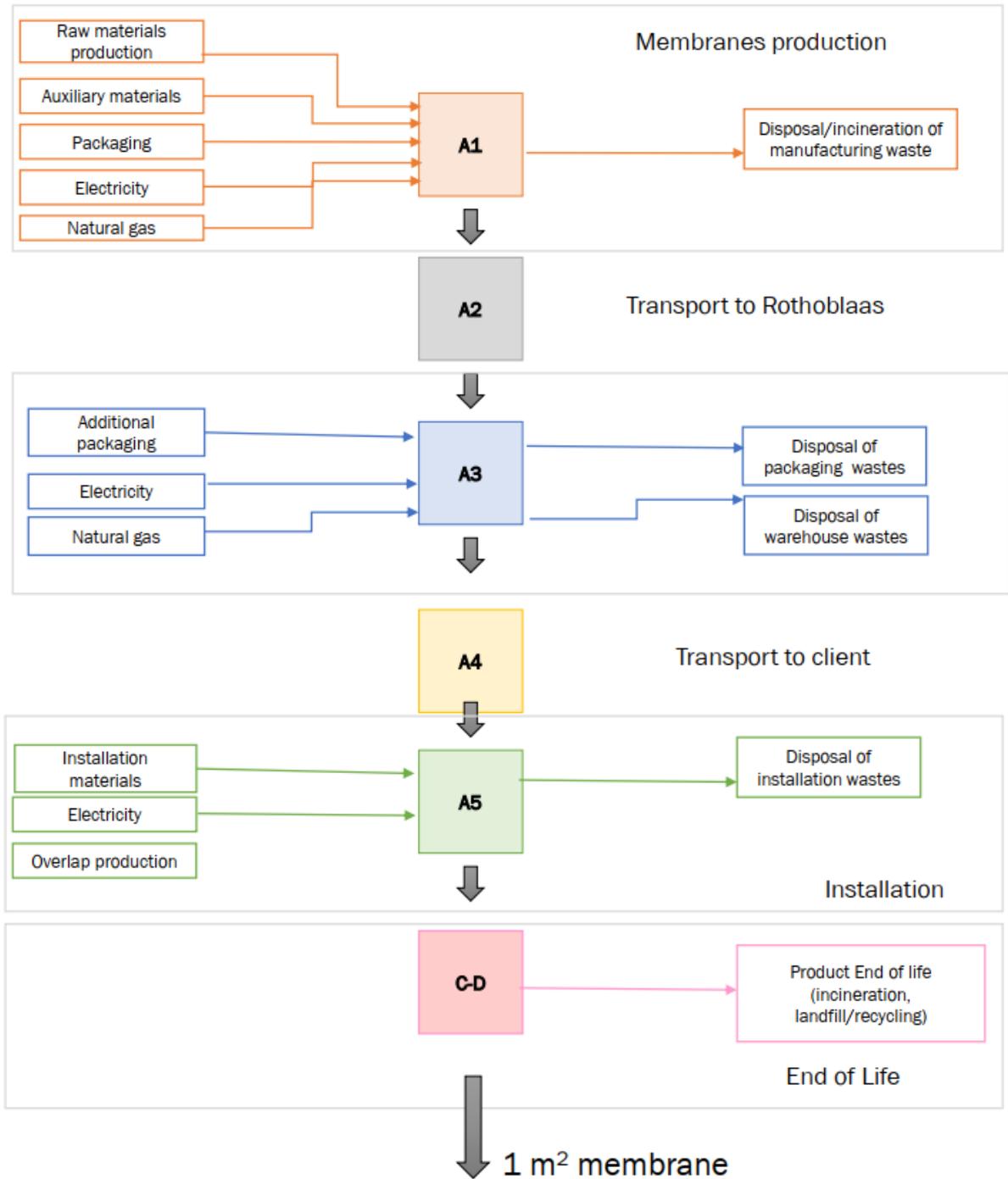
The declaration is 1a (Declaration of a specific product from a manufacturer’s plant).

The production facility is in Europe and the distribution is managed by Rothoblaas s.r.l. located in Cortaccia (BZ). The market range is Worldwide.

**Geographical validity:** Worldwide

**Database:** GaBi Database DB 2021.1

**Software:** GaBi professional 10 software.



Flow diagram

## Product description

### 1.1. Detailed product description

#### TRASPIR 110

### TRASPIR 110

HIGHLY BREATHABLE MEMBRANE

#### COMPOSITION

- top layer  
non-woven PP fabric
- middle layer  
PP breathable film
- bottom layer  
non-woven PP fabric



#### TRASPIR EVO UV 210

### TRASPIR EVO UV 210

HIGHLY BREATHABLE MONOLITHIC  
MEMBRANE RESISTANT TO UV RAYS

#### MONOLITHIC

The monolithic structure of the membrane guarantees excellent durability over time, thanks to the special polymers used.

#### B-s1,d0

Flame retardant certification, Euroclass reaction to fire B-s1,d0 based on EN 13501-1.

#### PERMANENT UV STABILITY

Permanent resistance to UV rays with exposure with open joints up to 50 mm wide, and with up to 40% of the surface uncovered.

#### COMPOSITION

- top layer  
monolithic breathable film
- reinforcing layer  
PL fabric



MONOLITHIC

## CLIMA CONTROL 80

# CLIMA CONTROL 80

## MEMBRANE WITH VARIABLE VAPOUR DIFFUSION

### VARIABLE DIFFUSION

Variable resistance to vapour diffusion: maximum protection for walls and excellent security in insulation.

### TRANSPARENCY

Easy to install thanks to its transparent quality; controls the passage of water vapour based on climate and humidity.

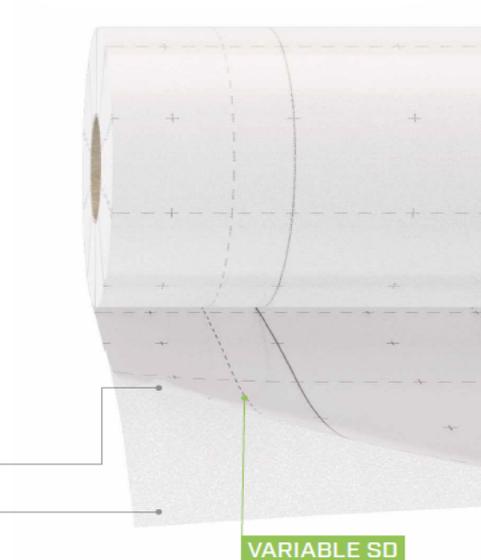
### SCIENTIFICALLY TESTED

The product has been researched and tested by external scientific bodies who have also simulated its behaviour in real conditions.

## COMPOSITION

top layer  
PA functional film

bottom layer  
non-woven PP fabric



## TRASPIR EVO 160

### TRASPIR EVO 160

#### HIGHLY BREATHABLE MONOLITHIC MEMBRANE

##### MONOLITHIC

The monolithic structure of the membrane guarantees excellent durability over time, thanks to the special polymers used.

##### REACTION TO FIRE B-s1,d2

Self-extinguishing membrane which does not spread the flame in case of fire, contributing to the protection of the structure.

##### HIGH UV STABILITY

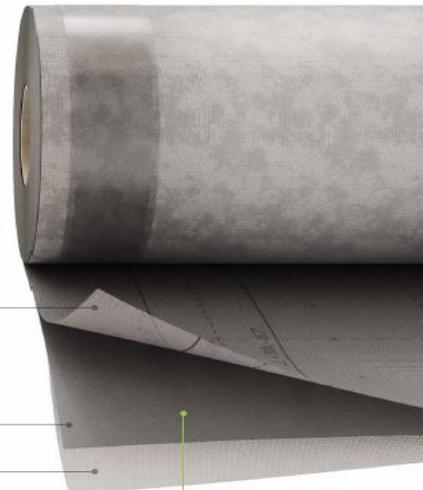
It passed the artificial ageing test involving exposure to UV light for 1000 hours.

##### COMPOSITION

top layer  
non-woven PP fabric

middle layer  
breathable monolithic TPE film

bottom layer  
non-woven PP fabric



MONOLITHIC

## TRASPIR EVO 300

### TRASPIR EVO 300

#### HIGHLY BREATHABLE MONOLITHIC MEMBRANE

##### MONOLITHIC

The monolithic structure of the membrane guarantees excellent durability over time, thanks to the special polymers used.

##### 9 MONTHS UV STABILITY

9 months resistance to UV rays with full exposure to radiation and no protection. Heat-resistant up to 120 °C.

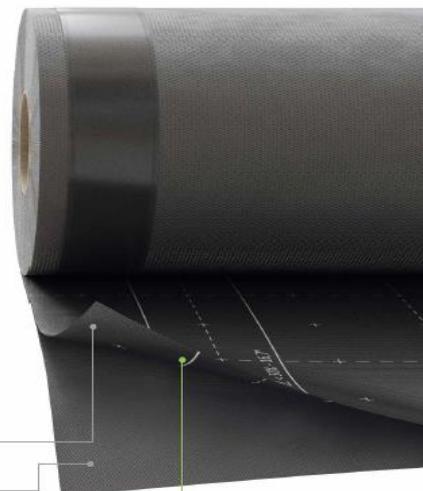
##### EXCEPTIONAL TEMPERATURE RESISTANCE

It passed the artificial ageing test involving exposure to UV light for 5000 hours. Heat-resistant up to 120 °C.

##### COMPOSITION

top layer  
breathable monolithic acrylate film

middle layer  
PL fabric



MONOLITHIC

## TRASPIR WELD EVO 360

### TRASPIR WELD EVO 360

#### WELDABLE MONOLITHIC BREATHABLE MEMBRANE

##### MONOLITHIC

The monolithic structure of the membrane guarantees excellent durability over time, thanks to the special polymers used.

##### DOUBLE PROTECTION

Excellent watertightness; the double external PU layer ensures the highest safety levels.

##### LOW PITCHES

Thanks to its mass per unit area, the membrane can also be effectively installed on roofs with pitches down to 5°.

##### COMPOSITION

- top layer  
breathable monolithic PU film
- middle layer  
PL fabric
- bottom layer  
breathable monolithic PU film



MONOLITHIC

## VAPOR 225

### VAPOR 225

#### VAPOUR CONTROL MEMBRANE

##### RELIABLE

The mass per unit area of the membrane provides mechanical strength and protection during construction.

##### PROTECTION

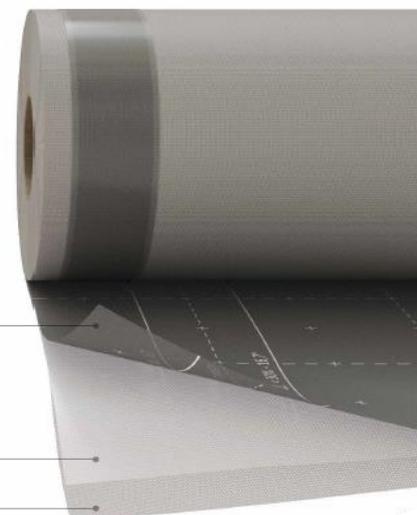
It is also suitable for applications on uneven and rough supports, which could damage lighter vapour control layers.

##### COST/PERFORMANCE

Cost-effective membrane, ensuring high performance and protection against weathering.

##### COMPOSITION

- top layer  
non-woven PP fabric
- middle layer  
vapour control PP film
- bottom layer  
non-woven PP fabric



## TRASPIR NET 160

### TRASPIR NET 160

HIGHLY BREATHABLE MEMBRANE

#### COMPOSITION

top layer  
non-woven PP fabric

reinforcing layer  
reinforcing PP grid

middle layer  
PP breathable film

bottom layer  
non-woven PP fabric



## VAPOR IN GREEN 200

### VAPOR IN GREEN 200

VAPOUR CONTROL MEMBRANE BASED  
ON NATURAL CELLULOSE

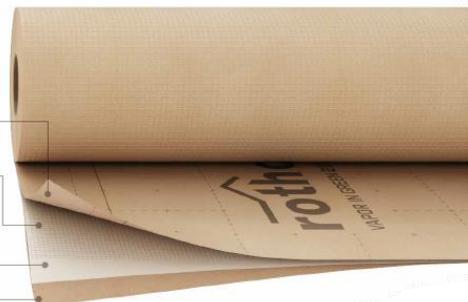
#### COMPOSITION

top layer  
kraft paper

reinforcing layer  
reinforcing grid

middle layer  
functional film

bottom layer  
kraft paper



## 1.2. Technical data

		1	2	3	4	5	6	7	8	9	
		TRASPIR 110	TRASPIR EVO UV 210	CLIMA CONTROL 80	TRASPIR EVO 160	TRASPIR EVO 300	TRASPIR WELD EVO 360	VAPOR 225	TRASPIR NET 160	VAPOR IN GREEN 200	
Monolithic/Evo			✓	✓	✓	✓	✓				
Microporous/Standard		✓						✓	✓	✓	
Bituminous											
Reinforcing grid							✓		✓	✓	
Variable Sd				✓							
Reflective											
Self-adhesive											
Permanent UV stability			✓			✓					
	Mass per unit area [EN 1849]	g/m <sup>2</sup>	112	210	80	160	300	360	225	160	200
	Water vapour transmission (Sd) [EN 1931]	m	0,03	0,04	0,15 5	0,1	0,04	0,2	4	0,02	7
	Reaction to fire [EN 13501-1]	steel	E	B-s1,d0	E	B-s1,d2	B-s1,d0	E	E	E	E
	Maximum tensile force MD/CD [EN 12311]	N/50mm	250 165	300 200	120 90	280 220	380 250	420 490	380 300	420 420	250 170
	Elongation MD/CD [EN 12311]	%	50 70	25 25	50 50	50 60	25 25	50 65	60 80	25 20	5 5
	Resistance to nail tearing MD/CD [EN 12310]	N	115 135	120 120	40 40	180 200	160 190	310 280	225 300	390 360	100 130
	internal		✓	✓	✓	✓	✓	✓	✓	✓	✓
	external		✓	✓		✓	✓	✓	✓	✓	
	roof		✓	✓	✓	✓	✓	✓	✓	✓	✓
	wall		✓	✓	✓	✓			✓		✓
Waste classification (2014/955/EU)			17 02 03	17 02 03	17 02 03	17 02 03	17 02 03	17 02 03	17 02 03	17 02 03	17 09 04

### 1.3. Products Distribution

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Membranes are distributed by Rothoblaas which are sold as individual rolls or whole pallets. Packaging includes polyethylene film and cardboard to protect separate rolls. PET bands and pallets.

The amount of final packaging on Rothoblaas products are the following:

- 66.5% of the times goods are delivered to final client with the same packaging as received from the supplier
- 33.5% of the times rolls are unpacked and sold with the given packaging:
  - o 100% of the original PE film as packaging of the individual roll
  - o Additional PE film and PET strips
  - o Additional wooden pallets.

### 1.4. Installation

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The membranes installation requires the following materials: steel clips and adhesive band on products not having an already adhesive tape on them (so-called “double tape” which is added to the product directly by the manufacturer). Only in case of TWELD products, a specific solvent is used together with a dedicated electrical tool. No water or electrical energy is used to install other products. A 10% overlap is considered in the installation phase.

### 1.5. Functional unit

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The functional unit is defined as 1 m<sup>2</sup> of membrane as described below.

Functional unit reference flow	Mass [kg/FU]	FU [m <sup>2</sup> ] <sup>1</sup>	Conversion factor di 1 kg
TRASPIR 110	0.112	1	8.9
TRASPIR EVO UV 210	0.245	1	4.1
CLIMA CONTROL 80	0.100	1	10
TRASPIR EVO 160	0.187	1	5.3
TRASPIR EVO 300	0.335	1	3
TRASPIR WELD EVO 360	0.378	1	2.6
VAPOR 225	0.252	1	4
TRASPIR NET 160	0.171	1	5.8
VAPOR IN GREEN 200	0.211	1	4.7

#### Dangerous materials

The product does not contain any substances included in the “Candidate List of Substances of Very High Concern for Authorization” compliant with /REACH/ and with EC 1272/2008

The grammage varies from 100 g/m<sup>2</sup> to 360g/m<sup>2</sup> depending on the product.

**Condition of use:**

Operational use falls outside the system boundaries of this LCA project. hence. it is not relevant for the EPD. Maintenance is not needed for the membranes product and they are generally replaced at the building end of life. A general scenario of zero impact for membranes is considered.

**Reference service life**

Membranes are regarded as having 50 years Reference service life (RLS ) independent of their material as we assume same service life as the building.

**1.6. End of life**

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After the demolition and deconstruction phase. according to Building & Construction wastes statistics. membranes can be incinerated. sent to landfill or recycled.

## LCA results – Environmental impact per functional unit

The tables below show the results of the Air, wind and water barrier membranes and Vapor control layers LCA study (Life Cycle Assessment).

Additional environmental impact indicators are not declared according to EN 15804 + A2 chapter 7.2.3.2.

**Table 1 Environmental impacts: 1 m<sup>2</sup> TRASPIR 110**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	2.91E-01	6.88E-03	9.83E-04	1.89E-02	8.84E-02	0	1.25E-03	3.13E-03	6.43E-02	6.43E-03	-5.70E-02
GWP fossil	[kg CO <sub>2</sub> -eq.]	3.11E-01	6.82E-03	9.68E-04	1.88E-02	6.10E-02	0	1.24E-03	3.11E-03	6.43E-02	6.49E-03	-5.67E-02
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-2.05E-02	0	1.49E-05	0	2.73E-02	0	1.06E-05	0	4.17E-05	-6.74E-05	-2.74E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	1.49E-04	5.56E-05	5.17E-07	1.02E-04	2.95E-05	0	1.76E-06	2.55E-05	3.18E-06	5.41E-06	-2.79E-05
ODP	[kg CFC-11-eq.]	2.65E-15	1.34E-18	2.68E-18	3.11E-18	3.24E-16	0	2.97E-17	3.98E-19	5.02E-17	1.56E-17	-4.38E-16
AP	[mole of H <sup>+</sup> -eq.]	5.42E-04	2.19E-05	1.91E-06	2.84E-04	1.24E-04	0	2.58E-06	8.82E-06	1.11E-05	1.94E-05	-8.90E-05
EP - freshwater	[kg P eq.]	4.69E-07	2.02E-08	2.93E-09	3.84E-08	2.50E-07	0	3.33E-09	9.25E-09	3.15E-08	1.20E-06	-6.65E-08
EP - marine	[kg N eq.]	1.49E-04	1.00E-05	5.50E-07	8.12E-05	3.03E-05	0	6.14E-07	3.97E-06	2.80E-06	4.46E-06	-2.38E-05
EP - terrestrial	[mole of N eq.]	1.59E-03	1.12E-04	5.92E-06	8.93E-04	3.23E-04	0	6.44E-06	4.47E-05	4.36E-05	4.84E-05	-2.55E-04
POCP	[kg NMVOC eq.]	6.10E-04	1.98E-05	1.88E-06	2.11E-04	1.30E-04	0	1.66E-06	7.88E-06	7.74E-06	1.41E-05	-8.49E-05
ADPF	[MJ]	1.02E01	9.06E-02	7.61E-03	2.42E-01	1.79E00	0	2.21E-02	4.15E-02	6.29E-02	9.43E-02	-1.42E00
ADPE	[kg Sb eq.]	5.16E-08	6.03E-10	2.85E-08	1.29E-09	2.52E-08	0	3.65E-10	2.37E-10	6.98E-10	4.45E-10	-8.15E-09
WDP	[m <sup>3</sup> world eq.]	3.88E-02	6.31E-05	8.29E-05	1.25E-04	9.25E-03	0	1.99E-04	2.71E-05	6.00E-03	-7.81E-05	-6.65E-03

Caption

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

**Table 2: Environmental impacts: 1 m<sup>2</sup> TRASPIR EVO UV 210**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	1.33E00	1.39E-02	2.15E-03	3.71E-02	1.77E-01	0	2.73E-03	6.83E-03	1.14E-01	1.58E-02	-9.63E-02
GWP fossil	[kg CO <sub>2</sub> -eq.]	1.35E00	1.38E-02	2.11E-03	3.69E-02	1.52E-01	0	2.71E-03	6.78E-03	1.14E-01	1.59E-02	-9.57E-02
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.71E-02	0	3.25E-05	0	2.53E-02	0	2.30E-05	0	1.31E-04	-5.97E-05	-4.91E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	4.24E-04	1.13E-04	1.13E-06	2.32E-04	6.39E-05	0	3.83E-06	5.57E-05	1.07E-05	9.01E-06	-5.79E-05
ODP	[kg CFC-11-eq.]	5.63E-15	2.72E-18	5.84E-18	6.47E-18	5.97E-16	0	6.48E-17	8.69E-19	1.60E-16	2.45E-17	-8.02E-16
AP	[mole of H <sup>+</sup> -eq.]	1.93E-02	4.44E-05	4.18E-06	4.25E-04	1.98E-03	0	5.64E-06	1.92E-05	4.08E-05	4.12E-05	-1.20E-04
EP - freshwater	[kg P eq.]	2.22E-06	4.09E-08	6.38E-09	8.61E-08	6.45E-07	0	7.27E-09	2.02E-08	1.01E-07	2.88E-06	-1.36E-07
EP - marine	[kg N eq.]	6.57E-04	2.03E-05	1.20E-06	1.28E-04	8.02E-05	0	1.34E-06	8.67E-06	1.37E-05	2.58E-05	-3.38E-05
EP - terrestrial	[mole of N eq.]	7.80E-03	2.27E-04	1.29E-05	1.42E-03	9.16E-04	0	1.41E-05	9.75E-05	1.60E-04	1.32E-04	-3.65E-04
POCP	[kg NMVOC eq.]	3.41E-03	4.01E-05	4.11E-06	3.22E-04	4.01E-04	0	3.63E-06	1.72E-05	3.60E-05	4.23E-05	-1.07E-04
ADPF	[MJ]	2.66E01	1.84E-01	1.66E-02	4.81E-01	3.13E00	0	4.82E-02	9.05E-02	2.01E-01	1.46E-01	-2.04E00
ADPE	[kg Sb eq.]	2.62E-02	1.22E-09	6.23E-08	2.77E-09	2.62E-03	0	7.97E-10	5.18E-10	2.22E-09	6.96E-10	-1.44E-08
WDP	[m <sup>3</sup> world eq.]	1.73E-01	1.28E-04	1.81E-04	2.76E-04	2.32E-02	0	4.35E-04	5.91E-05	1.17E-02	2.80E-04	-4.64E-03

Caption	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
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**Table 3 - Environmental impacts: 1 m<sup>2</sup> CLIMA CONTROL 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	7.12E-01	6.24E-03	8.78E-04	1.77E-02	1.30E-01	0	1.12E-03	2.79E-03	5.60E-02	6.20E-03	-8.71E-02
GWP fossil	[kg CO <sub>2</sub> -eq.]	7.30E-01	6.19E-03	8.64E-04	1.76E-02	1.03E-01	0	1.11E-03	2.78E-03	5.60E-02	6.24E-03	-8.66E-02
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.74E-02	0	1.33E-05	0	2.75E-02	0	9.42E-06	0	3.43E-05	-4.43E-05	-5.00E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	2.80E-04	5.04E-05	4.61E-07	1.00E-04	4.19E-05	0	1.57E-06	2.28E-05	2.84E-06	4.39E-06	-3.55E-05
ODP	[kg CFC-11-eq.]	3.51E-15	1.22E-18	2.39E-18	2.97E-18	4.16E-16	0	2.65E-17	3.55E-19	4.03E-17	1.24E-17	-4.88E-16
AP	[mole of H <sup>+</sup> -eq.]	1.16E-03	1.99E-05	1.71E-06	2.47E-04	1.92E-04	0	2.31E-06	7.87E-06	6.08E-05	1.75E-05	-1.10E-04
EP - freshwater	[kg P eq.]	9.17E-07	1.83E-08	2.61E-09	3.76E-08	2.90E-07	0	2.97E-09	8.26E-09	5.95E-08	1.14E-06	-8.54E-08
EP - marine	[kg N eq.]	3.12E-04	9.11E-06	4.91E-07	7.17E-05	4.96E-05	0	5.48E-07	3.55E-06	2.83E-05	7.20E-06	-3.42E-05
EP - terrestrial	[mole of N eq.]	3.00E-03	1.02E-04	5.28E-06	7.89E-04	4.94E-04	0	5.75E-06	3.99E-05	3.21E-04	4.93E-05	-3.27E-04
POCP	[kg NMVOC eq.]	9.32E-04	1.80E-05	1.68E-06	1.84E-04	1.69E-04	0	1.49E-06	7.03E-06	7.25E-05	1.51E-05	-9.71E-05
ADPF	[MJ]	1.43E01	8.22E-02	6.79E-03	2.28E-01	2.21E00	0	1.97E-02	3.70E-02	8.70E-02	7.43E-02	-1.61E00
ADPE	[kg Sb eq.]	1.53E-05	5.47E-10	2.55E-08	1.25E-09	1.55E-06	0	3.26E-10	2.12E-10	1.11E-09	3.52E-10	-1.10E-08
WDP	[m <sup>3</sup> world eq.]	6.77E-03	5.73E-05	7.40E-05	1.22E-04	6.10E-03	0	1.78E-04	2.42E-05	5.90E-03	1.69E-05	-1.93E-03

Caption	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
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**Table 4 - Environmental impacts: 1 m<sup>2</sup> TRASPIR EVO 160**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	6.12E-01	1.04E-02	1.64E-03	2.44E-02	8.41E-02	0	2.09E-03	5.22E-03	9.89E-02	9.53E-03	-1.08E-01
GWP fossil	[kg CO <sub>2</sub> -eq.]	6.21E-01	1.04E-02	1.61E-03	2.43E-02	7.22E-02	0	2.07E-03	5.18E-03	9.88E-02	9.60E-03	-1.08E-01
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-9.14E-03	0	2.48E-05	0	1.19E-02	0	1.76E-05	0	1.15E-04	-7.65E-05	-5.30E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	3.52E-04	8.45E-05	8.61E-07	1.57E-04	4.70E-05	0	2.93E-06	4.25E-05	8.67E-06	7.08E-06	-5.24E-05
ODP	[kg CFC-11-eq.]	4.58E-15	2.04E-18	4.46E-18	4.31E-18	4.58E-16	0	4.95E-17	6.64E-19	1.36E-16	2.01E-17	-7.44E-16
AP	[mole of H <sup>+</sup> -eq.]	1.21E-03	3.34E-05	3.19E-06	2.59E-04	1.29E-04	0	4.30E-06	1.47E-05	2.53E-05	2.74E-05	-1.62E-04
EP - freshwater	[kg P eq.]	1.05E-06	3.07E-08	4.87E-09	5.82E-08	3.63E-07	0	5.55E-09	1.54E-08	8.71E-08	1.76E-06	-1.35E-07
EP - marine	[kg N eq.]	2.83E-04	1.53E-05	9.16E-07	7.95E-05	3.18E-05	0	1.02E-06	6.62E-06	7.25E-06	9.89E-06	-4.33E-05
EP - terrestrial	[mole of N eq.]	3.09E-03	1.70E-04	9.87E-06	8.78E-04	3.44E-04	0	1.07E-05	7.45E-05	9.40E-05	7.47E-05	-4.65E-04
POCP	[kg NMVOC eq.]	1.08E-03	3.01E-05	3.14E-06	1.97E-04	1.17E-04	0	2.77E-06	1.31E-05	1.94E-05	2.26E-05	-1.56E-04
ADPF	[MJ]	1.72E01	1.38E-01	1.27E-02	3.17E-01	1.73E00	0	3.68E-02	6.91E-02	1.68E-01	1.21E-01	-2.76E00
ADPE	[kg Sb eq.]	1.53E-05	9.16E-10	4.76E-08	1.85E-09	1.55E-06	0	6.09E-10	3.95E-10	1.87E-09	5.72E-10	-1.51E-08
WDP	[m <sup>3</sup> world eq.]	5.85E-02	9.59E-05	1.38E-04	1.86E-04	6.94E-03	0	3.32E-04	4.51E-05	9.43E-03	-1.16E-05	-1.03E-02

Caption	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
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**Table 5 - Environmental impacts: 1 m<sup>2</sup> TRASPIR EVO 300**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	1.76E00	1.87E-02	2.93E-03	3.55E-02	1.90E-01	0	3.74E-03	9.34E-03	8.70E-02	2.35E-02	-1.24E-01
GWP fossil	[kg CO <sub>2</sub> -eq.]	1.78E00	1.86E-02	2.89E-03	3.53E-02	1.72E-01	0	3.70E-03	9.27E-03	8.68E-02	2.36E-02	-1.23E-01
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.61E-02	0	4.44E-05	0	1.73E-02	0	3.15E-05	0	2.41E-04	-7.43E-05	-6.46E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	5.72E-04	1.51E-04	1.54E-06	2.47E-04	7.73E-05	0	5.24E-06	7.61E-05	1.80E-05	1.28E-05	-7.25E-05
ODP	[kg CFC-11-eq.]	7.22E-15	3.65E-18	7.99E-18	6.48E-18	7.16E-16	0	8.86E-17	1.19E-18	2.83E-16	3.46E-17	-9.24E-16
AP	[mole of H <sup>+</sup> -eq.]	3.02E-02	5.97E-05	5.71E-06	3.01E-04	3.02E-03	0	7.70E-06	2.63E-05	4.42E-05	6.04E-05	-1.54E-04
EP - freshwater	[kg P eq.]	2.79E-06	5.50E-08	8.73E-09	9.07E-08	8.87E-07	0	9.93E-09	2.76E-08	1.85E-07	4.27E-06	-1.83E-07
EP - marine	[kg N eq.]	9.04E-04	2.73E-05	1.64E-06	9.81E-05	9.55E-05	0	1.83E-06	1.18E-05	1.39E-05	4.04E-05	-4.29E-05
EP - terrestrial	[mole of N eq.]	1.09E-02	3.05E-04	1.77E-05	1.08E-03	1.11E-03	0	1.92E-05	1.33E-04	1.54E-04	1.98E-04	-4.64E-04
POCP	[kg NMVOC eq.]	4.82E-03	5.39E-05	5.61E-06	2.34E-04	4.90E-04	0	4.97E-06	2.35E-05	3.63E-05	6.39E-05	-1.41E-04
ADPF	[MJ]	3.42E01	2.46E-01	2.27E-02	4.64E-01	3.18E00	0	6.59E-02	1.24E-01	3.46E-01	2.06E-01	-2.80E00
ADPE	[kg Sb eq.]	4.19E-02	1.64E-09	8.51E-08	2.83E-09	4.19E-03	0	1.09E-09	7.08E-10	3.88E-09	9.81E-10	-1.81E-08
WDP	[m <sup>3</sup> world eq.]	2.46E-01	1.72E-04	2.47E-04	2.88E-04	2.56E-02	0	5.94E-04	8.07E-05	8.96E-03	4.82E-04	-4.84E-03

Caption	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
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**Table 6 - Environmental impacts: 1 m<sup>2</sup> TRASPIR WELD EVO 360**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	1.54E00	2.09E-02	3.30E-03	5.57E-02	2.17E-01	0	4.22E-03	1.05E-02	4.01E-02	2.57E-02	-7.53E-02
GWP fossil	[kg CO <sub>2</sub> -eq.]	1.56E00	2.08E-02	3.25E-03	5.55E-02	1.79E-01	0	4.18E-03	1.05E-02	4.01E-02	2.60E-02	-7.50E-02
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.53E-02	0	5.01E-05	0	3.79E-02	0	3.55E-05	0	6.56E-05	-2.49E-04	-3.13E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	9.09E-04	1.69E-04	1.74E-06	2.21E-04	1.21E-04	0	5.91E-06	8.59E-05	5.56E-06	2.08E-05	-5.11E-05
ODP	[kg CFC-11-eq.]	8.78E-15	4.09E-18	9.00E-18	8.26E-18	9.66E-16	0	1.00E-16	1.34E-18	8.22E-17	5.98E-17	-5.04E-16
AP	[mole of H <sup>+</sup> -eq.]	2.72E-03	6.68E-05	6.43E-06	1.18E-03	3.30E-04	0	8.69E-06	2.97E-05	1.28E-05	7.65E-05	-1.11E-04
EP - freshwater	[kg P eq.]	5.65E-06	6.16E-08	9.83E-09	8.66E-08	1.16E-06	0	1.12E-08	3.11E-08	5.02E-08	4.79E-06	-1.96E-07
EP - marine	[kg N eq.]	7.80E-04	3.06E-05	1.85E-06	3.20E-04	9.33E-05	0	2.06E-06	1.34E-05	3.60E-06	2.08E-05	-3.35E-05
EP - terrestrial	[mole of N eq.]	8.39E-03	3.42E-04	1.99E-05	3.51E-03	9.98E-04	0	2.17E-05	1.50E-04	4.61E-05	1.97E-04	-3.57E-04
POCP	[kg NMVOC eq.]	3.27E-03	6.03E-05	6.32E-06	8.60E-04	3.85E-04	0	5.60E-06	2.65E-05	9.56E-06	5.81E-05	-1.12E-04
ADPF	[MJ]	3.69E01	2.76E-01	2.56E-02	7.04E-01	4.23E00	0	7.43E-02	1.40E-01	9.79E-02	3.61E-01	-1.68E00
ADPE	[kg Sb eq.]	1.54E-05	1.84E-09	9.59E-08	3.25E-09	1.57E-06	0	1.23E-09	7.98E-10	1.13E-09	1.70E-09	-1.04E-08
WDP	[m <sup>3</sup> world eq.]	2.94E-01	1.92E-04	2.78E-04	2.94E-04	3.25E-02	0	6.70E-04	9.11E-05	3.94E-03	-2.19E-04	-9.47E-03

Caption	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
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**Table 7 - Environmental impacts: 1 m<sup>2</sup> VAPOR 225**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	6.70E-01	1.43E-02	2.21E-03	2.34E-02	9.20E-02	0	2.81E-03	7.03E-03	9.54E-02	1.24E-02	-1.39E-01
GWP fossil	[kg CO <sub>2</sub> -eq.]	6.88E-01	1.42E-02	2.17E-03	2.33E-02	8.05E-02	0	2.79E-03	6.98E-03	9.52E-02	1.25E-02	-1.38E-01
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.82E-02	0	3.34E-05	0	1.14E-02	0	2.37E-05	0	2.17E-04	-1.07E-04	-6.62E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	3.70E-04	1.16E-04	1.16E-06	1.90E-04	5.30E-05	0	3.94E-06	5.73E-05	1.65E-05	9.53E-06	-4.40E-05
ODP	[kg CFC-11-eq.]	4.49E-15	2.79E-18	6.01E-18	4.59E-18	4.67E-16	0	6.67E-17	8.94E-19	2.57E-16	2.72E-17	-6.18E-16
AP	[mole of H <sup>+</sup> -eq.]	1.47E-03	4.56E-05	4.30E-06	8.04E-05	1.62E-04	0	5.80E-06	1.98E-05	3.67E-05	3.61E-05	-2.52E-04
EP - freshwater	[kg P eq.]	1.10E-06	4.20E-08	6.57E-09	6.91E-08	4.68E-07	0	7.47E-09	2.08E-08	1.66E-07	2.30E-06	-1.50E-07
EP - marine	[kg N eq.]	3.56E-04	2.09E-05	1.23E-06	3.71E-05	4.08E-05	0	1.38E-06	8.92E-06	1.04E-05	1.19E-05	-6.46E-05
EP - terrestrial	[mole of N eq.]	3.90E-03	2.33E-04	1.33E-05	4.14E-04	4.44E-04	0	1.45E-05	1.00E-04	1.25E-04	9.65E-05	-7.02E-04
POCP	[kg NMVOC eq.]	1.42E-03	4.12E-05	4.23E-06	7.25E-05	1.57E-04	0	3.74E-06	1.77E-05	2.76E-05	2.90E-05	-2.62E-04
ADPF	[MJ]	2.19E01	1.88E-01	1.71E-02	3.10E-01	2.25E00	0	4.96E-02	9.31E-02	3.11E-01	1.64E-01	-4.46E00
ADPE	[kg Sb eq.]	1.53E-05	1.25E-09	6.41E-08	2.06E-09	1.55E-06	0	8.20E-10	5.33E-10	3.53E-09	7.74E-10	-1.75E-08
WDP	[m <sup>3</sup> world eq.]	9.99E-02	1.31E-04	1.86E-04	2.16E-04	1.10E-02	0	4.47E-04	6.08E-05	9.39E-03	-4.82E-05	-2.15E-02

Caption	<p>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. deprivation-weighted water consumption</p>
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**Table 8 - Environmental impacts: 1 m<sup>2</sup> TRASPIR NET 160**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	4.59E-01	1.00E-02	1.50E-03	2.76E-02	9.15E-02	0	1.91E-03	4.77E-03	2.03E-02	1.29E-02	-1.75E-02
GWP fossil	[kg CO <sub>2</sub> -eq.]	4.78E-01	9.93E-03	1.48E-03	2.75E-02	5.47E-02	0	1.89E-03	4.74E-03	2.02E-02	1.30E-02	-1.74E-02
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.88E-02	0	2.27E-05	0	3.68E-02	0	1.61E-05	0	1.15E-05	-1.01E-04	-9.19E-05
GWP luluc	[kg CO <sub>2</sub> -eq.]	2.50E-04	8.09E-05	7.87E-07	9.99E-05	3.67E-05	0	2.68E-06	3.89E-05	9.20E-07	9.45E-06	-1.08E-05
ODP	[kg CFC-11-eq.]	3.85E-15	1.95E-18	4.08E-18	3.98E-18	4.08E-16	0	4.53E-17	6.07E-19	1.41E-17	2.68E-17	-1.75E-16
AP	[mole of H <sup>+</sup> -eq.]	9.94E-04	3.19E-05	2.92E-06	6.28E-04	1.17E-04	0	3.94E-06	1.34E-05	3.86E-06	3.68E-05	-2.70E-05
EP - freshwater	[kg P eq.]	8.81E-07	2.94E-08	4.46E-09	3.96E-08	4.02E-07	0	5.07E-09	1.41E-08	8.60E-09	2.38E-06	-2.36E-08
EP - marine	[kg N eq.]	2.27E-04	1.46E-05	8.38E-07	1.68E-04	2.89E-05	0	9.35E-07	6.05E-06	1.06E-06	1.37E-05	-7.24E-06
EP - terrestrial	[mole of N eq.]	2.47E-03	1.63E-04	9.02E-06	1.85E-03	3.05E-04	0	9.82E-06	6.81E-05	1.56E-05	1.01E-04	-7.74E-05
POCP	[kg NMVOC eq.]	9.19E-04	2.88E-05	2.87E-06	4.56E-04	1.13E-04	0	2.54E-06	1.20E-05	2.90E-06	3.07E-05	-2.41E-05
ADPF	[MJ]	1.50E01	1.32E-01	1.16E-02	3.48E-01	1.57E00	0	3.37E-02	6.32E-02	1.78E-02	1.61E-01	-4.02E-01
ADPE	[kg Sb eq.]	1.53E-05	8.77E-10	4.35E-08	1.54E-09	1.55E-06	0	5.57E-10	3.62E-10	1.96E-10	7.63E-10	-2.86E-09
WDP	[m <sup>3</sup> world eq.]	4.94E-02	9.18E-05	1.26E-04	1.37E-04	5.42E-03	0	3.04E-04	4.13E-05	1.93E-03	-3.62E-06	-1.98E-03

Caption	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. deprivation-weighted water consumption
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**Table 9 - Environmental impacts: 1 m<sup>2</sup> LCA VAPOR IN GREEN 200**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	2.24E-01	1.17E-02	1.85E-03	3.16E-02	7.05E-02	0	2.36E-03	5.89E-03	9.33E-02	8.52E-03	-4.22E-02
GWP fossil	[kg CO <sub>2</sub> -eq.]	4.02E-01	1.16E-02	1.82E-03	3.14E-02	7.32E-02	0	2.33E-03	5.85E-03	9.32E-02	8.55E-03	-4.20E-02
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.78E-01	0	2.80E-05	0	-2.82E-03	0	1.98E-05	0	6.80E-05	-4.10E-05	-2.14E-04
GWP luluc	[kg CO <sub>2</sub> -eq.]	4.17E-04	9.48E-05	9.71E-07	2.05E-04	6.17E-05	0	3.30E-06	4.80E-05	6.87E-06	6.35E-06	-2.62E-05
ODP	[kg CFC-11-eq.]	1.13E-12	2.29E-18	5.04E-18	5.60E-18	1.13E-13	0	5.59E-17	7.49E-19	8.93E-17	1.36E-17	-4.27E-16
AP	[mole of H <sup>+</sup> -eq.]	9.89E-04	3.74E-05	3.60E-06	3.28E-04	1.72E-04	0	4.86E-06	1.66E-05	4.29E-05	2.53E-05	-5.98E-05
EP - freshwater	[kg P eq.]	2.79E-06	3.45E-08	5.50E-09	7.59E-08	5.08E-07	0	6.26E-09	1.74E-08	5.31E-08	1.39E-06	-5.44E-08
EP - marine	[kg N eq.]	2.74E-04	1.71E-05	1.03E-06	1.01E-04	4.55E-05	0	1.15E-06	7.47E-06	1.56E-05	1.59E-05	-1.67E-05
EP - terrestrial	[mole of N eq.]	2.84E-03	1.91E-04	1.11E-05	1.12E-03	4.67E-04	0	1.21E-05	8.40E-05	1.80E-04	8.30E-05	-1.79E-04
POCP	[kg NMVOC eq.]	9.05E-04	3.38E-05	3.54E-06	2.51E-04	1.61E-04	0	3.13E-06	1.48E-05	4.09E-05	2.62E-05	-5.18E-05
ADPF	[MJ]	1.07E01	1.54E-01	1.43E-02	4.11E-01	1.84E00	0	4.15E-02	7.80E-02	1.18E-01	7.22E-02	-8.85E-01
ADPE	[kg Sb eq.]	1.53E-05	1.03E-09	5.37E-08	2.41E-09	1.55E-06	0	6.87E-10	4.46E-10	1.26E-09	3.71E-10	-6.80E-09
WDP	[m <sup>3</sup> world eq.]	2.26E-02	1.08E-04	1.56E-04	2.42E-04	8.13E-03	0	3.74E-04	5.09E-05	1.07E-02	2.83E-04	-4.08E-03

Caption	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. deprivation-weighted water consumption
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## LCA results – Resource use per functional unit

Table 10 - Resource use: 1 m<sup>2</sup> TRASPIR 110

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	5.37E-01	5.21E-03	-5.34E-05	9.80E-03	9.57E-02	0	1.02E-02	2.32E-03	1.70E-02	6.85E-03	-1.51E-01
PERM	[MJ]	2.48E-01	0	1.21E-02	0	1.03E-02	0	0	0	0	0	0
PERT	[MJ]	7.85E-01	5.21E-03	1.20E-02	9.80E-03	1.06E-01	0	1.02E-02	2.32E-03	1.70E-02	6.85E-03	-1.51E-01
PENRE	[MJ]	4.65E00	9.09E-02	5.60E-03	2.43E-01	9.15E-01	0	2.21E-02	4.15E-02	8.42E-01	9.43E-02	-1.42E00
PENRM	[MJ]	5.60E00	0	2.02E-03	0	8.77E-01	0	0	0	-7.79E-01	0	0
PENRT	[MJ]	1.02E01	9.09E-02	7.61E-03	2.43E-01	1.79E00	0	2.21E-02	4.15E-02	6.29E-02	9.43E-02	-1.42E00
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	1.46E-03	5.97E-06	2.48E-06	1.14E-05	2.74E-04	0	9.91E-06	2.65E-06	1.49E-04	9.07E-07	-2.34E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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\* Reference to only foreground system

**Table 11 - Resource use: 1 m<sup>2</sup> TRASPIR EVO UV 210**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	1.39E00	1.06E-02	-1.17E-04	2.21E-02	1.86E-01	0	2.22E-02	5.05E-03	5.40E-02	1.08E-02	-2.39E-01
PERM	[MJ]	2.48E-01	0	2.64E-02	0	5.02E-03	0	0	0	0	0	0
PERT	[MJ]	1.64E00	1.06E-02	2.62E-02	2.21E-02	1.91E-01	0	2.22E-02	5.05E-03	5.40E-02	1.08E-02	-2.39E-01
PENRE	[MJ]	1.98E01	1.84E-01	1.22E-02	4.83E-01	2.17E00	0	4.82E-02	9.07E-02	1.28E00	1.46E-01	-2.04E00
PENRM	[MJ]	6.95E00	0	4.40E-03	0	9.78E-01	0	0	0	-1.08E00	0	0
PENRT	[MJ]	2.68E01	1.84E-01	1.66E-02	4.83E-01	3.14E00	0	4.82E-02	9.07E-02	2.01E-01	1.46E-01	-2.04E00
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	5.88E-03	1.21E-05	5.42E-06	2.54E-05	7.10E-04	0	2.16E-05	5.78E-06	3.01E-04	1.08E-05	-5.36E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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\* Reference to only foreground system

**Table 12 - Resource use: 1 m<sup>2</sup> CLIMA CONTROL 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	6.97E-01	4.73E-03	-4.77E-05	9.61E-03	1.18E-01	0	9.08E-03	2.07E-03	1.55E-02	5.43E-03	-1.50E-01
PERM	[MJ]	2.48E-01	0	1.08E-02	0	4.58E-03	0	0	0	0	0	0
PERT	[MJ]	9.44E-01	4.73E-03	1.07E-02	9.61E-03	1.22E-01	0	9.08E-03	2.07E-03	1.55E-02	5.43E-03	-1.50E-01
PENRE	[MJ]	1.05E01	8.25E-02	5.00E-03	2.29E-01	1.49E00	0	1.97E-02	3.71E-02	6.86E-01	7.43E-02	-1.61E00
PENRM	[MJ]	3.80E00	0	1.80E-03	0	7.16E-01	0	0	0	-5.99E-01	0	0
PENRT	[MJ]	1.43E01	8.25E-02	6.80E-03	2.29E-01	2.21E00	0	1.97E-02	3.71E-02	8.70E-02	7.43E-02	-1.61E00
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	1.73E-03	5.42E-06	2.22E-06	1.11E-05	3.06E-04	0	8.84E-06	2.37E-06	1.45E-04	2.56E-06	-2.09E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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\* Reference to only foreground system

**Table 13 - Resource use: 1 m<sup>2</sup> TRASPIR EVO 160**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	9.88E-01	7.92E-03	-8.90E-05	1.49E-02	1.13E-01	0	1.70E-02	3.86E-03	4.62E-02	8.82E-03	-2.37E-01
PERM	[MJ]	1.38E-01	0	2.01E-02	0	6.51E-03	0	0	0	0	0	0
PERT	[MJ]	1.13E00	7.92E-03	2.00E-02	1.49E-02	1.19E-01	0	1.70E-02	3.86E-03	4.62E-02	8.82E-03	-2.37E-01
PENRE	[MJ]	9.91E00	1.38E-01	9.33E-03	3.18E-01	1.12E00	0	3.68E-02	6.92E-02	1.26E00	1.21E-01	-2.76E00
PENRM	[MJ]	7.28E00	0	3.36E-03	0	6.06E-01	0	0	0	-1.09E00	0	0
PENRT	[MJ]	1.72E01	1.38E-01	1.27E-02	3.18E-01	1.73E00	0	3.68E-02	6.92E-02	1.68E-01	1.21E-01	-2.76E00
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	3.37E-03	9.08E-06	4.14E-06	1.72E-05	3.55E-04	0	1.65E-05	4.42E-06	2.44E-04	3.24E-06	-5.33E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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\* Reference to only foreground system

Table 14- Resource use: 1 m<sup>2</sup> TRASPIR EVO 300

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	1.86E00	1.42E-02	-1.59E-04	2.33E-02	2.00E-01	0	3.04E-02	6.91E-03	9.60E-02	1.52E-02	-2.54E-01
PERM	[MJ]	2.48E-01	0	3.60E-02	0	2.13E-02	0	0	0	0	0	0
PERT	[MJ]	2.11E00	1.42E-02	3.59E-02	2.33E-02	2.21E-01	0	3.04E-02	6.91E-03	9.60E-02	1.52E-02	-2.54E-01
PENRE	[MJ]	2.53E01	2.47E-01	1.67E-02	4.66E-01	2.36E00	0	6.59E-02	1.24E-01	8.42E-01	2.06E-01	-2.80E00
PENRM	[MJ]	9.12E00	0	6.02E-03	0	8.39E-01	0	0	0	-4.96E-01	0	0
PENRT	[MJ]	3.44E01	2.47E-01	2.27E-02	4.66E-01	3.20E00	0	6.59E-02	1.24E-01	3.46E-01	2.06E-01	-2.80E00
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	8.08E-03	1.62E-05	7.40E-06	2.68E-05	8.16E-04	0	2.96E-05	7.91E-06	2.59E-04	1.73E-05	-7.80E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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\* Reference to only foreground system

**Table 15 - Resource use: 1 m<sup>2</sup> TRASPIR WELD EVO 360**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	2.42E00	1.59E-02	-1.80E-04	2.19E-02	2.82E-01	0	3.42E-02	7.79E-03	2.72E-02	2.62E-02	-1.57E-01
PERM	[MJ]	2.46E-01	0	4.06E-02	0	2.53E-02	0	0	0	0	0	0
PERT	[MJ]	2.67E00	1.59E-02	4.04E-02	2.19E-02	3.08E-01	0	3.42E-02	7.79E-03	2.72E-02	2.62E-02	-1.57E-01
PENRE	[MJ]	2.41E01	2.77E-01	1.88E-02	7.06E-01	2.79E00	0	7.43E-02	1.40E-01	5.56E-01	3.61E-01	-1.68E00
PENRM	[MJ]	1.29E01	0	6.78E-03	0	1.44E00	0	0	0	-4.59E-01	0	0
PENRT	[MJ]	3.70E01	2.77E-01	2.56E-02	7.06E-01	4.23E00	0	7.43E-02	1.40E-01	9.79E-02	3.61E-01	-1.68E00
SM	[kg]	3.01E-03	0	0	0	3.78E-04	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	8.62E-03	1.82E-05	8.34E-06	2.56E-05	9.43E-04	0	3.33E-05	8.92E-06	1.06E-04	5.34E-06	-4.62E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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\* Reference to only foreground system

Table 16 - Resource use: 1 m<sup>2</sup> VAPOR 225

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	1.02E00	1.08E-02	-1.20E-04	1.78E-02	1.18E-01	0	2.28E-02	5.20E-03	8.69E-02	1.19E-02	-2.14E-01
PERM	[MJ]	2.48E-01	0	2.71E-02	0	2.03E-02	0	0	0	0	0	0
PERT	[MJ]	1.27E00	1.08E-02	2.70E-02	1.78E-02	1.39E-01	0	2.28E-02	5.20E-03	8.69E-02	1.19E-02	-2.14E-01
PENRE	[MJ]	1.05E01	1.89E-01	1.26E-02	3.11E-01	1.21E00	0	4.96E-02	9.33E-02	1.09E00	1.64E-01	-3.83E00
PENRM	[MJ]	1.15E01	0	4.53E-03	0	1.04E00	0	0	0	-7.76E-01	0	-6.36E-01
PENRT	[MJ]	2.19E01	1.89E-01	1.71E-02	3.11E-01	2.25E00	0	4.96E-02	9.33E-02	3.11E-01	1.64E-01	-4.47E00
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	3.32E-03	1.24E-05	5.57E-06	2.04E-05	3.57E-04	0	2.22E-05	5.95E-06	2.64E-04	3.63E-06	-6.32E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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\* Reference to only foreground system

Table 17 - Resource use: 1 m<sup>2</sup> TRASPIR NET 160

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	8.30E-01	7.58E-03	-8.14E-05	9.97E-03	9.49E-02	0	1.55E-02	3.53E-03	4.77E-03	1.18E-02	-5.99E-02
PERM	[MJ]	2.48E-01	0	1.84E-02	0	2.27E-02	0	0	0	0	0	0
PERT	[MJ]	1.08E00	7.58E-03	1.83E-02	9.97E-03	1.18E-01	0	1.55E-02	3.53E-03	4.77E-03	1.18E-02	-5.99E-02
PENRE	[MJ]	7.26E00	1.32E-01	8.53E-03	3.49E-01	8.21E-01	0	3.37E-02	6.33E-02	2.52E-01	1.61E-01	-4.02E-01
PENRM	[MJ]	7.71E00	0	3.07E-03	0	7.47E-01	0	0	0	-2.34E-01	0	0
PENRT	[MJ]	1.50E01	1.32E-01	1.16E-02	3.49E-01	1.57E00	0	3.37E-02	6.33E-02	1.78E-02	1.61E-01	-4.02E-01
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2.27E-03	8.69E-06	3.78E-06	1.17E-05	2.45E-04	0	1.51E-05	4.04E-06	4.74E-05	4.60E-06	-7.85E-05

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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**Table 18 - Resource use: 1 m<sup>2</sup> LCA VAPOR IN GREEN 200**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	2.36E00	8.89E-03	-1.00E-04	1.95E-02	2.80E-01	0	1.91E-02	4.35E-03	2.97E-02	6.04E-03	-1.47E-01
PERM	[MJ]	1.97E00	0	2.27E-02	0	1.84E-01	0	0	0	0	0	0
PERT	[MJ]	4.33E00	8.89E-03	2.26E-02	1.95E-02	4.64E-01	0	1.91E-02	4.35E-03	2.97E-02	6.04E-03	-1.47E-01
PENRE	[MJ]	6.07E00	1.55E-01	1.05E-02	4.12E-01	1.02E00	0	4.15E-02	7.81E-02	4.59E-01	7.22E-02	-8.85E-01
PENRM	[MJ]	4.68E00	0	3.79E-03	0	8.27E-01	0	0	0	-3.42E-01	0	0
PENRT	[MJ]	1.07E01	1.55E-01	1.43E-02	4.12E-01	1.84E00	0	4.15E-02	7.81E-02	1.18E-01	7.22E-02	-8.85E-01
SM	[kg]	3.08E-03	0	0	0	3.85E-04	0	0	0	0	0	0
RSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2.72E-03	1.02E-05	4.67E-06	2.24E-05	4.12E-04	0	1.86E-05	4.98E-06	2.65E-04	9.05E-06	-1.72E-04

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy 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
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## LCA results – Output flows and waste categories per functional unit

Table 19 - Output flows and waste categories: 1 m<sup>2</sup> TRASPIR 110

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	1.55E-09	4.79E-12	3.29E-11	9.36E-12	4.11E-10	0	5.84E-12	2.09E-12	1.42E-11	1.70E-11	-2.89E-10
NHWD	[kg]	4.01E-03	1.43E-05	2.71E-04	3.38E-05	1.65E-02	0	1.57E-05	6.17E-06	7.35E-04	9.00E-02	-4.15E-04
RWD	[kg]	1.65E-04	1.65E-07	1.82E-07	3.87E-07	2.83E-05	0	3.29E-06	5.03E-08	5.38E-06	1.10E-06	-4.89E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	9.32E-04	0	0	0	1.13E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	2.12E-02	0	0	0	1.21E-01	0	0
EET	[MJ]	0	0	0	0	2.82E-02	0	0	0	2.16E-01	0	0

Caption

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

Table 20 - Output flows and waste categories: 1 m<sup>2</sup> TRASPIR EVO UV 210

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	1.27E-08	9.70E-12	7.19E-11	2.08E-11	1.46E-09	0	1.27E-11	4.57E-12	4.54E-11	2.62E-11	-5.64E-10
NHWD	[kg]	8.70E-02	2.89E-05	5.91E-04	6.98E-05	3.20E-02	0	3.42E-05	1.35E-05	6.62E-03	1.42E-01	-8.47E-04
RWD	[kg]	4.85E-04	3.34E-07	3.98E-07	8.03E-07	4.89E-05	0	7.18E-06	1.10E-07	1.68E-05	1.72E-06	-6.30E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	1.34E-03	0	0	0	3.55E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	2.57E-02	0	0	0	1.47E-01	0	0
EET	[MJ]	0	0	0	0	3.14E-02	0	0	0	2.17E-01	0	0

Caption	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
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**Table 21 - Output flows and waste categories: 1 m<sup>2</sup> CLIMA CONTROL 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	8.00E-09	4.35E-12	2.94E-11	9.13E-12	1.06E-09	0	5.21E-12	1.87E-12	1.42E-11	1.33E-11	-4.12E-10
NHWD	[kg]	7.47E-03	1.29E-05	2.42E-04	3.22E-05	1.47E-02	0	1.40E-05	5.51E-06	2.15E-03	7.14E-02	-5.00E-04
RWD	[kg]	1.35E-04	1.50E-07	1.63E-07	3.69E-07	2.72E-05	0	2.94E-06	4.49E-08	5.52E-06	8.67E-07	-4.12E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	9.98E-04	0	0	0	1.06E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	1.93E-02	0	0	0	9.47E-02	0	0
EET	[MJ]	0	0	0	0	2.46E-02	0	0	0	1.65E-01	0	0

Caption	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
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**Tabel 22 - Output flows and waste categories: 1 m<sup>2</sup> TRASPIR EVO 160**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	6.99E-09	7.28E-12	5.49E-11	1.40E-11	7.07E-10	0	9.73E-12	3.49E-12	3.85E-11	2.17E-11	-6.32E-10
NHWD	[kg]	9.56E-03	2.17E-05	4.52E-04	4.64E-05	1.92E-02	0	2.61E-05	1.03E-05	2.46E-03	1.16E-01	-8.49E-04
RWD	[kg]	3.05E-04	2.51E-07	3.04E-07	5.34E-07	2.57E-05	0	5.48E-06	8.37E-08	1.46E-05	1.41E-06	-6.90E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	1.45E-03	0	0	0	3.16E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	2.12E-02	0	0	0	1.54E-01	0	0
EET	[MJ]	0	0	0	0	3.23E-02	0	0	0	2.63E-01	0	0

Caption	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
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**Table 23: Output flows and waste categories: 1 m<sup>2</sup> TRASPIR EVO 300**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	1.64E-08	1.30E-11	9.83E-11	2.17E-11	1.58E-09	0	1.74E-11	6.24E-12	7.99E-11	3.68E-11	-8.18E-10
NHWD	[kg]	1.33E-01	3.88E-05	8.08E-04	6.95E-05	4.46E-02	0	4.67E-05	1.84E-05	5.54E-03	2.01E-01	-1.14E-03
RWD	[kg]	6.02E-04	4.49E-07	5.44E-07	8.01E-07	5.06E-05	0	9.81E-06	1.50E-07	3.03E-05	2.43E-06	-5.69E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	1.78E-03	0	0	0	6.76E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	1.97E-02	0	0	0	1.02E-01	0	0
EET	[MJ]	0	0	0	0	1.81E-02	0	0	0	1.02E-01	0	0

Caption	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
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**Table 24 - Output flows and waste categories: 1 m<sup>2</sup> TRASPIR WELD EVO 360**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	2.63E-08	1.46E-11	1.11E-10	2.17E-11	2.80E-09	0	1.96E-11	7.04E-12	2.25E-11	6.49E-11	-1.08E-09
NHWD	[kg]	2.79E-02	4.35E-05	9.11E-04	9.13E-05	4.83E-02	0	5.27E-05	2.08E-05	2.46E-03	3.45E-01	-8.12E-04
RWD	[kg]	7.72E-04	5.02E-07	6.12E-07	1.04E-06	8.45E-05	0	1.11E-05	1.69E-07	8.27E-06	4.20E-06	-4.32E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	4.18E-04	0	0	0	1.79E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	1.41E-02	0	0	0	5.27E-02	0	0
EET	[MJ]	0	0	0	0	1.20E-02	0	0	0	9.73E-02	0	0

Caption	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
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Table 25 - Output flows and waste categories: 1 m<sup>2</sup> VAPOR 225

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	6.58E-09	9.97E-12	7.39E-11	1.64E-11	6.73E-10	0	1.31E-11	4.70E-12	7.20E-11	2.94E-11	-7.39E-10
NHWD	[kg]	1.05E-02	2.97E-05	6.08E-04	4.88E-05	2.66E-02	0	3.52E-05	1.39E-05	4.47E-03	1.57E-01	-9.75E-04
RWD	[kg]	3.11E-04	3.43E-07	4.09E-07	5.64E-07	3.13E-05	0	7.38E-06	1.13E-07	2.72E-05	1.91E-06	-6.87E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	2.11E-03	0	0	0	6.07E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	1.96E-02	0	0	0	1.19E-01	0	0
EET	[MJ]	0	0	0	0	3.01E-02	0	0	0	2.12E-01	0	0

Caption	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
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Table 26 - Output flows and waste categories: 1 m<sup>2</sup> TRASPIR NET 160

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	6.35E-09	6.97E-12	5.02E-11	1.00E-11	6.50E-10	0	8.90E-12	3.19E-12	4.00E-12	2.90E-11	-8.15E-11
NHWD	[kg]	8.63E-03	2.08E-05	4.13E-04	4.42E-05	2.58E-02	0	2.39E-05	9.41E-06	3.86E-04	1.55E-01	-1.41E-04
RWD	[kg]	1.98E-04	2.40E-07	2.78E-07	5.02E-07	2.32E-05	0	5.01E-06	7.66E-08	1.49E-06	1.88E-06	-1.93E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	1.71E-04	0	0	0	3.06E-03	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	1.28E-02	0	0	0	4.66E-02	0	0
EET	[MJ]	0	0	0	0	8.11E-03	0	0	0	6.65E-02	0	0

Caption	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
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Table 27 - Output flows and waste categories: 1 m<sup>2</sup> LCA VAPOR IN GREEN 200

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	3.13E-08	8.17E-12	6.19E-11	1.83E-11	3.38E-09	0	1.10E-11	3.94E-12	2.57E-11	1.21E-11	-1.57E-10
NHWD	[kg]	1.09E-02	2.43E-05	5.10E-04	6.03E-05	1.95E-02	0	2.94E-05	1.16E-05	9.40E-03	1.16E-01	-3.52E-04
RWD	[kg]	1.86E-04	2.81E-07	3.43E-07	6.93E-07	3.00E-05	0	6.18E-06	9.45E-08	8.99E-06	8.39E-07	-4.72E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	1.38E-03	0	0	0	1.73E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	1.98E-02	0	0	0	1.28E-01	0	0
EET	[MJ]	0	0	0	0	2.74E-02	0	0	0	2.04E-01	0	0

Caption	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
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## Biogenic C Content

**Table 22- Biogenic carbon content of product and packaging: 1 m<sup>2</sup> TRASPIR 110**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	5.9E-003	0	2.9E-004	0	6.2E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 23- Biogenic carbon content of product and packaging: 1 m<sup>2</sup> TRASPIR EVO UV 210**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	5.9E-003	0	6.2E-004	0	6.6E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 23- Biogenic carbon content of product and packaging: 1 m2 CLIMA CONTROL 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	5.9E-003	0	2.6E-004	0	6.2E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**. Table 24 - Biogenic carbon content of product and packaging: 1 m<sup>2</sup> TRASPIR EVO 160**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3.3E-003	0	4.8E-004	0	3.8E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 25 - Biogenic carbon content of product and packaging: 1 m<sup>2</sup> TRASPIR EVO 300**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	5.9E-003	0	8.5E-004	0	6.8E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 26 -Biogenic carbon content of product and packaging: 1 m<sup>2</sup> TRASPIR WELD EVO 360**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	5.9E-003	0	9.6E-004	0	6.9E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 27 - Biogenic carbon content of product and packaging: 1 m<sup>2</sup> VAPOR 225**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	5.9E-003	0	6.4E-004	0	6.6E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 28 - Biogenic**

**carbon content of product and packaging: 1 m<sup>2</sup> TRASPIR NET 160**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	5.9E-003	0	4.4E-004	0	6.4E-004	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 28 - Biogenic carbon content of product and packaging: 1 m<sup>2</sup> LCA VAPOR IN GREEN 200**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3.3E-003	0	5.4E-004	0	3.9E-004	0	0	0	0	0	0
Biog. C in product	[kg]	4.6E-002	0	0	0	4.6E-003	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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## Calculation rules

### Assumptions

Where possible, a conservative approach has been adopted, overestimating burdens to prove irrelevance. In other cases, alternative data were selected based on scientific experience, in order to improve the accuracy of the model. Where it was not possible to know the exact materials composition in the supply chain (due to commercial or industrial confidential suppliers' reasons or due to missing datasets), these have been approximated with LCIs of similar materials, estimated by the combination of available dataset or reconstructed with literature data.

The list of assumptions in the LCA study are as follows:

1. Lead batteries have been taken into account as a conservative choice.
2. In A5 and C modules, where potential benefits from energy recovery are considered, European grid mix values were used as a basis for the rest of the world calculations.
3. For boilers (natural gas fed) an efficiency factor equal to 0.95 is considered.
4. For distribution an estimated distance of 500 km by truck is added to the transport via ship (whose distance (6520 km) is taken from the /PCR: CERAMIC TILES AND PANELS/ for countries belonging to Rest of World area).
5. The functional unit is defined without packaging.
6. In case of transports on truck where the payload was neither available nor conceivable, utilization factor of 0.53 has been considered (empty way back).
7. When a specific distribution scenario (A4) was unavailable, a scenario of a similar product has been considered.
8. For end of life scenarios, the relative proportion between recycling and energy recovery has been assumed to be the same as in /ISPRA/ for 2010 as Building & Construction update percentage for Italy only considered the overall recovery percentage, not distinguishing between recycling and energy recovery.
9. We assume that supplier packaging waste are raw materials' packaging and they are also input in the manufacturing process.
10. Distance to disposal site after demolition is assumed to be 100 km
11. The content of antimony within the flame retardant has been assumed to be 20%, the remaining is modelled as polymeric flame retardant.

### Cut off rules

EN 15804 requires that in case of data discrepancies or insufficient input data for a unit process, the cut-off criteria shall be 1% of renewable and non-renewable primary energy usage and 1% of the total mass of this unit process. The total neglected flows from a product stage must be no more than 5% of product inputs by mass or 5% of primary energy contribution.

Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment.

### Data quality

The data quality can be considered as good. The LCA models have been checked and most relevant flows were considered. Technological, geographical and temporal representativeness is appropriate.

### **Examination period**

Primary data collected in the context of this study refer to 2019.

### **Allocation – upstream data**

Information about single datasets is documented in <http://database-documentation.gabi-software.com/support/gabi/>.

## Scenarios and additional technical information

- Module A1 refers to all raw materials impacts production with supplier's packaging and all types of energy inputs. all production activities. waste treatment and process emissions from the supplier's plant. Primary data have been collected from supplier.
- Module A2 includes the product transport from the supplier to Rothoblaas plant
- Module A3 comprises all activities related to warehousing and additional packaging from Rothoblaas. Membranes are distributed by Rothoblaas that sells rolls individually or as whole pallets. Packaging includes polyethylene film. cardboard to protect separate rolls. PET bands and pallets.

Additional packaging from Rothoblaas comprises pallets. PET strips and PE film and is added whenever original packaging from supplier is not kept (66.5% of the times packaging from supplier is maintained). Final packaging is calculated as follows:

### Final product packaging

Material	Final packaging
Wooden pallet	66.5% *Wood Supplier packaging + Rothoblaas wood packaging
PE film packaging	PE Supplier packaging + Rothoblaas PE packaging
PET film packaging	66.5% * PET Supplier packaging + Rothoblaas PET packaging
Cardboard packaging	66.5% * Cardboard Supplier packaging

### Products rolls areas

Product	Height [m]	Length [m]	Membrane area [m <sup>2</sup> ]
TRASPIR 110	1.5	50	75
TRASPIR EVO UV 210	1.5	50	75
CLIMA CONTROL 80	1.5	50	75
TRASPIR EVO 160	1.5	50	75
TRASPIR EVO 300	1.5	50	75
TRASPIR WELD EVO 360	3	25	75
VAPOR 225	1.5	50	75
TRASPIR NET 160	1.5	50	75
VAPOR IN GREEN 200	1.5	50	75

- Module A4 takes into account the transport to the final customer/distributor. In 2019, membranes were sold mainly to Italy and Europe. only partially to the rest of the world . The distribution scenario is shown below:

Product	IT	EU	Truck [km]	Ship [km]
TRASPIR 110	12%	32%	817	3654
TRASPIR EVO UV 210	22%	41%	898	2397
CLIMA CONTROL 80	1%	46%	890	3440
TRASPIR EVO 160	46%	26%	807	1864
TRASPIR EVO 300	82%	2%	708	1065
TRASPIR WELD EVO 360	16%	4%	565	5254
VAPOR 225	100%	0,00%	718	0
TRASPIR NET 160	0%	8%	542	6018
VAPOR IN GREEN 200	15%	53%	937	2086

- For Module A5 the following parameters have been taken into account:

Installation		
Material	Amount	Note
Stainless steel clips	0.10 g/m <sup>2</sup>	For all products
Adhesive band	28 g for 1 m of membrane's length. 28/1000/(height*2) kg/m <sup>2</sup>	Only for products not having the double tape
Adhesive band (1.5 m height)	28/1000/1.5*2 = 0.00933 kg/ m <sup>2</sup>	Only for products not having the double tape
Adhesive band (3 m height)	28/1000/3*2 = 0.00466 kg/ m <sup>2</sup>	Only for products not having the double tape
Weld liquid (1.5 m height)	[(0.15/200)*1.5*weld-liquid_density/2]/2 kg/ m <sup>2</sup>	Only for TWELD360 [50% of the times]
Weld liquid (3 m height)	[(0.15/200)*3*weld-liquid_density/2]/2 kg/ m <sup>2</sup>	Only for TWELD360 [50% of the times]
Electric tool (1.5 m height)	(0.1 <sup>2</sup> h * 1.6 <sup>3</sup> kW)/(1.5m*2))/2 kWh/ m <sup>2</sup>	Only for TWELD360 [50% of the times]
Electric tool (3 m height)	(0.1 <sup>8</sup> h* 1.6 <sup>9</sup> kW)/(3*2))/2 kWh/ m <sup>2</sup>	Only for TWELD360 [50% of the times]

- Module B (maintenance and operational use): Operational use and Maintenance are not relevant for membranes. A general scenario of zero impact for the system is considered for all B modules (B1-B2-B3-B4-B5-B6-B7).
- Module C1 (Deconstruction / demolition) has been included and deconstruction impacts have been considered.
- Module C3 (recycling and incineration with energy recovery) and C4 (landfilling) consider the end of life scenarios of the product, considering all components of the installed membranes. The percentages to the given scenarios have been taken from statistics related to Building & Construction wastes.

<sup>2</sup> 0.1 h is the time required to joint 1 m membrane length

<sup>3</sup> 1.6 kW is the power of the electric tool

### End of life scenarios for plastic B&C wastes

Scenario	Italy	Europe	Rest of World
Source	/PLASTIC WASTE FROM B&C IN EU 2018/ /ISPRA/	/PLASTIC WASTE FROM B&C IN EU 2018/	/
Recycling	$12.5^4/16.2^5*36\%=28\%$	26%	0
Incineration	$3.7^6/16.2*36\%=8\%$	47.5%	0
Landfill	64%	26.5%	100%

- Module D consists of loads and benefits beyond the system boundaries.

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<sup>4</sup> Recycling percentage for B&C waste in Italy /PLASTIC WASTE FROM B&C IN EU 2018/

<sup>5</sup> Recycling + Energy recovery for B&C waste in Italy /PLASTIC WASTE FROM B&C IN EU 2018/

<sup>6</sup> Energy recovery for B&C waste in Italy /PLASTIC WASTE FROM B&C IN EU 2018/

## Other additional environmental information

### **Emissions to indoor air:**

No direct emissions at the building site. Rothoblaas srl confirms that the products don't contain any substances mentioned on the REACH-list.

### **Emissions to soil and water:**

No direct emissions at the building site. Rothoblaas srl confirms that the products don't contain any substances mentioned on the REACH-list.

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