ENVIRONMENTAL PRODUCT DECLARATION

Product names:

Air, wind and water barrier membranes and Vapor control layers

[TRASPIR EVO 220- VAPOR IN 120 - BARRIER ALU NET SD1500 - CLIMA CONTROL NET 160 - TRASPIR EVO SEAL 200 - TRASPIR DOUBLE EVO 340 - VAPOR IN NET 140]

Site Plants:

Cortaccia (BZ)

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

Program Operator	EPDItaly
Publisher	EPDItaly

Declaration Number	2021M10140
Registration Number	EPDITALY0140

Issue Date	18/05/2021
Valid to	18/05/2026

General information

EPD OWNER:	ROTHO BLAAS SRL
PLANT INVOLVED in the declaration:	ROTHO BLAAS SRL Via dell'Adige N. 2/1 - I-39040, Cortaccia (BZ)
SCOPE OF APPLICATION:	This Environmental Product Declaration (EPD) is valid for Air, wind and water barrier membranes and Vapor control layers designed by Rothoblass in Europe. The type of declaration is related to 7 specific products by Rothoblaas. The life cycle assessment (LCA) is representative for the products introduced in the declaration for the given system boundaries.
PROGRAM OPERATOR:	EPDITALY, via Gaetano De Castillia 10, 20124 Milano, Italia.
INDIPENDENT CHECK:	This declaration has been developed referring to EPDItaly, following the General Program Instruction; further information and the document are available at: www.epditaly.it. This EPD document is valid within the following geographical area: worlwide according to sales market conditions. 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 info@epditaly.it Independent verification of the declaration and data, according to EN ISO 14025:2010. Third party verifier: ICMQ SpA, via De Castillia, 10 20124 Milano (www.icmq.it) ☐EPD process certification (Internal)☑ EPD verification (External) ***Accredited by: Accredia***
CPC CODE:	**3699-** Articles of plastics n.e.c.
CORPORATE CONTACT:	info@rothoblaas.com
TECHNICAL SUPPORT:	Sphera https://www.sphera.com
COMPARABILITY:	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.
ACCOUNTABILITY:	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.
REFERENCE DOCUMENT:	This declaration has been developed following the General Program Instruction document of EPDItaly, available at www.epditaly.it.
PRODUCT CATEGORY RULES (PCR):	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_2 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

TÜV NORD

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

rothoblaas
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

Ente 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

IAF

DAkkS
Deutsche
Akkreditierungsstelle
D-ZM-12007-01-00

Product Certifications

TRASPIR DOUBLE EVO 340:

CE
EN 13859-1/2

TRASPIR EVO 220:

CE
EN 13859-1/2

TRASPIR EVO SEAL 200:

CE
EN 13859-1/2
ETA PENDING

CLIMA CONTROL NET 160:

CE
EN 13984

BARRIER ALU NET SD1500:

CE
EN 13984

VAPOR IN NET 140:

CE
EN 13984

VAPOR IN 120:

CE
EN 13984

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) 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

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Banca: UniCredit SpA | Piazza Walther 4 | 39100 Bolzano | Italia | IBAN: IT08Y0200811600000030088887 | BIC: UNCRITM1965

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 7 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).

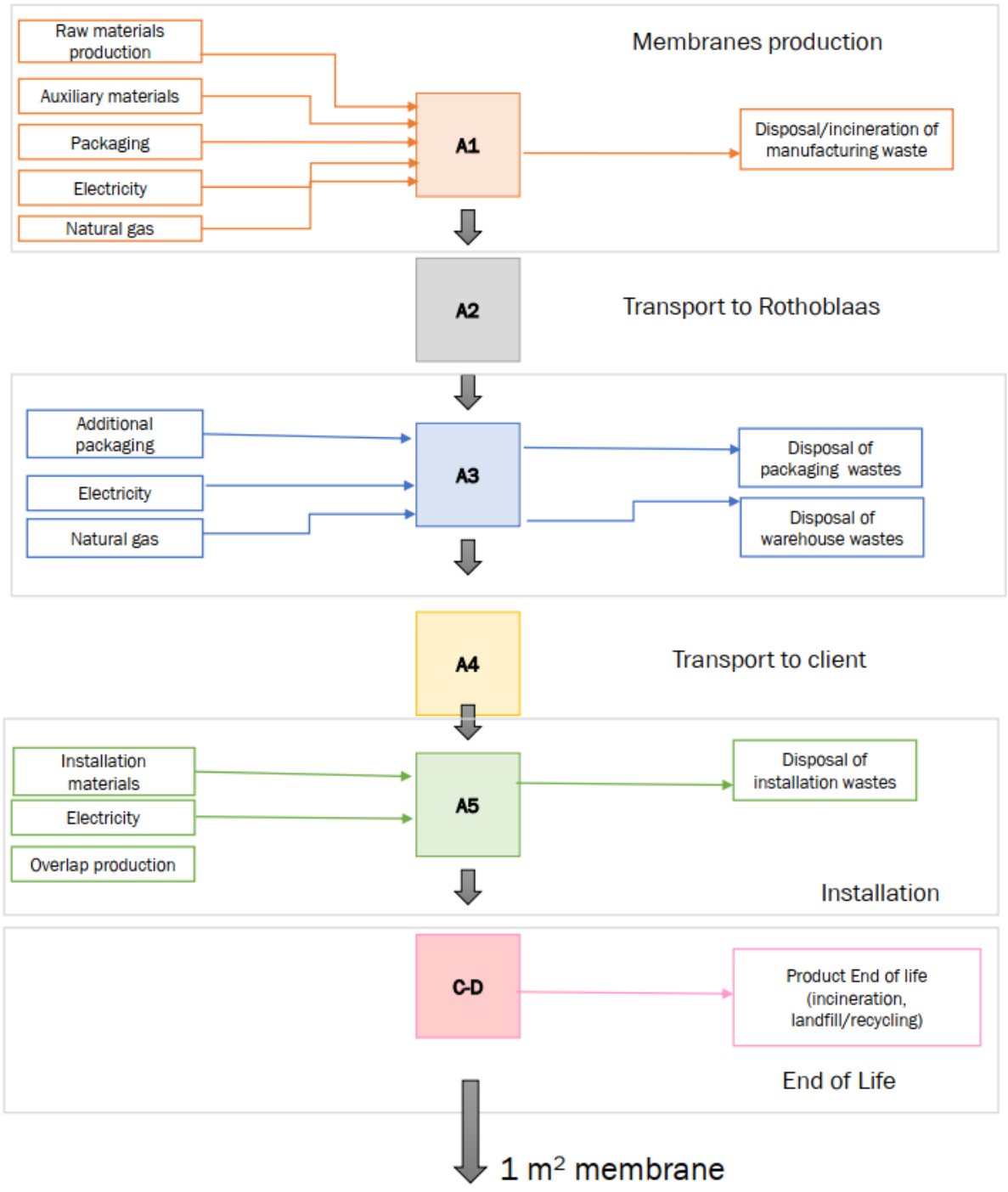
The declaration is 1a (Declaration of a specific product from a manufacturer’s plant).

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 EVO 220

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

SUPER TAPE
Greater tape width to guarantee excellent resistance to heavy rain, approved by ÖNORM B 4119.

ANTISLIP
Rough surface for excellent sliding resistance thanks to the double polypropylene coating.

VAPOR IN 120

BARRIER ALU NET SD1500

REINFORCING GRID
Thanks to its composition, the membrane is not affected by mechanical stress or by staples and nails.

REFLECTIVE
Thanks to its ability to reflect up to 70% of the heat, the membrane improves the thermal performance of the construction panels.

REACTION TO FIRE B-s1,d0
Self-extinguishing membrane that does not spread the flame in case of fire contributing to the protection of the structure.

COMPOSITION

top layer
functional aluminised PE film

middle layer
PE reinforcing grid

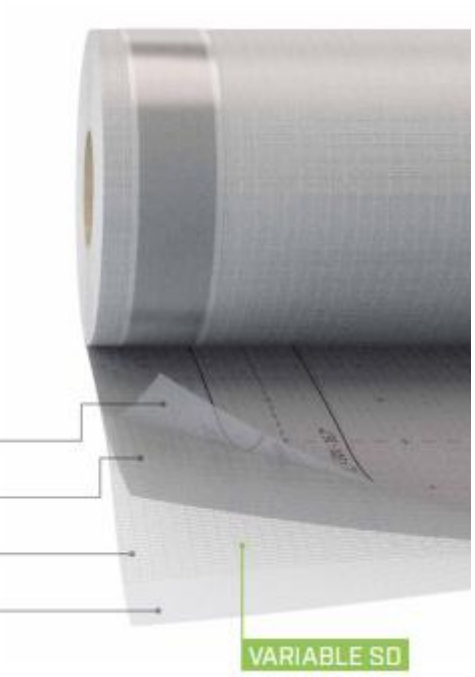
bottom layer
PE film

CLIMA CONTROL NET 160

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

ENERGY RECONDITIONING
Ideal to increase energy performance for packages and solutions for reconditioning of existing structures.

REINFORCING GRID
Thanks to its composition, the membrane is not affected by mechanical stresses caused by staples, nails or wear caused by walking.



COMPOSITION

top layer
non-woven PP fabric

reinforcing layer
PE reinforcing grid

middle layer
PA functional film

bottom layer
non-woven PP fabric

TRASPIR EVO SEAL 200

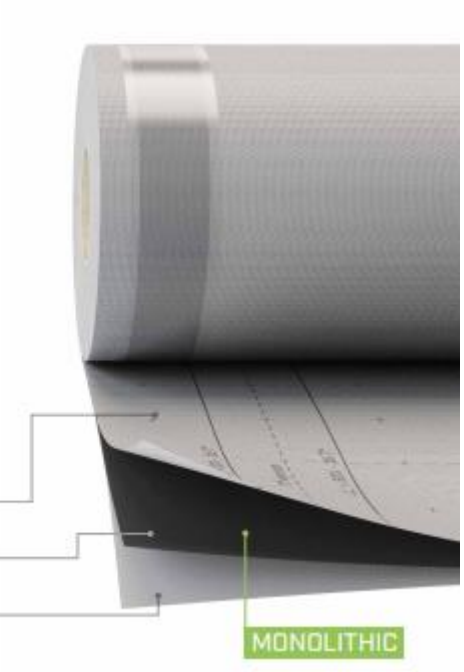
It has passed stringent tests to be classified as a screw, staple or nail puncture resistant membrane.

TIME AND COST SAVING

The oversized TPU film ensures that the membrane remains waterproof even in the event of a screw or nail puncture without the need for additional products. This means that installation is quick and time-saving.

AGEING RESISTANCE

The special functional film guarantees high durability and unaltered mechanical performance, ensuring protection and reliability.



COMPOSITION

top layer
non-woven PP fabric

middle layer
breathable monolithic PU film

bottom layer
non-woven PP fabric

TRASPIR DOUBLE EVO 340

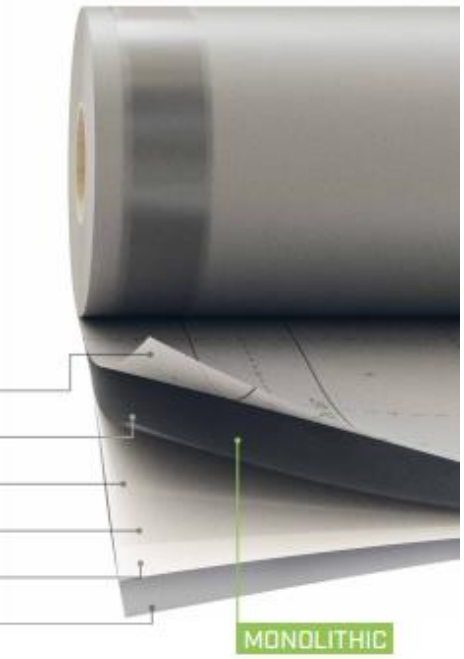
The monolithic structure of the membrane guarantees excellent durability over time, thanks to the special polymers used.

LOW PITCHES

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

DOUBLE PROTECTION

Double functional membrane for double watertightness and weather protection.



COMPOSITION

top layer
non-woven PP fabric

middle layer
breathable monolithic TPE film

middle layer
non-woven PP fabric

middle layer
non-woven PP fabric

middle layer
PP breathable film

bottom layer
non-woven PP fabric

VAPOR IN NET 140

COMPOSITION

top layer
vapour control PP film

reinforcing layer
reinforcing PP grid

bottom layer
non-woven PP fabric

Rotho Blaas Srl

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1.2. Technical data

			1	2	3	4	5	6	7
			TRASPIR EVO 220	VAPOR IN 120	BARRIER ALU NET SD1500	CLIMA CONTROL NET 160	TRASPIR EVO SEAL 200	TRASPIR DOUBLE EVO 340	VAPOR IN NET 140
Monolithic/Evo			✓			✓	✓	✓	
Microporous/Standard				✓	✓				✓
Bituminous									
Reinforcing grid					✓	✓			✓
Variable Sd						✓			
Reflective					✓				
Self-adhesive									
Permanent UV stability									
	Mass per unit area [EN 1849]	g/m2	220	120	200	160	200	340	140
	Water vapour transmission (Sd) [EN 1931]	m	0.2	30	4000	0.5 5	0.08	0.19	30
	Reaction to fire [EN 13501-1]	steel	E	E	B-s1,d0	E	E	E	E
	Maximum tensile force MD/CD [EN 12311]	N/50mm	385 315	220 180	465 495	400 270	300 220	605 455	390 360
	Elongation MD/CD [EN 12311]	%	65 80	47 68	26 19	20 20	50 70	65 80	10 16
	Resistance to nail tearing MD/CD [EN 12310]	N	345 425	160 205	400 400	240 250	260 340	415 500	280 260
	internal		✓	✓	✓	✓	✓	✓	✓
	external		✓			✓	✓	✓	
	roof		✓	✓	✓	✓	✓	✓	✓
	wall		✓	✓	✓	✓	✓	✓	✓
Waste classification (2014/955/EU)			17 02 03	17 02 03	17 09 04	17 02 03	17 02 03	17 02 03	17 02 03

1.3. Products Distribution

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:
    - 100% of the original PE film as packaging of the individual roll
    - Additional PE film and PET strips
    - Additional wooden pallets

1.4. Installation

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). No water or electrical energy is used to install the products. A 10% overlap is considered in the installation phase.

1.5. Functional unit

The functional unit is defined as 1 m^2 of membrane as described below.

Functional unit – reference flow	Mass [kg/FU]	FU [m^2][1]	Conversion factor di 1 kg
TRASPIR EVO 220	0.238	1	4.2
VAPOR IN 120	0.121	1	8.3
BARRIER ALU NET SD1500	0.203	1	4.9
CLIMA CONTROL NET 160	0.170	1	5.9
TRASPIR EVO SEAL 200	0.218	1	4.6
TRASPIR DOUBLE EVO 340	0.361	1	2.8
VAPOR IN NET 140	0.152	1	6.6

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 170 g/m^2 to 360g/m^2 depending on the product.

[1] Functional unit does not include packaging.

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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

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 m² TRASPIR EVO 220

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO_2-eq.]	8,33E-01	6,33E-03	2,09E-03	6,60E-03	9,75E-02	0	2,92E-03	7,30E-03	1,14E-01	1,49E-02	-1,28E-01
GWP fossil	[kg CO_2-eq.]	8,44E-01	6,28E-03	2,05E-03	6,58E-03	8,70E-02	0	2,89E-03	7,25E-03	1,13E-01	1,37E-02	-1,28E-01
GWP biogenic	[kg CO_2-eq.]	-1,09E-02	0	3,16E-05	0	1,05E-02	0	2,46E-05	0	1,54E-04	1,24E-03	-6,19E-04
GWP luluc	[kg CO_2-eq.]	4,09E-04	5,12E-05	1,10E-06	2,47E-05	4,88E-05	0	4,10E-06	5,95E-05	1,23E-05	1,06E-05	-4,98E-05
ODP	[kg CFC-11-eq.]	5,45E-15	1,24E-18	5,68E-18	9,62E-19	5,57E-16	0	6,93E-17	9,29E-19	1,87E-16	2,94E-17	-7,24E-16
AP	[mole of H^+-eq.]	1,60E-03	2,02E-05	4,06E-06	1,46E-04	1,66E-04	0	6,02E-06	2,06E-05	3,31E-05	3,99E-05	-2,21E-04
EP - freshwater	[kg P eq.]	1,34E-06	1,86E-08	6,20E-09	9,76E-09	1,61E-07	0	7,77E-09	2,16E-08	1,44E-07	2,53E-06	-1,53E-07
EP - marine	[kg N eq.]	3,67E-04	9,24E-06	1,17E-06	3,94E-05	3,85E-05	0	1,43E-06	9,26E-06	9,04E-06	1,22E-05	-5,65E-05
EP - terrestrial	[mole of N eq.]	3,97E-03	1,03E-04	1,26E-05	4,33E-04	4,16E-04	0	1,50E-05	1,04E-04	1,19E-04	1,05E-04	-6,05E-04
POCP	[kg NMVOC eq.]	1,55E-03	1,82E-05	3,99E-06	1,06E-04	1,61E-04	0	3,88E-06	1,84E-05	2,43E-05	3,16E-05	-2,24E-04
ADPF	[kg Sb eq.]	2,29E01	8,34E-02	1,61E-02	8,33E-02	2,29E00	0	5,15E-02	9,68E-02	2,48E-01	1,83E-01	-3,73E00
ADPE	[MJ]	1,12E-07	5,55E-10	6,05E-08	3,74E-10	3,18E-08	0	8,52E-10	5,53E-10	2,95E-09	8,56E-10	-1,69E-08
WDP	[m^3 world eq.]	1,13E-01	5,81E-05	1,76E-04	3,34E-05	1,17E-02	0	4,65E-04	6,31E-05	1,11E-02	-8,64E-05	-1,71E-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

Table 2: Environnemental impacts: 1 m² VAPOR IN 120 - VINNEN120

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO_2-eq.]	3,50E-01	3,32E-03	1,06E-03	5,49E-03	7,12E-02	0	1,48E-03	3,70E-03	1,28E-01	6,26E-03	-9,97E-02
GWP fossil	[kg CO_2-eq.]	3,60E-01	3,30E-03	1,04E-03	5,48E-03	5,73E-02	0	1,47E-03	3,67E-03	1,28E-01	5,99E-03	-9,92E-02
GWP biogenic	[kg CO_2-eq.]	-1,06E-02	0	1,60E-05	0	1,39E-02	0	1,25E-05	0	7,06E-05	2,67E-04	-4,76E-04
GWP luluc	[kg CO_2-eq.]	2,05E-04	2,69E-05	5,55E-07	1,29E-05	3,17E-05	0	2,08E-06	3,01E-05	5,47E-06	4,81E-06	-4,89E-05
ODP	[kg CFC-11-eq.]	2,91E-15	6,50E-19	2,87E-18	7,11E-19	3,45E-16	0	3,51E-17	4,70E-19	8,54E-17	1,36E-17	-7,69E-16
AP	[mole of H^+-eq.]	7,16E-04	1,06E-05	2,06E-06	1,55E-04	1,34E-04	0	3,05E-06	1,04E-05	2,23E-05	1,77E-05	-1,54E-04
EP - freshwater	[kg P eq.]	5,12E-07	9,78E-09	3,14E-09	5,54E-09	1,10E-07	0	3,93E-09	1,09E-08	6,48E-08	1,11E-06	-1,16E-07
EP - marine	[kg N eq.]	1,75E-04	4,86E-06	5,90E-07	4,05E-05	3,03E-05	0	7,25E-07	4,69E-06	5,69E-06	4,75E-06	-4,13E-05
EP - terrestrial	[mole of N eq.]	1,89E-03	5,42E-05	6,36E-06	4,44E-04	3,26E-04	0	7,61E-06	5,28E-05	8,83E-05	4,53E-05	-4,42E-04
POCP	[kg NMVOC eq.]	6,83E-04	9,58E-06	2,02E-06	1,11E-04	1,28E-04	0	1,97E-06	9,30E-06	1,58E-05	1,35E-05	-1,46E-04
ADPF	[kg Sb eq.]	1,07E01	4,38E-02	8,17E-03	6,82E-02	1,79E00	0	2,61E-02	4,90E-02	1,18E-01	8,35E-02	-2,45E00
ADPE	[MJ]	5,78E-08	2,92E-10	3,06E-08	2,56E-10	2,58E-08	0	4,31E-10	2,80E-10	1,36E-09	3,92E-10	-1,42E-08
WDP	[m^3 world eq.]	5,28E-02	3,05E-05	8,90E-05	2,05E-05	1,02E-02	0	2,35E-04	3,20E-05	1,20E-02	-5,41E-05	-1,14E-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

Table 3 - Environmental impacts: 1 m² BARRIER ALU NET SD1500

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO_2-eq.]	8,59E-01	5,39E-03	1,78E-03	5,66E-03	1,10E-01	0	2,50E-03	6,24E-03	8,48E-02	1,57E-02	-5,88E-02
GWP fossil	[kg CO_2-eq.]	8,69E-01	5,35E-03	1,75E-03	5,64E-03	1,02E-01	0	2,47E-03	6,20E-03	8,48E-02	1,35E-02	-5,85E-02
GWP biogenic	[kg CO_2-eq.]	-9,79E-03	0	2,70E-05	0	7,68E-03	0	2,10E-05	0	2,63E-05	2,18E-03	-2,94E-04
GWP luluc	[kg CO_2-eq.]	3,51E-04	4,36E-05	9,36E-07	2,11E-05	4,83E-05	0	3,50E-06	5,09E-05	2,28E-06	1,10E-05	-3,39E-05
ODP	[kg CFC-11-eq.]	4,87E-15	1,05E-18	4,85E-18	8,23E-19	5,42E-16	0	5,92E-17	7,94E-19	3,38E-17	2,73E-17	-5,48E-16
AP	[mole of H^+-eq.]	4,76E-03	1,72E-05	3,47E-06	1,26E-04	5,31E-04	0	5,15E-06	1,76E-05	1,37E-05	4,06E-05	-8,48E-05
EP - freshwater	[kg P eq.]	7,51E-07	1,58E-08	5,30E-09	8,32E-09	1,24E-07	0	6,64E-09	1,84E-08	2,36E-08	2,40E-06	-7,37E-08
EP - marine	[kg N eq.]	5,79E-04	7,87E-06	9,96E-07	3,39E-05	6,85E-05	0	1,22E-06	7,92E-06	3,67E-06	1,46E-05	-2,37E-05
EP - terrestrial	[mole of N eq.]	6,36E-03	8,79E-05	1,07E-05	3,72E-04	7,50E-04	0	1,28E-05	8,90E-05	5,81E-05	1,12E-04	-2,54E-04
POCP	[kg NMVOC eq.]	2,12E-03	1,55E-05	3,41E-06	9,16E-05	2,64E-04	0	3,32E-06	1,57E-05	1,02E-05	3,42E-05	-7,60E-05
ADPF	[kg Sb eq.]	1,94E01	7,10E-02	1,38E-02	7,14E-02	2,56E00	0	4,40E-02	8,27E-02	4,78E-02	1,69E-01	-1,31E00
ADPE	[MJ]	2,95E-03	4,73E-10	5,17E-08	3,20E-10	2,95E-04	0	7,28E-10	4,73E-10	5,36E-10	7,99E-10	-9,18E-09
WDP	[m^3 world eq.]	1,26E-01	4,95E-05	1,50E-04	2,86E-05	1,74E-02	0	3,97E-04	5,39E-05	8,04E-03	3,26E-05	-5,97E-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 4 - Environnental impacts: 1 m² CLIMA CONTROL NET 160

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO_2-eq.]	9,24E-01	4,53E-03	1,49E-03	6,36E-03	1,19E-01	0	2,08E-03	5,20E-03	6,58E-02	1,43E-02	-7,65E-02
GWP fossil	[kg CO_2-eq.]	9,30E-01	4,50E-03	1,46E-03	6,34E-03	1,10E-01	0	2,06E-03	5,17E-03	6,57E-02	1,21E-02	-7,60E-02
GWP biogenic	[kg CO_2-eq.]	-6,45E-03	0	2,25E-05	0	9,06E-03	0	1,75E-05	0	7,56E-05	2,21E-03	-4,03E-04
GWP luluc	[kg CO_2-eq.]	3,87E-04	3,66E-05	7,81E-07	1,77E-05	5,10E-05	0	2,92E-06	4,24E-05	5,72E-06	8,68E-06	-3,12E-05
ODP	[kg CFC-11-eq.]	4,56E-15	8,85E-19	4,05E-18	8,55E-19	5,11E-16	0	4,94E-17	6,62E-19	8,82E-17	2,30E-17	-4,51E-16
AP	[mole of H^+-eq.]	1,41E-03	1,45E-05	2,89E-06	1,67E-04	1,98E-04	0	4,29E-06	1,47E-05	5,04E-05	3,42E-05	-1,16E-04
EP - freshwater	[kg P eq.]	1,13E-06	1,33E-08	4,42E-09	7,34E-09	1,65E-07	0	5,53E-09	1,54E-08	8,29E-08	2,22E-06	-8,19E-08
EP - marine	[kg N eq.]	4,09E-04	6,61E-06	8,31E-07	4,41E-05	5,23E-05	0	1,02E-06	6,60E-06	2,18E-05	1,30E-05	-3,23E-05
EP - terrestrial	[mole of N eq.]	4,05E-03	7,39E-05	8,95E-06	4,83E-04	5,26E-04	0	1,07E-05	7,43E-05	2,50E-04	9,45E-05	-3,30E-04
POCP	[kg NMVOC eq.]	1,33E-03	1,30E-05	2,84E-06	1,21E-04	1,87E-04	0	2,77E-06	1,31E-05	5,61E-05	2,93E-05	-1,11E-04
ADPF	[kg Sb eq.]	2,01E01	5,97E-02	1,15E-02	7,93E-02	2,66E00	0	3,67E-02	6,90E-02	1,35E-01	1,48E-01	-1,85E00
ADPE	[MJ]	1,12E-07	3,97E-10	4,31E-08	3,16E-10	3,23E-08	0	6,07E-10	3,94E-10	1,63E-09	6,86E-10	-1,01E-08
WDP	[m^3 world eq.]	5,98E-02	4,16E-05	1,25E-04	2,64E-05	1,07E-02	0	3,31E-04	4,50E-05	6,63E-03	-1,01E-05	-6,55E-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 5 - Environmental impacts: 1 m² TRASPIR EVO SEAL 200

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO_2-eq.]	8,10E-01	5,76E-03	1,90E-03	6,84E-03	9,51E-02	0	2,67E-03	6,66E-03	2,04E-01	1,18E-02	-1,58E-01
GWP fossil	[kg CO_2-eq.]	8,19E-01	5,72E-03	1,87E-03	6,81E-03	8,30E-02	0	2,64E-03	6,62E-03	2,04E-01	1,02E-02	-1,57E-01
GWP biogenic	[kg CO_2-eq.]	-9,02E-03	0	2,88E-05	0	1,20E-02	0	2,25E-05	0	1,36E-04	1,61E-03	-7,38E-04
GWP luluc	[kg CO_2-eq.]	4,75E-04	4,66E-05	1,00E-06	2,25E-05	5,48E-05	0	3,74E-06	5,43E-05	1,14E-05	7,52E-06	-7,84E-05
ODP	[kg CFC-11-eq.]	5,64E-15	1,13E-18	5,18E-18	9,60E-19	5,75E-16	0	6,33E-17	8,48E-19	1,69E-16	2,02E-17	-1,19E-15
AP	[mole of H^+-eq.]	3,55E-03	1,84E-05	3,71E-06	1,65E-04	3,59E-04	0	5,50E-06	1,88E-05	4,41E-05	2,92E-05	-2,45E-04
EP - freshwater	[kg P eq.]	1,60E-06	1,69E-08	5,66E-09	9,08E-09	1,89E-07	0	7,09E-09	1,97E-08	1,25E-07	1,89E-06	-2,00E-07
EP - marine	[kg N eq.]	4,75E-04	8,41E-06	1,06E-06	4,39E-05	4,90E-05	0	1,31E-06	8,46E-06	1,22E-05	1,05E-05	-6,62E-05
EP - terrestrial	[mole of N eq.]	5,38E-03	9,40E-05	1,15E-05	4,81E-04	5,55E-04	0	1,37E-05	9,51E-05	1,74E-04	7,96E-05	-7,09E-04
POCP	[kg NMVOC eq.]	1,84E-03	1,66E-05	3,64E-06	1,19E-04	1,89E-04	0	3,54E-06	1,68E-05	3,32E-05	2,45E-05	-2,35E-04
ADPF	[kg Sb eq.]	2,10E01	7,59E-02	1,47E-02	8,58E-02	2,10E00	0	4,70E-02	8,83E-02	2,29E-01	1,29E-01	-3,88E00
ADPE	[MJ]	1,64E-04	5,05E-10	5,52E-08	3,65E-10	1,64E-05	0	7,77E-10	5,05E-10	2,67E-09	5,98E-10	-2,23E-08
WDP	[m^3 world eq.]	1,40E-01	5,29E-05	1,60E-04	3,17E-05	1,45E-02	0	4,24E-04	5,76E-05	1,98E-02	-2,40E-05	-1,87E-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

Table 6 - Environmental impacts: 1 m² TRASPIR DOUBLE EVO 340

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO_2-eq.]	1,49E00	9,62E-03	3,16E-03	1,11E-02	1,72E-01	0	4,43E-03	1,11E-02	3,01E-01	2,01E-02	-2,49E-01
GWP fossil	[kg CO_2-eq.]	1,50E00	9,56E-03	3,11E-03	1,10E-02	1,52E-01	0	4,39E-03	1,10E-02	3,01E-01	1,79E-02	-2,48E-01
GWP biogenic	[kg CO_2-eq.]	-1,54E-02	0	4,79E-05	0	1,95E-02	0	3,73E-05	0	2,16E-04	2,15E-03	-1,20E-03
GWP luluc	[kg CO_2-eq.]	7,24E-04	7,79E-05	1,66E-06	3,76E-05	8,42E-05	0	6,21E-06	9,02E-05	1,83E-05	1,36E-05	-1,17E-04
ODP	[kg CFC-11-eq.]	8,75E-15	1,88E-18	8,60E-18	1,57E-18	8,93E-16	0	1,05E-16	1,41E-18	2,70E-16	3,72E-17	-1,80E-15
AP	[mole of H^+-eq.]	2,67E-03	3,07E-05	6,15E-06	2,62E-04	2,72E-04	0	9,13E-06	3,12E-05	6,55E-05	5,18E-05	-3,89E-04
EP - freshwater	[kg P eq.]	2,59E-06	2,83E-08	9,40E-09	1,51E-08	3,20E-07	0	1,18E-08	3,27E-08	1,99E-07	3,31E-06	-3,02E-07
EP - marine	[kg N eq.]	6,14E-04	1,41E-05	1,77E-06	7,00E-05	6,32E-05	0	2,17E-06	1,40E-05	1,78E-05	1,70E-05	-1,03E-04
EP - terrestrial	[mole of N eq.]	6,65E-03	1,57E-04	1,90E-05	7,68E-04	6,84E-04	0	2,28E-05	1,58E-04	2,56E-04	1,38E-04	-1,10E-03
POCP	[kg NMVOC eq.]	2,57E-03	2,77E-05	6,05E-06	1,90E-04	2,64E-04	0	5,88E-06	2,78E-05	4,85E-05	4,21E-05	-3,75E-04
ADPF	[kg Sb eq.]	3,74E01	1,27E-01	2,44E-02	1,39E-01	3,69E00	0	7,80E-02	1,47E-01	3,61E-01	2,34E-01	-6,26E00
ADPE	[MJ]	1,84E-07	8,44E-10	9,17E-08	6,00E-10	4,21E-08	0	1,29E-09	8,38E-10	4,25E-09	1,09E-09	-3,49E-08
WDP	[m^3 world eq.]	1,98E-01	8,84E-05	2,66E-04	5,25E-05	2,08E-02	0	7,04E-04	9,56E-05	2,91E-02	-8,26E-05	-2,75E-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

Table 7 - Environmental impacts: 1 m² VAPOR IN NET 140

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO_2-eq.]	4,29E-01	4,14E-03	1,33E-03	7,34E-03	7,73E-02	0	1,87E-03	4,67E-03	1,04E-01	9,58E-03	-7,76E-02
GWP fossil	[kg CO_2-eq.]	4,40E-01	4,11E-03	1,31E-03	7,32E-03	6,26E-02	0	1,85E-03	4,64E-03	1,04E-01	9,47E-03	-7,71E-02
GWP biogenic	[kg CO_2-eq.]	-1,16E-02	0	2,02E-05	0	1,47E-02	0	1,57E-05	0	4,64E-05	9,95E-05	-3,78E-04
GWP luluc	[kg CO_2-eq.]	1,99E-04	3,35E-05	7,00E-07	1,61E-05	3,19E-05	0	2,62E-06	3,81E-05	3,65E-06	7,81E-06	-4,08E-05
ODP	[kg CFC-11-eq.]	2,99E-15	8,08E-19	3,63E-18	9,38E-19	3,54E-16	0	4,43E-17	5,94E-19	5,68E-17	2,23E-17	-6,51E-16
AP	[mole of H^+-eq.]	8,85E-04	1,32E-05	2,60E-06	2,11E-04	1,48E-04	0	3,85E-06	1,31E-05	1,65E-05	2,82E-05	-1,16E-04
EP - freshwater	[kg P eq.]	5,46E-07	1,22E-08	3,96E-09	7,02E-09	1,16E-07	0	4,96E-09	1,38E-08	4,22E-08	1,75E-06	-9,28E-08
EP - marine	[kg N eq.]	2,26E-04	6,04E-06	7,45E-07	5,52E-05	3,47E-05	0	9,15E-07	5,92E-06	4,08E-06	6,85E-06	-3,18E-05
EP - terrestrial	[mole of N eq.]	2,44E-03	6,75E-05	8,02E-06	6,05E-04	3,73E-04	0	9,60E-06	6,66E-05	6,67E-05	7,10E-05	-3,40E-04
POCP	[kg NMVOC eq.]	8,71E-04	1,19E-05	2,55E-06	1,52E-04	1,44E-04	0	2,48E-06	1,17E-05	1,14E-05	2,09E-05	-1,08E-04
ADPF	[kg Sb eq.]	1,35E01	5,45E-02	1,03E-02	9,10E-02	2,03E00	0	3,29E-02	6,19E-02	7,87E-02	1,36E-01	-1,83E00
ADPE	[MJ]	6,18E-08	3,63E-10	3,87E-08	3,34E-10	2,69E-08	0	5,44E-10	3,54E-10	9,03E-10	6,40E-10	-1,15E-08
WDP	[m^3 world eq.]	7,88E-02	3,80E-05	1,12E-04	2,64E-05	1,28E-02	0	2,97E-04	4,04E-05	9,77E-03	-1,05E-04	-8,43E-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

LCA results – Resource use per functional unit

Table 8 - Resource use: 1 m² TRASPIR EVO 220

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	1,29E00	4,80E-03	-1,13E-04	2,46E-03	1,40E-01	0	2,37E-02	5,40E-03	6,43E-02	1,30E-02	-2,48E-01
PERM	[MJ]	1,30E-01	0	2,56E-02	0	9,84E-03	0	0	0	0	0	0
PERT	[MJ]	1,42E00	4,80E-03	2,55E-02	2,46E-03	1,49E-01	0	2,37E-02	5,40E-03	6,43E-02	1,30E-02	-2,48E-01
PENRE	[MJ]	1,27E01	8,37E-02	1,19E-02	8,35E-02	1,30E00	0	5,15E-02	9,69E-02	1,29E00	1,83E-01	-3,73E00
PENRM	[MJ]	1,02E01	0	4,28E-03	0	9,89E-01	0	0	0	-1,05E00	0	0
PENRT	[MJ]	2,29E01	8,37E-02	1,61E-02	8,35E-02	2,29E00	0	5,15E-02	9,69E-02	2,48E-01	1,83E-01	-3,73E00
SM	[kg]	6,60E-04	0	0	0	1,43E-04	0	0	0	0	0	0
RSF[2]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF[2]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	3,81E-03	5,50E-06	5,26E-06	2,89E-06	3,92E-04	0	2,31E-05	6,18E-06	2,93E-04	3,13E-06	-5,53E-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

[2] Reference to only foreground system

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Banca: UniCredit SpA | Piazza Walther 4 | 39100 Bolzano | Italia | IBAN: IT08Y0200811600000030088887 | BIC: UNCRITM1965

Table 9 - Resource use: 1 m² VAPOR IN 120 (1,5 m)

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	6,75E-01	2,52E-03	-5,74E-05	1,36E-03	1,08E-01	0	1,20E-02	2,73E-03	2,97E-02	5,99E-03	-2,66E-01
PERM	[MJ]	1,25E-01	0	1,30E-02	0	-3,08E-03	0	0	0	0	0	0
PERT	[MJ]	8,00E-01	2,52E-03	1,29E-02	1,36E-03	1,05E-01	0	1,20E-02	2,73E-03	2,97E-02	5,99E-03	-2,66E-01
PENRE	[MJ]	5,17E00	4,40E-02	6,01E-03	6,84E-02	8,48E-01	0	2,61E-02	4,91E-02	1,66E00	8,35E-02	-2,45E00
PENRM	[MJ]	5,58E00	0	2,17E-03	0	9,43E-01	0	0	0	-1,55E00	0	0
PENRT	[MJ]	1,07E01	4,40E-02	8,17E-03	6,84E-02	1,79E00	0	2,61E-02	4,91E-02	1,18E-01	8,35E-02	-2,45E00
SM	[kg]	3,30E-04	0	0	0	1,10E-04	0	0	0	0	0	0
RSF[3]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF[3]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	1,57E-03	2,89E-06	2,66E-06	1,64E-06	2,71E-04	0	1,17E-05	3,13E-06	2,96E-04	1,11E-06	-4,04E-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

[3] Reference to only foreground system

Table 10 - Resource use: 1 m² BARRIER ALU NET SD1500

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	2,57E00	4,09E-03	-9,68E-05	2,10E-03	2,84E-01	0	2,03E-02	4,61E-03	1,16E-02	1,22E-02	-1,88E-01
PERM	[MJ]	9,85E-02	0	2,19E-02	0	9,81E-03	0	0	0	0	0	0
PERT	[MJ]	2,67E00	4,09E-03	2,18E-02	2,10E-03	2,94E-01	0	2,03E-02	4,61E-03	1,16E-02	1,22E-02	-1,88E-01
PENRE	[MJ]	1,23E01	7,13E-02	1,01E-02	7,15E-02	1,48E00	0	4,40E-02	8,28E-02	1,09E00	1,69E-01	-1,31E00
PENRM	[MJ]	7,10E00	0	3,65E-03	0	1,08E00	0	0	0	-1,04E00	0	0
PENRT	[MJ]	1,94E01	7,13E-02	1,38E-02	7,15E-02	2,56E00	0	4,40E-02	8,28E-02	4,78E-02	1,69E-01	-1,31E00
SM	[kg]	5,50E-04	0	0	0	1,32E-04	0	0	0	0	0	0
RSF[4]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF[4]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	6,79E-03	4,68E-06	4,50E-06	2,46E-06	7,84E-04	0	1,97E-05	5,28E-06	1,93E-04	5,58E-06	-2,40E-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

[4] Reference to only foreground system

Table 11 - Resource use: 1 m² CLIMA CONTROL NET 160

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	1,07E00	3,43E-03	-8,07E-05	1,83E-03	1,34E-01	0	1,69E-02	3,85E-03	3,13E-02	1,03E-02	-1,49E-01
PERM	[MJ]	9,85E-02	0	1,83E-02	0	8,92E-03	0	0	0	0	0	0
PERT	[MJ]	1,17E00	3,43E-03	1,82E-02	1,83E-03	1,43E-01	0	1,69E-02	3,85E-03	3,13E-02	1,03E-02	-1,49E-01
PENRE	[MJ]	1,31E01	5,99E-02	8,46E-03	7,95E-02	1,58E00	0	3,67E-02	6,91E-02	8,08E-01	1,48E-01	-1,85E00
PENRM	[MJ]	7,05E00	0	3,05E-03	0	1,08E00	0	0	0	-6,72E-01	0	0
PENRT	[MJ]	2,01E01	5,99E-02	1,15E-02	7,95E-02	2,66E00	0	3,67E-02	6,91E-02	1,36E-01	1,48E-01	-1,85E00
SM	[kg]	5,50E-04	0	0	0	1,32E-04	0	0	0	0	0	0
RSF[5]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF[5]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2,76E-03	3,93E-06	3,75E-06	2,18E-06	3,83E-04	0	1,65E-05	4,41E-06	1,71E-04	3,79E-06	-2,66E-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

[5] Reference to only foreground system

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Table 12 - Resource use: 1 m² TRASPIR EVO SEAL 200

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	1,49E00	4,37E-03	-1,03E-04	2,28E-03	1,71E-01	0	2,17E-02	4,93E-03	5,81E-02	9,00E-03	-4,10E-01
PERM	[MJ]	1,07E-01	0	2,34E-02	0	-4,57E-03	0	0	0	0	0	0
PERT	[MJ]	1,60E00	4,37E-03	2,33E-02	2,28E-03	1,67E-01	0	2,17E-02	4,93E-03	5,81E-02	9,00E-03	-4,10E-01
PENRE	[MJ]	1,11E01	7,62E-02	1,08E-02	8,60E-02	1,12E00	0	4,70E-02	8,84E-02	2,53E00	1,29E-01	-3,88E00
PENRM	[MJ]	9,99E00	0	3,90E-03	0	9,74E-01	0	0	0	-2,30E00	0	0
PENRT	[MJ]	2,11E01	7,62E-02	1,47E-02	8,60E-02	2,10E00	0	4,70E-02	8,84E-02	2,29E-01	1,29E-01	-3,88E00
SM	[kg]	0	0	0	0	7,68E-05	0	0	0	0	0	0
RSF[6]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF[6]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	4,57E-03	5,00E-06	4,80E-06	2,69E-06	4,69E-04	0	2,11E-05	5,64E-06	4,91E-04	2,97E-06	-6,54E-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

[6] Reference to only foreground system

Table 13 - Resource use: 1 m² TRASPIR DOUBLE EVO 340

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	2,14E00	7,30E-03	-1,72E-04	3,79E-03	2,47E-01	0	3,60E-02	8,18E-03	9,23E-02	1,65E-02	-6,15E-01
PERM	[MJ]	1,89E-01	0	3,88E-02	0	-3,32E-03	0	0	0	0	0	0
PERT	[MJ]	2,33E00	7,30E-03	3,86E-02	3,79E-03	2,44E-01	0	3,60E-02	8,18E-03	9,23E-02	1,65E-02	-6,15E-01
PENRE	[MJ]	2,12E01	1,27E-01	1,80E-02	1,40E-01	2,15E00	0	7,80E-02	1,47E-01	3,61E00	2,34E-01	-6,26E00
PENRM	[MJ]	1,62E01	0	6,48E-03	0	1,55E00	0	0	0	-3,25E00	0	0
PENRT	[MJ]	3,74E01	1,27E-01	2,45E-02	1,40E-01	3,70E00	0	7,80E-02	1,47E-01	3,61E-01	2,34E-01	-6,26E00
SM	[kg]	5,50E-04	0	0	0	1,32E-04	0	0	0	0	0	0
RSF[7]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF[7]	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	6,89E-03	8,36E-06	7,97E-06	4,46E-06	7,11E-04	0	3,50E-05	9,36E-06	7,26E-04	4,58E-06	-1,01E-03

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

[7] Reference to only foreground system

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Table 14 - Resource use: 1 m² VAPOR IN NET 140

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	7,28E-01	3,14E-03	-7,24E-05	1,72E-03	1,13E-01	0	1,52E-02	3,45E-03	1,97E-02	9,82E-03	-2,25E-01
PERM	[MJ]	1,29E-01	0	1,64E-02	0	-1,46E-03	0	0	0	0	0	0
PERT	[MJ]	8,57E-01	3,14E-03	1,63E-02	1,72E-03	1,12E-01	0	1,52E-02	3,45E-03	1,97E-02	9,82E-03	-2,25E-01
PENRE	[MJ]	6,58E00	5,47E-02	7,59E-03	9,12E-02	9,51E-01	0	3,29E-02	6,19E-02	1,39E00	1,36E-01	-1,83E00
PENRM	[MJ]	6,96E00	0	2,73E-03	0	1,08E00	0	0	0	-1,31E00	0	0
PENRT	[MJ]	1,35E01	5,47E-02	1,03E-02	9,12E-02	2,03E00	0	3,29E-02	6,19E-02	7,87E-02	1,36E-01	-1,83E00
SM	[kg]	5,50E-04	0	0	0	1,32E-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]	2,05E-03	3,59E-06	3,36E-06	2,08E-06	3,15E-04	0	1,48E-05	3,95E-06	2,38E-04	1,46E-06	-3,14E-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

LCA results – Output flows and waste categories per functional unit

Table 15 - Output flows and waste categories: 1 m² TRASPIR EVO 220

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	3,90E-09	4,41E-12	6,98E-11	2,46E-12	3,94E-10	0	1,36E-11	4,88E-12	5,24E-11	3,29E-11	-7,72E-10
NHWD	[kg]	3,32E-02	1,31E-05	5,75E-04	1,07E-05	6,19E-03	0	3,65E-05	1,44E-05	4,93E-03	1,76E-01	-9,14E-04
RWD	[kg]	3,03E-04	1,52E-07	3,86E-07	1,21E-07	3,16E-05	0	7,67E-06	1,17E-07	2,06E-05	2,02E-06	-7,91E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	8,69E-04	0	0	0	4,44E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	7,86E-03	0	0	0	1,77E-01	0	0
EET	[MJ]	0	0	0	0	1,01E-02	0	0	0	3,24E-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 16 - Output flows and waste categories: 1 m² VAPOR IN 120 - VINNEN120

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	1,62E-09	2,32E-12	3,54E-11	1,47E-12	4,06E-10	0	6,89E-12	2,47E-12	2,44E-11	1,50E-11	-5,00E-10
NHWD	[kg]	2,02E-02	6,90E-06	2,91E-04	8,04E-06	5,76E-03	0	1,85E-05	7,29E-06	1,84E-03	8,00E-02	-7,26E-04
RWD	[kg]	1,44E-04	7,98E-08	1,96E-07	9,07E-08	2,58E-05	0	3,88E-06	5,93E-08	9,67E-06	9,44E-07	-8,59E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	5,47E-04	0	0	0	1,98E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	8,01E-03	0	0	0	2,45E-01	0	0
EET	[MJ]	0	0	0	0	9,69E-03	0	0	0	4,33E-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 17 - Output flows and waste categories: 1 m² BARRIER ALU NET SD1500

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	2,93E-09	3,76E-12	5,97E-11	2,10E-12	5,16E-10	0	1,16E-11	4,17E-12	9,72E-12	2,97E-11	-2,16E-10
NHWD	[kg]	1,02E-01	1,12E-05	4,91E-04	9,12E-06	1,26E-02	0	3,12E-05	1,23E-05	1,41E-03	1,91E-01	-4,93E-04
RWD	[kg]	4,52E-04	1,29E-07	3,30E-07	1,04E-07	5,69E-05	0	6,55E-06	1,00E-07	3,72E-06	1,77E-06	-6,03E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	7,66E-04	0	0	0	6,95E-03	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	6,51E-03	0	0	0	1,73E-01	0	0
EET	[MJ]	0	0	0	0	8,63E-03	0	0	0	2,94E-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

Tabel 18 - Output flows and waste categories: 1 m² CLIMA CONTROL NET 160

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	5,44E-09	3,16E-12	4,98E-11	1,91E-12	7,74E-10	0	9,70E-12	3,48E-12	2,68E-11	2,65E-11	-3,92E-10
NHWD	[kg]	1,66E-02	9,40E-06	4,10E-04	9,61E-06	4,35E-03	0	2,60E-05	1,03E-05	2,07E-03	1,44E-01	-5,04E-04
RWD	[kg]	2,32E-04	1,09E-07	2,75E-07	1,09E-07	3,47E-05	0	5,47E-06	8,35E-08	1,04E-05	1,54E-06	-4,52E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	6,72E-04	0	0	0	2,21E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	6,16E-03	0	0	0	1,08E-01	0	0
EET	[MJ]	0	0	0	0	7,67E-03	0	0	0	1,83E-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 19: Output flows and waste categories: 1 m² TRASPIR EVO SEAL 200

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	4,89E-08	4,02E-12	6,37E-11	2,32E-12	4,89E-09	0	1,24E-11	4,46E-12	4,78E-11	2,31E-11	-9,15E-10
NHWD	[kg]	5,78E-02	1,20E-05	5,25E-04	1,07E-05	8,84E-03	0	3,33E-05	1,31E-05	6,13E-03	1,25E-01	-1,18E-03
RWD	[kg]	3,27E-04	1,38E-07	3,53E-07	1,21E-07	3,39E-05	0	7,00E-06	1,07E-07	1,85E-05	1,36E-06	-1,32E-04
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	5,29E-04	0	0	0	3,79E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	8,58E-03	0	0	0	3,70E-01	0	0
EET	[MJ]	0	0	0	0	1,14E-02	0	0	0	6,62E-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 m² TRASPIR DOUBLE EVO 340

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	9,22E-09	6,71E-12	1,06E-10	3,84E-12	9,16E-10	0	2,06E-11	7,40E-12	7,56E-11	4,20E-11	-1,33E-09
NHWD	[kg]	5,38E-02	2,00E-05	8,71E-04	1,75E-05	1,11E-02	0	5,53E-05	2,18E-05	9,61E-03	2,26E-01	-1,83E-03
RWD	[kg]	5,11E-04	2,31E-07	5,85E-07	1,98E-07	5,32E-05	0	1,16E-05	1,78E-07	2,92E-05	2,54E-06	-1,96E-04
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	1,72E-03	0	0	0	6,02E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	1,83E-02	0	0	0	5,40E-01	0	0
EET	[MJ]	0	0	0	0	2,61E-02	0	0	0	9,77E-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 21 - Output flows and waste categories: 1 m² VAPOR IN NET 140

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	1,66E-09	2,88E-12	4,46E-11	1,88E-12	4,02E-10	0	8,70E-12	3,12E-12	1,63E-11	2,44E-11	-3,35E-10
NHWD	[kg]	1,69E-02	8,59E-06	3,67E-04	1,06E-05	5,67E-03	0	2,33E-05	9,20E-06	1,23E-03	1,30E-01	-6,06E-04
RWD	[kg]	1,98E-04	9,93E-08	2,47E-07	1,20E-07	3,13E-05	0	4,90E-06	7,49E-08	6,41E-06	1,56E-06	-7,23E-05
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	6,01E-04	0	0	0	1,28E-02	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	0	0	0	0	8,00E-03	0	0	0	2,05E-01	0	0
EET	[MJ]	0	0	0	0	9,32E-03	0	0	0	3,63E-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

Biogenic C Content

Table 22- Biogenic carbon content of product and packaging: 1 m² TRASPIR EVO 220

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3,1E-003	0	6,1E-004	0	3,7E-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

Table 23- Biogenic carbon content of product and packaging: 1 m2 VAPOR IN 120 - VINNEN120

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3,0E-003	0	3,1E-004	0	3,3E-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

. Table 24 - Biogenic carbon content of product and packaging: 1 m² BARRIER ALU NET SD1500

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	2,3E-003	0	5,2E-004	0	2,9E-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

Table 25 - Biogenic carbon content of product and packaging: 1 m² CLIMA CONTROL NET 160

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	2,3E-003	0	4,3E-004	0	2,8E-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

Table 26 -Biogenic carbon content of product and packaging: 1 m² TRASPIR EVO SEAL 200

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	2,5E-003	0	5,5E-004	0	3,1E-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

Table 27 - Biogenic carbon content of product and packaging: 1 m² TRASPIR DOUBLE EVO 340

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	4,5E-003	0	9,2E-004	0	5,4E-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

Table 28 - Biogenic carbon content of product and packaging: 1 m² VAPOR IN NET 140

Para-meter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3,1E-003	0	3,9E-004	0	3,4E-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

Calculation rules

Assumptions

Where possible, a conservative approach has been adopted, overestimating burdens to prove irrelevance. In other cases, alternatives 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 Wold 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. For the polypropylene-based textile (coloured) material, 5% pigment is assumed (as no precise composition value was available).
8. PET band amount as additional packaging added by Rothoblaas is assumed to be 50 g per pallet.
9. When a specific distribution scenario (A4) was unavailable, a scenario of a similar product has been considered.
10. Product containing aluminium foil inside (i.e. BARRIER ALU NET SD1500 product) assumed as not recyclable at the end of life.
11. 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.
12. We assume that supplier packaging waste are raw materials' packaging and they are also input in the manufacturing process.
13. We assume that the aluminium foil used in the product BARRIER ALU NET SD1500 is made of primary aluminium.
14. Distance to disposal site after demolition is assumed to be 100 km.

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.

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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%*Supplier packaging + Rothoblaas PET packaging
Cardboard packaging	66.5%*Supplier packaging

Products rolls areas

Product	Height [m]	Length [m]	Membrane area [m2]
TRASPIR EVO 220	1.5	50	75
VAPOR IN 120	1.5	50	75
BARRIER ALU NET SD1500	1.5	50	75
CLIMA CONTROL NET 160	1.5	50	75
TRASPIR EVO SEAL 200	1.5	50	75
TRASPIR DOUBLE EVO 340	1.5	25	37.5
VAPOR IN NET 140	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:

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Product	IT	EU	Truck [km]	Ship [km]
TRASPIR EVO 220	74%	10%	834	1042
VAPOR IN 120	16%	60%	961	1554
BARRIER ALU NET SD1500	84%	0%	357	1052
CLIMA CONTROL NET 160	70%	4%	685	1710
TRASPIR EVO SEAL 200	20%	60%	1013	1304
TRASPIR DOUBLE EVO 340	30%	51%	771	1239
VAPOR IN NET 140	10%	53%	930	2412

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

Installation		
Material	**Amount**	**Note**
Stainless steel clips	0.10 g/m^2	For all products
Adhesive band	28 g for 1 m of membrane's length. 28/1000/(height*2) kg/m^2	Only for products not having the double tape
Adhesive band (1.5 m height)	28/1000/1.5*2 = 0.00933 kg/m^2	Only for products not having the double tape
Adhesive band (3 m height)	28/1000/3*2 = 0.00466 kg/m^2	Only for products not having the double tape

- 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 C2, 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.

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[8]/16.2[9]*36%=28%	26%	0
Incineration	3.7[10]/16.2*36%=8%	47.5%	0
Landfill	64%	26.5%	100%

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

[8] Recycling percentage for B&C waste in Italy /PLASTIC WASTE FROM B&C IN EU 2018/

[9] Recycling + Energy recovery for B&C waste in Italy /PLASTIC WASTE FROM B&C IN EU 2018/

[10] Energy recovery for B&C waste in Italy /PLASTIC WASTE FROM B&C IN EU 2018/

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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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