

POLYGLASS®



**REOXTHENE
TECHNOLOGY®**
WATERPROOFING MEMBRANE WITH REVOLUTIONARY TECHNOLOGY

ENVIRONMENTAL PRODUCT DECLARATION

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

Polyflex Light Evolution P

Programme:	The International EPD® System; www.environdec.com
Programme operator:	EPD International AB
EPD registration number:	S-P-06507
Publication date:	2022-10-14
Revision date:	2023-09-12
Valid until:	2027-10-13
Geographical scope:	International

1. COMPANY DESCRIPTION / GOAL & SCOPE

The Company's headquarter is located in Ponte di Piave, Treviso (Italy). Over 90.000 m² of surface, 25.000 m² covered, 4 production lines of polymer-bitumen membranes, one production line of thermal and acoustic insulation systems and two production lines of synthetic PVC-P and TPO/FPO membranes.

In October 2008 Polyglass was taken over by the MAPEI Group, an international Company in the chemical industry for construction, with 84 production plants in 5 continents, in 36 countries.

Polyglass SpA is ISO 14001 certified since 2010 and ISO 9001 since 1995.

The goal of the study is to provide necessary data and documentation to produce an EPD according to the requirements of PCR Environdec (version 1.11, 2021-02-05) under EN 15804:2012+A2:2019/AC:2021 and to have more comprehension about the environmental impacts related to **Polyflex Light Evolution P** manufactured in Polyglass SpA located in Ponte di Piave (TV-Italy), including packaging of the finished product.

Target audiences of the study are customers and other parties with an interest in the environmental impacts of **Polyflex Light Evolution P**.

This analysis shall not support comparative assertions intended to be disclosed to the public.



Figure 1: Polyglass S.p.A. head quarter

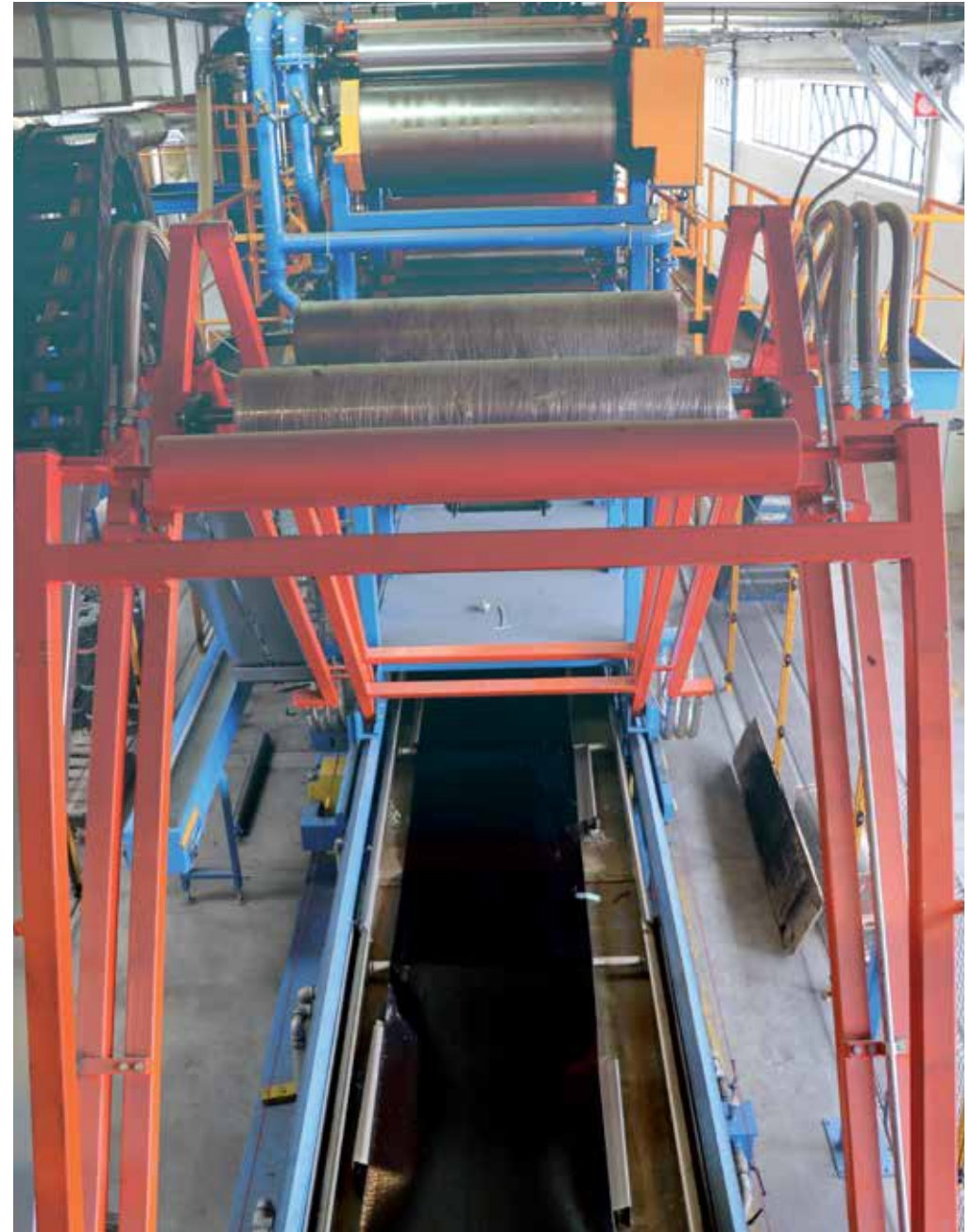


Figure 2: Production equipment

2. PRODUCT DESCRIPTION

Polyflex Light Evolution P is an elastoplastomeric (BPP) prefabricated membrane able to give excellent performances and flexible values also at low temperatures, thanks to the presence of a major percentage of high-performance polymers e.g. polypropylene (APP) and polyolefin (APAO). Its special composition allows to obtain unique weight/thickness rates. The **Polyflex Light Evolution P** contains anti-aging additives, and it is reinforced with polyester and longitudinal glass wires. The upper side is faced with natural or coloured ceramic-coated slate chippings.

Polyflex Light Evolution P is compliant with European legislation and it is sold with different packaging, as follow:

- Pallet: 14 rolls per pallet
- Length of rolls: 8 m
- Width of rolls: 1 m



Figure 3: Polyflex Light Evolution P G F

3. CONTENT DECLARATION

The main components and ancillary materials of **Polyflex Light Evolution P** are the following:

Table 1: Composition

Materials	Percentage (%)
Bitumen	50 - 70
Polymers	10 - 20 (5-10% recycled post-consumer)
Filler	10 - 20
Reinforcing material	0 - 5
Other additives	0 - 2
Packaging Materials	Percentage (%)
Wood	< 0,5
Plastic	< 0,5

The product does not contain a concentration higher than 0,1% (by unit weight) of either carcinogenic substances or substances of very high concern (SVHC) on the REACH Candidate List published by the European Chemicals Agency.

4. DECLARED UNIT AND REFERENCE SERVICE LIFE

The declared unit is 1 m² of packaged finished product having a 4 mm thickness (areic mass: 4,6 kg/m²).

Packaging materials include:

- Wooden pallet
- LDPE and PPL used as wrapping material

The reference service life of the roofing membrane, according to Polyglass experience, is estimated at least 30 years, if professionally installed and properly used.

System Boundaries & additional technical information

The approach is a "cradle to gate" with options, modules A1-A3 + A4-A5 + C + D;

The following modules have been considered:

- A1 - A3 (Product stage): extraction and transport of raw materials, packaging included production process.
- A4 - A5 (Construction process stage): transport of the finished product to final customers and installation into the building with the incineration of the packaging material.
- C1 - C4 (End of life stage): collection rate of 100% as C&D waste, considering an end-of-life scenario with recycling, incineration, and disposal.
- D (Resource recovery stage): benefits and loads of energy recovery and recycling of installation and demolition wastes are considered.

Table 2: System boundaries

	Product stage			Construction process stage		Use stage							End of life stage			Resource recovery stage		
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential	
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
Modules declared	X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X	
Geography	EU, IT	EU, IT	IT	EU	EU	-	-	-	-	-	-	-	EU, IT	EU, IT	EU	EU	EU	
Specific data	> 90%					-	-	-	-	-	-	-	-	-	-	-	-	
Variation - products	Not-relevant					-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	Not-relevant					-	-	-	-	-	-	-	-	-	-	-	-	-

A brief description of production process is the following:

The bituminous membrane production is an impregnation process with an internal carrier (reinforcement) made of fiberglass or non-woven polyester. Raw materials such as bitumen, resins, filler and other additives are first put inside a primary mixer where polymers and additives are melted at 200 °C with bitumen and filler. After blending for 4/5 hours, the compound is pumped into a secondary mixer that has the aim to fulfil the impregnation vat, where the carrier will be impregnated before calendaring. Then the membrane is cooled in a water-cooling apparatus and at the end of the process, the product is wound into rolls and palletized.

Table 3: Transport to the building site (A4) per DU (declared unit)

Scenario information	Value	Unit
Means of transport: truck euro 6 with 27 tons of payload & ship with a 27500 DWT		
Litres of fuel (diesel for truck)	0,002	l/100km
Litres for fuel (HFO for ship)	0,0004	l/100km
Transport distance - truck	1300	km
Transport distance - ship	500	km
Capacity utilisation (including empty runs) - ship	48	%
Capacity utilisation (including empty runs) - truck	61	%
Gross density of products transported	~ 1200	kg/m ³
Capacity utilisation volume factor	100	%

Table 4: Installation into the building (A5)

Scenario information	Value	Unit
Ancillary materials for installation	0	kg
Water use	0	m ³
Other resources use (propane)	0,1125	kg/m ²
Electricity and other energy consumption for the installation	0	kWh
Waste materials on building site before waste processing, generated by the product's installation (specified by type)	0,00139 (LDPE) 0,000157 (PP) 0,0248 (wood)	kg
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	0,0263 (incineration)	kg
Direct emission to ambient air, soil and water	0	kg
Overlaps (membrane)	12	%

Table 5: End of Life (C1-C4) per DU

Scenario information	Value	Unit
Collected separately	0	kg
Collected with mixed construction waste	1	kg
Reuse	1	kg
Recycling	0,146	kg
Energy recovery	0,388	kg
Landfill	0,437	kg
Transport to recycling	300	km
Transport to energy recovery	100	km
Transport to landfill	50	km

5. CUT-OFF RULES & ALLOCATION

Criteria for the exclusion of inputs and outputs (cut-off rules) in the LCA, information modules and any additional information are intended to support an efficient calculation procedure. They are not applied in order to hide data.

The following procedure is followed for the exclusion of inputs and outputs:

- All inputs and outputs to a unit process, for which data are available, are included in the calculation.
- Less than 1% of the total mass inputs/outputs of the unit process A3, are cut off (see Table 6).

Input flows are covered for the whole formula.

Table 6: Cut-off criteria

Process excluded from study	Cut-off criteria	Quantified contribution from process
A3: production (auxiliary materials)	Less than 10^{-4} kg/kg of finished product	Sensitivity study demonstrates a relative contribution lower than 0,5%
A3: production (particle emissions to air)	Less than 10^{-4} kg/kg of finished product	Sensitivity study demonstrates a relative contribution lower than 0,5%

For the allocation procedure and principles, consider the following table (Table 7).

Table 7: Allocation procedure and principles

Module	Allocation Principle
A1	All data are referred to 1m ² of product - A1: electricity is allocated to the reference production line
A3	All data are referred to 1m ² of packaged product. - A3-wastes: the data are allocated to the whole plant production and to the reference production line



6. ENVIRONMENTAL PERFORMANCE & INTERPRETATION

The following tables show the environmental impacts for the products considered according to the requirements of EN15804:2012+A2:2019/AC:2021. The results are referred to the declared unit (see § 4). The additional environmental indicators are not declared.

Table 8: Polyflex Light Evolution P - Potential environmental impact - mandatory indicators according to en 15804 referred to 1 m² of packaged finished product

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP_{TOTAL}	(kg CO ₂ eq.)	2,46E+00	4,94E-01	7,71E-01	0,00E+00	1,84E-02	2,24E+00	2,97E-02	-8,25E-01
GWP_{FOSSIL}	(kg CO ₂ eq.)	2,60E+00	4,88E-01	6,41E-01	0,00E+00	1,81E-02	2,21E+00	2,95E-02	-8,20E-01
GWP_{BIOGENIC}	(kg CO ₂ eq.)	-1,35E-01	1,64E-03	1,30E-01	0,00E+00	6,78E-05	2,87E-02	1,11E-04	-5,54E-03
GWP_{LULUC}	(kg CO ₂ eq.)	1,74E-03	4,05E-03	1,30E-04	0,00E+00	1,72E-04	1,32E-04	9,16E-05	-7,27E-05
ODP	(kg CFC 11 eq.)	2,47E-09	5,97E-14	1,01E-08	0,00E+00	2,41E-15	4,20E-13	7,50E-14	-4,06E-12
AP	(mol H+ eq.)	8,07E-03	3,02E-03	1,14E-03	0,00E+00	6,31E-05	1,21E-03	2,09E-04	-1,50E-03
EP_{FRESHWATER}	(kg P eq.)	7,41E-05	1,61E-06	3,63E-05	0,00E+00	6,78E-08	2,61E-07	5,93E-08	-1,10E-06
EP_{MARINE}	(kg N eq.)	2,22E-03	1,06E-03	3,75E-04	0,00E+00	2,88E-05	4,75E-04	5,40E-05	-3,73E-04
EP_{TERRESTRIAL}	(mol N eq.)	2,23E-02	1,18E-02	4,05E-03	0,00E+00	3,23E-04	5,41E-03	5,94E-04	-4,04E-03
POCP	(kg NMVOC eq.)	7,74E-03	2,39E-03	1,76E-03	0,00E+00	5,73E-05	1,24E-03	1,63E-04	-1,37E-03
ADP_{MINERALS&METALS*}	(kg Sb eq.)	1,90E-06	2,92E-08	1,13E-06	0,00E+00	1,22E-09	1,58E-08	1,36E-09	-5,66E-08
ADP_{FOSSIL*}	(MJ)	1,69E+02	6,46E+00	7,29E+00	0,00E+00	2,53E-01	1,29E+00	3,92E-01	-3,71E+01
WDP*	(m ³ world eq.)	3,84E-01	5,35E-03	4,03E-02	0,00E+00	2,24E-04	2,77E-01	3,24E-03	-5,07E-02

GWP_{TOTAL}: Global Warming Potential total; **GWP_{FOSSIL}**: Global Warming Potential fossil fuels; **GWP_{BIOGENIC}**: Global Warming Potential biogenic; **GWP_{LULUC}**: Global Warming Potential land use and land use change; **ODP**: Depletion Potential of the stratospheric Ozone layer; **AP**: Acidification Potential; **EP_{FRESHWATER}**: Eutrophication Potential, freshwater; **EP_{MARINE}**: Eutrophication Potential, marine; **EP_{TERRESTRIAL}**: Eutrophication Potential, terrestrial; **POCP**: Formation potential of tropospheric ozone; **ADP_{MINERALS&METALS*}**: Abiotic Depletion Potential for non-fossil resources; **ADP_{FOSSIL*}**: Abiotic Depletion Potential for fossil resources; **WDP**: Water Deprivation Potential.

*The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is a limited experienced with the indicator.

Table 9: Polyflex Light Evolution P - Potential environmental impact - additional mandatory and voluntary indicators referred to 1 m² of packaged finished product

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG	(kg CO ₂ eq.)	2,35E+00	4,81E-01	6,23E-01	0,00E+00	1,79E-02	2,21E+00	2,90E-02	-7,92E-01

GWP-GHG: The indicator includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This indicator is thus equal to the GWP indicator originally defined in EN 15804:2012+A1:2013.

Table 10: Polyflex Light Evolution P - Use of resources referred to 1 m² of packaged finished product

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4,69E+00	4,35E-01	1,16E-01	0,00E+00	1,84E-02	2,62E-01	6,40E-02	-2,79E+00
PERM	MJ	2,17E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	6,77E+00	4,35E-01	1,16E-01	0,00E+00	1,84E-02	2,62E-01	6,40E-02	-2,79E+00
PENRE	MJ	1,65E+02	6,49E+00	7,29E+00	0,00E+00	2,53E-01	1,29E+00	3,93E-01	-3,72E+01
PENRM	MJ	2,30E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	1,66E+02	6,49E+00	7,29E+00	0,00E+00	2,53E-01	1,29E+00	3,93E-01	-3,72E+01
SM	kg	3,09E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m ³	1,01E-02	4,77E-04	9,43E-04	0,00E+00	2,01E-05	6,56E-03	9,91E-05	-2,31E-03

PERE: Use of renewable primary energy excluding renewable primary energy resources used as raw materials; **PERM**: Use of renewable primary energy resources used as raw materials; **PERT**: Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); **PENRE**: Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; **PENRM**: Use of non-renewable primary energy resources used as raw materials; **PENRT**: Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); **SM**: Use of secondary material; **RSF**: Use of renewable secondary fuels; **NRSF**: Use of non-renewable secondary fuels; **FW**: Net use of fresh water.

Table 11: Polyflex Light Evolution P - Use of resources referred to 1 m² of packaged finished product

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	3,49E-05	2,01E-11	2,03E-12	0,00E+00	7,85E-13	3,68E-11	8,55E-12	-7,50E-10
NHWD	kg	9,98E-02	9,57E-04	1,64E-02	0,00E+00	3,86E-05	3,01E-01	1,96E+00	-7,23E-03
RWD	kg	6,30E-04	1,18E-05	2,52E-06	0,00E+00	4,74E-07	4,94E-05	4,48E-06	-7,40E-04
Components for re-use	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	5,33E-02	0,00E+00	1,67E-02	0,00E+00	0,00E+00	6,54E-01	0,00E+00	-6,54E-01
Materials for energy recovery	kg	0,00E+00	0,00E+00	9,47E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, electricity	MJ	0,00E+00	0,00E+00	1,33E-01	0,00E+00	0,00E+00	2,45E+00	0,00E+00	-2,58E+00
Exported energy, thermal	MJ	0,00E+00	0,00E+00	2,50E-01	0,00E+00	0,00E+00	4,59E+00	0,00E+00	-4,84E+00

HWD: Hazardous waste disposed; NHWD: Non-Hazardous waste disposed; RWD: Radioactive waste disposed.

Table 12: Polyflex Light Evolution P - Information on biogenic carbon content at the factory gate referred to 1 m² of packaged finished product

Indicator	Unit	Quantity
Biogenic carbon content in packaging	kg C	2,46E-02
Biogenic carbon content in product	kg C	4,90E-02

Tables above show absolute results for each of environmental impact categories. They clearly indicate that product stage (A1 - A3) has the highest contribution for each of them and accounts for up to 90% of the total impact in the whole system boundary.

In particular, bitumen, polymers and reinforcing materials, which are some of the main components in **Polyflex Light Evolution P** formulations, carry a significant impact for all environmental categories.

In terms of GWP, module A5 gives a not negligible contribution especially in the biogenic carbon impact category. This is due to the disposal of the packaging that is the principal responsible of the biogenic carbon content.

Referring to biogenic carbon the negative impacts of raw materials and packaging (A1 and A3) are compensated by the disposal of them in the modules A5 and C3.

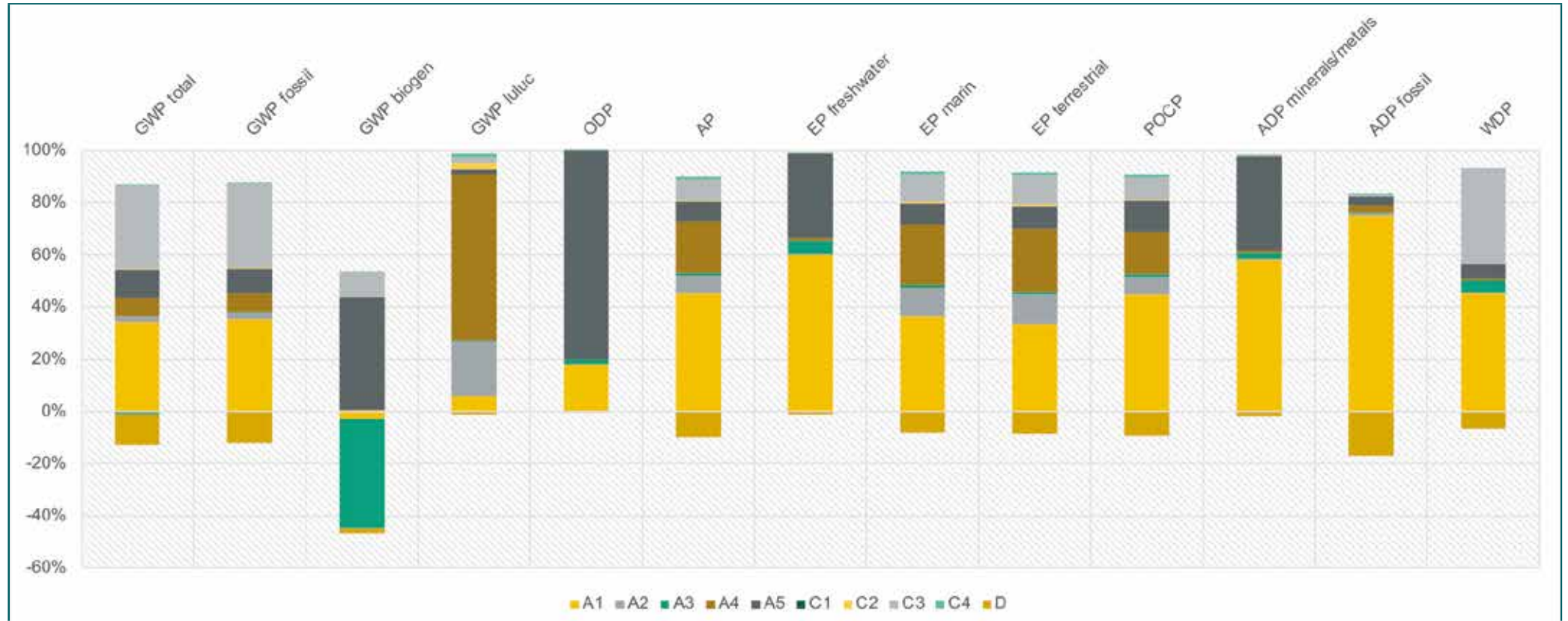
Transportation modules, especially A4, have relevant importance in terms of GW_{Pluluc} , while the contribution became less relevant in the other environmental categories.



Figure 4: Polyflex Light Evolution P application

The following table shows the relative contribution for all environmental categories considered in this EPD.

Table 13: Environmental Impact as percentage of Polyflex Light Evolution P



More details about electrical mix used in this EPD is shown below:

Data source	Amount	GWP	Unit
Residual electricity grid mix (IT) - 2022	AIB	0,562	kg CO ₂ -eqv/kWh

*CML2001 - Aug. 2016

7. DATA QUALITY

Table 14: Data quality

Dataset & Geographical reference	Database (source)	Temporary reference
A1		
Bitumen	Sphera Database	2019-2025
Polymers	Sphera Database	2022-2025
Filler	Sphera Database	2022-2025
Reinforcing material	Sphera Database	2022-2025
Other additives	Ecoinvent Database 3.9	2022
Residual electricity grid mix (IT)	AIB; Sphera Database	2022
A2 (Transport)		
Truck transport (27 ton payload - GLO)	Sphera Database	2022-2025
Diesel for transport (EU)	Sphera Database	2019-2025
A3 (Transport)		
Packaging (EU)	Sphera Database & Ecoinvent database 3.9	2012-2022
Diesel mix (EU)	Sphera Database	2019-2025
A4 (Transport)		
Truck transport (27ton payload - GLO)	Sphera Database	2022-2025
Diesel for transport (EU)	Sphera Database	2019-2025
Ocean ship (27500 DWT payload - GLO)	Sphera Database	2022-2024
Heavy fuel oil for ship transport (EU)	Sphera Database	2019-2025
C1-C4 (End of Life)		
Truck transport (9,3 ton payload - GLO)	Sphera Database	2022-2025
Diesel for transport (EU)	Sphera Database	2019-2025
Construction waste dumping (EU)	Sphera Database	2022-2025
Construction waste treatment (EU)	Sphera Database	2022-2025

All data included in table above refer to a period between 2019 and 2025; the most relevant ones are specific from supplier, while the others (i.e. transport and minor contribution dataset), come from European and global databases.

All datasets are not more than 10 years old according to EN 15804 §6.3.8.2 "Data quality requirements". The only exception is represented by one raw material used for one packaging component production.

Primary data concern the year 2021 and represent the whole annual production.

The Quality level concerning datasets used in the EPD can be considered as "very good" or "good" according to Annex E of the EN 15804 (current version); the only exception is represented by a packaging component which has a quality level classified as "poor" in terms of time representativeness.

8. DIFFERENCES VERSOUS PREVIOUS VERSION

New scenario concerning the installation module (A5), the end-of-life modules (C1-C4) and module D. Furthermore, the dataset used were updated to the latest version available.

9. VERIFICATION AND REGISTRATION

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

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

CEN standard EN15804 served as the Core Product Category Rules (PCR)	
PCR:	PCR 2019:14 Construction products (EN 15804:A2), Version 1.11, 2021-02-05, UN CPC code 54
PCR review was conducted by:	The Technical Committee of the International EPD® System. See www.environdec.com/TC for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact .
Independent third-party verification of the declaration and data, according to ISO 14025:2006:	<input checked="" type="checkbox"/> EPD Process Certification <input type="checkbox"/> EPD Verification
Third party verifier:	Certiquality S.r.l. Number of accreditations: 003H rev15
Accredited or approved by:	Accredia
Procedure for follow-up of data during EPD validity involves third-party verifier	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

10. REFERENCES

- EN 13707: FLEXIBLE SHEETS FOR WATERPROOFING - REINFORCED BITUMEN SHEETS FOR ROOF WATERPROOFING - DEFINITIONS AND CHARACTERISTICS
- EN 15804: SUSTAINABILITY OF CONSTRUCTION WORKS - ENVIRONMENTAL PRODUCT DECLARATIONS - CORE RULES FOR THE PRODUCT CATEGORY OF CONSTRUCTION PRODUCTS
- EUROPEAN DIRECTIVE 2008/98/EC
- EUROPEAN RESIDUAL MIXES VERSION 1.0, 2022-05-31 (AIB: ASSOCIATION OF ISSUING BODIES)
- EWA (EUROPEAN WATERPROOFING ASSOCIATION): SECTOR EPD S-P-00414
- GENERAL PROGRAMME INSTRUCTIONS OF THE INTERNATIONAL EPD® SYSTEM. VERSION 3.01
- ISO 14025 ENVIRONMENTAL LABELS AND DECLARATIONS - TYPE III ENVIRONMENTAL DECLARATIONS - PRINCIPLES AND PROCEDURES
- ISO 14044 ENVIRONMENTAL MANAGEMENT - LIFE CYCLE ASSESSMENT - REQUIREMENTS AND GUIDELINES
- PCR 2019:14 CONSTRUCTION PRODUCTS (EN 15804: A2), UN CPC CODE 54; VERSION 1.11

Contact information

EPD owner:



Polyglass SpA
www.polyglass.com

LCA author:



Mapei SpA
www.mapei.it;
Environmental Sustainability Office

Programme operator:



The International EPD® System
Address: EPD International AB
Box 210 60
SE-100 31 Stockholm
Sweden

Website: www.environdec.com
E-mail: info@environdec.com

POLYGLASS®



MAPEI
GROUP

POLYGLASS SPA

Via Giorgio Squinzi, 2
31047 Ponte di Piave (TV) - Italy



+39 04227547



+39 0422854118



info@polyglass.it