Environmental Product Declaration

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

Flexible sheet for waterproofing – RENOLIT ALKORPLAN F Smart

from

RENOLIT IBÉRICA, S.A.

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

Programme information

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

Product category rules (PCR): *PCR 2019:14 Construction Products, version 1.2.5*
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: ☐ EPD process certification ☒ EPD verification
Third party verifier: TECNALIA R&I CERTIFICACION, S.L. *info@tecnaliacertificacion.com* *Accredited by: ENAC nº125/C-PR283 accreditation.* Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☒ Yes ☐ No

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable.

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

1. Company information

Owner of the EPD: **RENOLIT** Ibérica, S.A.
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Description of the organisation: The **RENOLIT Group** is a leading global specialist for high-quality plastic films, sheets and other plastic products. With more than thirty production sites and sales units in over twenty countries, and with annual sales of around €1,2 billion, the company with headquarters in Worms – around 70 km south of Frankfurt am Main – is one of the world's leading plastic products manufacturers. About 5.000 employees continue to further develop the knowledge and expertise gained from over seventy-five years of business.

RENOLIT Ibérica is headquartered in Sant Celoni, north of Barcelona, manufacturing one million coils of membranes a year. The factory counts on more than 300 employees for the production of waterproofing membranes under the brand **RENOLIT** ALKORPLAN.
In the swimming pools industry, **RENOLIT** is the leading manufacturer of PVC sheets for swimming pool and the leading brand of waterproofing reinforced membrane for swimming pools.
In the roofing industry **RENOLIT** is a worldwide leader in the market of synthetic waterproofing membranes.
Our wide range of products and solutions meets the many demands and needs of architects, installers and facility managers.
In the civil engineering industry, **RENOLIT** has developed waterproofing solutions for all types of works, pioneering some applications that are mainstream today: hydraulic, such as basins, dams and attenuation tanks, as well as underground works, such as tunnels, shafts and foundations.

Product-related or management system-related certifications:

- Organisation certifications:

Factory certified in accordance with the requirements of ISO 9001 and ISO 14001 certificate. EMAS registration number: ES-CAT-000124.
Factory certified under the EuCertPlast Audit Scheme 4.2 in line with EN 15343:2007. Audit Report and Certificate Code: 0076-01-24-ECU-CR.

- Product certifications:

CE marking – EN 13956:2012 and ETAG 006

Name and location of production site: **RENOLIT** ALKORPLAN F Smart is produced in **RENOLIT Ibérica** in Sant Celoni (Spain).

2. Product information

Product name and description

Name

RENOLIT ALKORPLAN F Smart

Identification

RENOLIT ALKORPLAN F Smart

Brief description

Laminated membrane of flexible PVC with woven polyester reinforcing, with special reflecting and absorbing pigments added (Solar Shield Technology) to achieve the cool colour function. Expected service lifetime: 40 years.

Product specifications

- Used as waterproofing membrane within mechanically restrained systems.
- Installed on the roof by mechanical fastening.
- Reaction to fire (EN 12317-2) Class E.

The EPD focuses on the 1,5 mm thickness, even though there are more options.

This product can be grouped in the UN CPC code 363 – Semi-manufactures of plastics, and more specifically in code 36390: plates, sheets, film, foil and strips of plastics.

Geographical scope Europe

Product composition

The base raw materials for **RENOLIT** ALKORPLAN F Smart plastic sheet for roof waterproofing are:

- Polyvinyl chloride (PVC) 40-50%
- Reworked PVC-P 10-15%
- Plasticizer 20-30%
- Thermal stabilizer 1-2%
- Chalk 2-6%
- Soja oil <1%
- Reinforcing material, embedded polyester scrim <5%
- Colour pigments 2-6%
- Flame retardant 1-3%
- Others (binders, solvents and dispersant additive) <1%

Characteristics	Unit	Specifications
Effective Thickness (EN 1849-2)	mm	1,5 -5/+10%
Mass (EN 1849-2)	Kg/m^2	1,85 -5/+10%
Straightness (EN 1848-2)	mm	≤ 30
Watertightness (EN 1928 /B) -72 h/400 kPa	-	Watertight
Resistance to static load (EN 12730) - hard underground *(Method A)* - soft underground *(Method B)*	 kg kg	 ≥ 20 ≥ 20
Tensile properties (EN 12311-2 /A) -Tensile strength -Elongation	 N/50mm %	 ≥ 1.100 ≥ 16
Resistance to impact (EN 12691) - hard underground *(Method A)* - soft underground *(Method B)*	 mm mm	 ≥ 700 ≥ 2.000
Tear resistance (nail) (EN 12310-1)	N	≥ 400
Joint shear resistance (EN 12317-2) - Initial - After thermal ageing (28d/80ºC)	 N/50mm N/50mm	 ≥ 1.100 ≥ 880
Joint peel resistance (EN 12316-2) - Initial - After thermal ageing (28d/80ºC)	 N/50mm N/50mm	 ≥ 225 ≥ 180
Adhesion (EN 12316-2)	N/50mm	≥ 100
Water vapour properties (EN 1931)	-	20.000 +/- 30%
Resistance to ozone (EN 1844)	-	Resistant
Behaviour following exposure to UV radiation, elevated temperature, water (artificial ageing) (EN 1297)	-	Grade 0
Foldability at low temperature (EN 495-5) - Initial - After thermal ageing (24w/70ºC) - After UV ageing (1.000h)	 ºC ºC ºC	 ≤ -25 ≤ -25 ≤ -25
Effects of liquid chemicals including water (EN 1847)	-	Watertight

Manufacturing process

The production process starts with the preparation of mixtures of raw materials according to the type of product to be manufactured.

Subsequently, a calendaring process is employed for the production of plastic sheets: which the mixture that has been previously prepared and homogenized, in accordance with the formulations provided for each product, undergoes a transformation process through the application of heat, pressure and friction, through a "spindle". Later, the mixture is transformed into a plastic sheet by being rolled by the calender.

Then, an organosol lacquer is applied to the top plastic sheet.

To end the manufacturing process, the plastic sheets performed are bond and combine with a reinforcing material (embedded polyester scrim) in order to create the product. A lamination process is carried out, applying heat and pressure to fuse the layers.

The processes for obtaining the flexible sheet described can be followed by one or several finishing processes for the manufactured sheets. The finishing processes can be:

- Printing or lacquering of sheets: This process carries out the printing or lacquering of sheets using the "hologravure" technology.
- Mechanical engraving: In this phase of the production process of the thermoplastic sheets, a mechanical engraving or embossing of the sheets is carried out, sometimes simultaneously with the lacquering.
- Verification and cutting: In this process the products are verified, removing the defective part and giving them the presentation desired by the customer. Transforming the rolls of industrial use into rolls, of length specified by the customer or by the requirements of the product.

Within the manufacturing process, there is a supplementary procedure that demands particular attention:

• Recovery process of PVC material with polyester mesh: There is a secondary process consisting of the recovery of PVC with polyester mesh by means of grinding in a mill and subsequent separation by gravity of both using two air columns. In a second phase, the segregated PVC is crushed in a second mill and sent to Big-bags, or to two silos for storage or to make mixtures of different types.

3. LCA information

Declared unit: 1 m^2 of RENOLIT ALKORPLAN F Smart plastic sheet for roof waterproofing for a reference service life of 30 years.
Conversion factor to convert declared unit in surface to a declared unit in mass: 1,85 kg/m^2

Reference service life: 30 years

Service life: 40 years

Data collection period: 2022

Time representativeness: Where possible the most current data was used. For generic data, the limit has been stablished to 10 years and for specific data, a maximum of 5 years was allowed. The time period over which inputs and outputs from the system will be accounted for is 100 years.

Database(s) and LCA software used: Generic data is obtained from GaBi software database. This database is based on the International Reference Life Cycle Data System (ILCD), as required by EN 15804:2012+A2:2019/AC:2021.

- GaBi Professional v. 10.7.0.183
- GaBi database: 2023.1

System diagram: see figure 2.

Description of system boundaries: "Cradle-to-gate with options, modules C1–C4, module D and with optional modules" according to EN 15804 and the PCR. This includes the following life cycle stages:

- Modules A1-A3: Product stage
  - A1: Raw materials supply
  - A2: Transport
  - A3: Manufacturing
- Modules A4-A5: Construction process stage
  - A4: Transport
  - A5: Construction installation
- Module C: End of life stage
  - C1: Deconstruction, demolition
  - C2: Transport
  - C3: Waste processing
  - C4: Disposal
- Module D: Benefits and loads beyond the system boundary.
  Reuse, recovery, recycling potential

Excluded lifecycle stages: The following processes are excluded from the analysis, according to the PCR selected:

- Inventory flows from infrastructure, construction, production equipment and tools that are not directly used in the production process.
- Inventory flows from personnel-related processes, such as transportation to and from work.

More information:
Company website: https://www.renolit.com/es/

LCA practitioners: Alba Bala (UNESCO Chair in Life Cycle and Climate Change ESCI-UPF), Raúl Antúnez (Grup Carles).

The **rules for allocation** employed in this study are the ones stated in ISO 14044:2006, 4.3.4., and include the specifications for construction products detailed in EN 15804:2012+A2:2019/AC:2021. Allocation has been avoided as far as possible by dividing the unit process to be allocated into different sub-processes that can be allocated to each one of the co-products and collecting specific data on those sub-processes. In case it has not been possible, the allocation has been done taking into account the physical relationship among the different products. In this case, due to the similarity in the production process of all products produced by **RENOLIT**, a weight allocation has been used.

A mass **cut-off rule** has been applied for the raw material flame retardant (<3% of composition). No other specific cut-off rules have been applied.

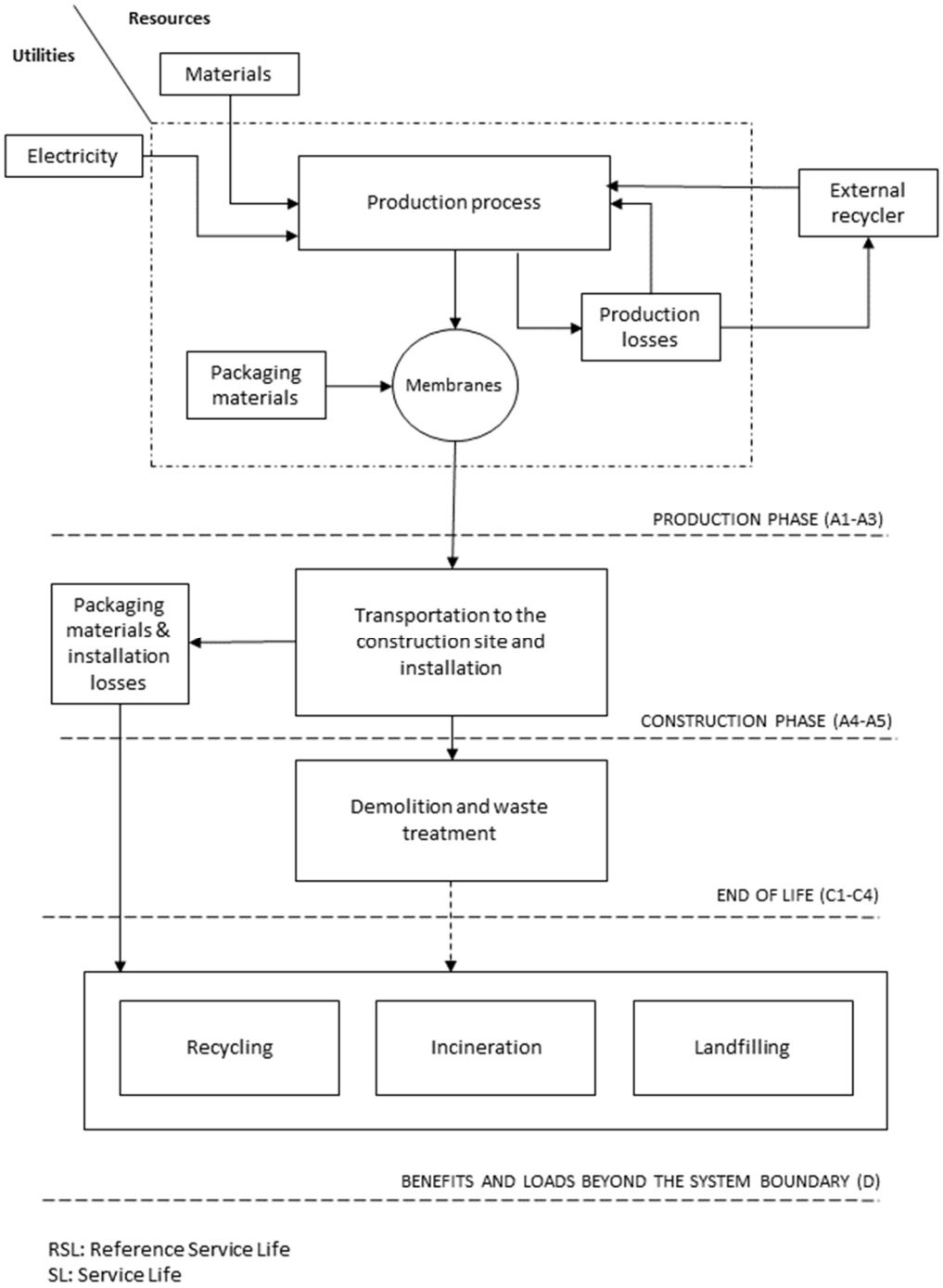
Reference service life

RSL information	Unit (expressed per declared unit)	
Reference Service Life	Years	30
Declared product properties (at the gate) and finishes, etc.	Units as appropriate	Refer to TDS and DoP
Design application parameters (if instructed by the manufacturer), including the references to the appropriate practices and application codes	Units as appropriate	The design of the waterproofing system shall follow EN 13956 and relevant national standards
An assumed quality of work, when installed in accordance with the manufacturer's instructions	Units as appropriate	The flexible sheet shall be installed as per manufacturer instructions
Outdoor environment, (for outdoor applications), e.g. weathering, pollutants, UV and wind exposure, building orientation, shading, temperature	Units as appropriate	The Service Life might be affected by the presence of pollutants or other abnormal circumstances different than usual outdoor conditions
Indoor environment (for indoor applications), e.g. temperature, moisture, chemical exposure	Units as appropriate	N/A
Usage conditions, e.g. frequency of use, mechanical exposure	Units as appropriate	The flexible sheet support must have the conditions established by the manufacturer
Maintenance e.g. required frequency, type and quality and replacement of components	Units as appropriate	No maintenance is expected

Figure 1. Modules declared

	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	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	Europe																
Specific data used	>90% specific data is used in the EPD					-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	0% (results are for one product)					-	-	-	-	-	-	-	-	-	-	-	-
Variation – sites	0% (one manufacturing site)					-	-	-	-	-	-	-	-	-	-	-	-

Figure 2. Flow diagram of the system under study



RSL: Reference Service Life
SL: Service Life

A1-A3 PRODUCT STAGE

- **A1-A3. Raw materials supply / Transport / Manufacturing:** this module includes:
    - The extraction and processing of raw materials and the energy that is produced prior to the manufacturing process under study.
    - The transport of the different raw materials from the manufacturer to the factory. The distance and type of concrete truck for each raw material has been introduced.
    - The consumption of energy and water used during the manufacturing process, as well as the transport and management of the factory-produced waste.

A4-A5 CONSTRUCTION PROCESS STAGE

- **A4. Transport**

PARAMETER	VALUE/DESCRIPTION
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long ditance truck, boat, etc.	20-26 tons truck with a maximum load capacity of 17,3 tons. This truck complies with the Euro V regulations.
Distance	Truck: 1.000 km
Capacity utilisation (including empty returns)	98%
Bulk density of transported products	1.250 kg/m^3

- **A5. Construction / Installation**

PARAMETER	VALUE/DESCRIPTION
Ancillary materials for installation (specified by material)	Polyropilene [g]: 68 Steel [g]: 56
Water use	Not used
Other resource use	No other resource consumption
Quantitative description of energy type (regional mix) and consumption during the installation process	Electricity grid mix, ES: 0,036 MJ
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	Materials for re-use [kg]: 0,057 Materials for recycling [kg]: 0,011 Materials for energy recovery [kg]: 0,022
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal	There is no waste processing at the building site
Direct emissions to environment, air, soil and water	Installation process without direct emissions

C1-C4 END OF LIFE STAGE

- **C1-C4. Transport / Waste processing / Disposal**

PARAMETER	VALUE/DESCRIPTION
Collection process specified by type	NOT APPLICABLE
	NOT APPLICABLE
Recovery system specified by type*	0,139 kg for recycling
	0,069 kg for incineration (without energy recovery)
	0,555 kg for incineration with energy recovery
Disposal specified by type*	0,624 kg for landfill
Assumptions for scenario, e.g. transportation	A bulky waste truck of 20-26 tonnes of gross weight and a maximum load capacity of 10 tonnes has been considered. This truck complies with the Euro VI regulations. Truck: 100 km

**Considering that the service life (40 years) is greater than the reference service life (30 years).*

After the service life of the product, the flexible sheets are destinated to different end of life treatments:
- Incineration with energy recovery: 40%
- Incineration without energy recovery: 5%
- Landfilling: 45%
- Recycling: 10%

No de-construction processes are contemplated because it is negligible. Thus, no extra waste management treatment and associated impact has been considered.

BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY (D)

For calculating the credits due to the recycling of materials, value-correction factors that reflect the difference in functional equivalence of recycled versus virgin materials have been applied. In particular, the ones provided by the Product Environmental Footprint (PEF): 0,85 for cardboard, 1 for wood chips and 0,75 for PVC and PE, in this case corresponding to the lower value for plastics.

In this stage, the credits due to the incineration with energy recovery of some packaging materials and the roofing sheet itself at the end-of-life have also been considered. In this case, the average mixes for the production of electricity and thermal energy from natural gas in Europe (EU-28) have been used. They are representative for the period 2019-2025.

Scenarios included are currently in use and are representative for one of the most probable alternatives. Additional declaration of representative mixes for the relevant region is permissible.

4. Content declaration

Product

Product components	Weight, %	Post-consumer recycled material, weight-%	Biogenic material, weight-% and kg C/kg
Chalk	2-6%	0%	0%
Colour Pigments	2-6%	0%	0%
Plasticizer	20-30%	0%	0%
Polyvinyl chloride (PVC)	40-50%	0%	0%
Reworked PVC-P	5-15%	0%	0%
Reinforcing material, embedded polyester scrim	<5%	0%	0%
Thermal stabilizer	1-2%	0%	0%
Soja oil	<1%	0%	0%
Flame retardant	1-3%	0%	0%
Others (binders, solvents and dispersant additive)	<1%	0%	0%
TOTAL	**100 %**	**0%**	**0%**
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/kg**
Cardboard tubes	0,008	0,49%	0,4
PE foil	0,001	0,08%	0,0
Pallet 108x111	0,057	3,66%	0,4
PE strips	0,002	0,11%	0,0
Felt blanket (PVC & geotextile)	0,022	1,39%	0,0
TOTAL	**0,089**	**5,74%**	**-**

None of the final product components are included in the “Candidate list of substances of very high concern for authorisation” of the REACH regulation.

Packaging

Distribution packaging: This distribution packaging is the same as the consumer packaging. Primarily, the plastic sheets are rolled around a cardboard tube of 70x82x1070 mm and protected with PE foil. Each role contains 15 linear meters of plastic sheet. Secondly, a wood pallet container of 108x111x67 cm is prepared with two felt blanket at the bottom. Afterwards, 15 rolls of plastic sheets are placed at the top of the blanket and arranged and fixed to the pallet. Finally, the entire pallet is strapped with PE foil.

Recycled material

Provenience of recycled materials (pre-consumer or post-consumer) in the product: The recycled PVC is recycled in the internal production process. For calculating the credits due to the recycling of materials, value-correction factors that reflect the difference in functional equivalence of recycled versus virgin

materials have been applied. In particular, the ones provided by the Product Environmental Footprint (PEF): 0,75 for PVC, corresponding to the lower value for plastics.

Electric mix. kg CO_2 eq./kWh

- MIX RENOLIT (production): 0,00239 kg CO2 eq./kWh.
- Spanish Mix (installation): 0,298 Kg CO2 eq/kWh.
- Mix EU-28 (packaging recycling process-installation): 0,33 kg CO2 eq./kWh.

1. Environmental performance

Potential environmental impact

Environmental impact indicators	Module	Manufacture	Installation		End of life				
	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
EN 15804 +A2									
Global warming potential (GWP) - GHG	[kg CO2 eq.]	3,40E+00	9,78E-02	4,59E-01	0,00E+00	3,15E-02	1,09E+00	1,81E-01	-5,51E-01
Global warming potential (GWP) - Total	[kg CO2 eq.]	3,33E+00	9,65E-02	4,47E-01	0,00E+00	3,11E-02	1,09E+00	1,80E-01	-4,64E-01
Global warming potential (GWP) - fossil	[kg CO2 eq.]	3,40E+00	9,69E-02	4,59E-01	0,00E+00	3,12E-02	1,09E+00	1,81E-01	-5,51E-01
Global warming potential (GWP) - biogenic	[kg CO2 eq.]	-6,55E-02	-1,34E-03	-1,27E-02	0,00E+00	-3,95E-04	1,86E-04	-4,83E-04	8,67E-02
Global warming potential (GWP) - luluc	[kg CO2 eq.]	2,19E-03	8,86E-04	4,25E-05	0,00E+00	2,79E-04	8,33E-05	4,58E-05	-2,38E-04
Ozone depletion	[kg CFC-11 eq.]	8,41E-11	1,24E-14	8,42E-09	0,00E+00	3,93E-15	7,77E-13	1,69E-13	-4,71E-12
Acidification	[Mole of H+ eq.]	7,21E-03	1,30E-04	3,39E-03	0,00E+00	4,42E-05	2,42E-04	1,59E-04	-7,55E-04
Eutrophication - freshwater	[kg P eq.]	1,39E-05	3,50E-07	4,57E-07	0,00E+00	1,10E-07	2,28E-07	8,29E-06	-1,29E-06
Eutrophication - marine	[kg N eq.]	1,94E-03	4,54E-05	5,49E-04	0,00E+00	1,64E-05	7,89E-05	3,94E-05	-2,38E-04
Eutrophication - terrestrial	[Mole of N eq.]	2,09E-02	5,41E-04	3,26E-03	0,00E+00	1,91E-04	1,04E-03	4,54E-04	-2,58E-03
Photochemical ozone formation, human health	[kg NMVOC eq.]	1,02E-02	1,13E-04	1,03E-03	0,00E+00	4,01E-05	2,24E-04	1,22E-04	-9,46E-04
Resource use, mineral and metals - minerals&metals	[kg Sb eq.]	4,41E-06	6,30E-09	7,90E-06	0,00E+00	1,99E-09	6,84E-09	1,99E-09	-3,83E-08
Resource use - fossil	[MJ]	8,48E+01	1,30E+00	7,62E+00	0,00E+00	4,11E-01	1,73E+00	8,58E-01	-1,17E+01
Water use	[m³ world equiv.]	1,71E+00	1,16E-03	1,87E-01	0,00E+00	3,65E-04	1,08E-01	1,28E-02	-4,31E-02

Use of resources

Resource use indicators	Module	Manufacture	Installation		End of life				
	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
Use of renewable primary energy (PERE)	[MJ]	4,52E+01	9,48E-02	8,93E-01	0,00E+00	2,99E-02	4,05E-01	1,09E-01	-3,41E+00
Use of renewable primary energy resources used as raw materials (PERM)	[MJ]	2,98E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy resources (PERT)	[MJ]	4,52E+01	9,48E-02	8,93E-01	0,00E+00	2,99E-02	4,05E-01	1,09E-01	-3,41E+00
Use of non-renewable primary energy (PENRE)	[MJ]	4,98E+01	1,31E+00	7,62E+00	0,00E+00	4,13E-01	1,73E+00	8,58E-01	-1,17E+01
Use of non-renewable primary energy resources used as raw materials (PENREM)	[MJ]	3,50E+01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy resources (PENRT)	[MJ]	8,48E+01	1,31E+00	7,62E+00	0,00E+00	4,13E-01	1,73E+00	8,58E-01	-1,17E+01
Use of secondary material (SM)	[MJ]	1,54E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of net fresh water (FW)	[m3]	3,26E-02	1,04E-04	4,45E-03	0,00E+00	3,28E-05	2,70E-03	3,44E-04	-2,40E-03
Use of renewable secondary fuels (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
Use of non-renewable secondary fuels (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

Waste production and output flows

Waste production

Parameter	Module	Manufacture	Installation		End of life				
	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste disposed (HWD)	[kg]	7,46E-07	4,05E-12	1,42E-04	0,00E+00	1,28E-12	5,92E-12	5,47E-11	-1,14E-07
Non-hazardous waste disposed (NHWD)	[kg]	9,39E-01	1,99E-04	1,95E-02	0,00E+00	6,29E-05	4,63E-01	6,80E-01	-5,52E-03
Radioactive waste disposed (RWD)	[kg]	1,22E-03	2,45E-06	3,19E-04	0,00E+00	7,72E-07	4,81E-05	1,36E-05	-5,52E-04

Output flows

Parameter	A1 - A3	A4	A5	C1	C2	C3	C4	D
Components for re-use [kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,68E-02
Materials for recycling [kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,50E-01
Materials for energy recovery [kg]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	6,46E-01
Exported energy [MJ]	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	4,46E+00

Other environmental indicators

Optional indicators	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
Particulate matter (PM)	[Disease incidences]	8,77E-08	1,06E-09	3,55E-08	0,00E+00	2,58E-10	5,43E-09	1,93E-09	0,00E+00
Ionising radiation, human health (IRP)	[kBq U235 eq.]	1,63E-01	3,65E-04	1,34E-01	0,00E+00	1,15E-04	5,83E-03	1,85E-03	-1,80E-08
Ecotoxicity, freshwater (ETP-fw)	[CTUe]	3,41E+01	9,26E-01	2,78E+00	0,00E+00	2,92E-01	1,13E+00	7,52E-01	-8,79E-02
Human toxicity, cancer (HTP-c)	[CTUh]	5,50E-09	1,89E-11	3,69E-10	0,00E+00	5,98E-12	4,74E-11	3,40E-11	-4,03E+00
Human toxicity, non-cancer (HTP-nc)	[CTUh]	4,95E-07	1,01E-09	3,26E-08	0,00E+00	3,17E-10	4,51E-09	2,90E-09	-1,47E-10
Land Use (SQP)	[Pt]	3,19E+01	5,45E-01	2,63E-01	0,00E+00	1,72E-01	3,70E-01	1,02E-01	-4,84E-09

Biogenic carbon content	Unit	A1 - A3	A4	A5	C1	C2	C3	C4	D
Biogenic carbon content in product	[Kg C]	-4,71E-04	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Biogenic carbon content in accompanying packaging	[Kg C]	-2,81E-02	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

In order to further analyse the results, the characterized results have been normalized by the average emissions of a European citizen. For doing this, the normalization factors of the Product Environmental Footprint (PEF) of the European Union, adapted to the indicators of EN 15804 have been used. The 4 most relevant impact categories are Human Toxicity, non-cancer effects (HTP-nc), Resource Use Fossil (ADP-fossil), Ecotoxicity Freshwater (ETP-fw) and Climate Change Total (GWP-Total), as can be seen in the following figure.

Figure 3. Normalized results of the environmental impact categories

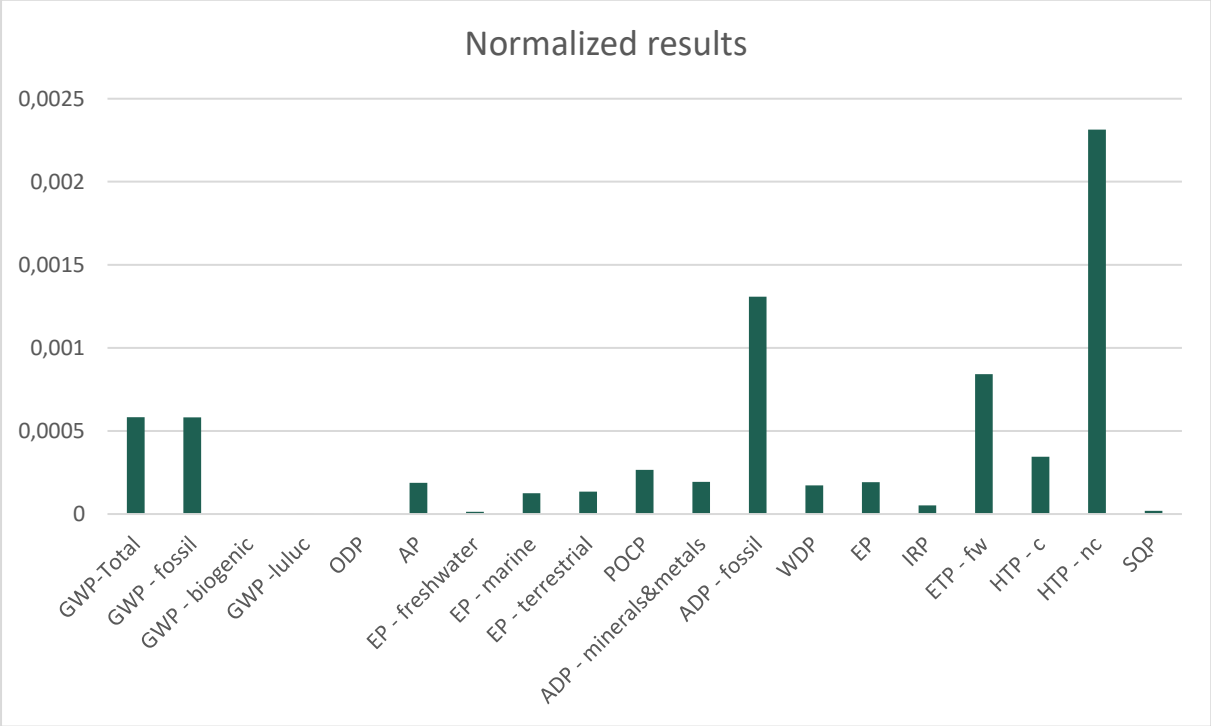


Table 5 — Classification of disclaimers to the declaration of core and additional environmental impact indicators

ILCD classification	Indicator	Disclaimer
ILCD Type 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD Type 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
ILCD Type 3	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2
	Potential Soil quality index (SQP)	2
Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.		
Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.		

References

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

UNE-EN 15804:2012+A2:2019/AC:2021. Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products.

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ISO 14025: 2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures

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

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

ISO 14044: 2006 Environmental management - Life cycle assessment - Requirements and guidelines

Weidema, B.P. and Wesnaes, M., 1996. Data quality management for life cycle inventories – an example using data quality indicators. Journal of Cleaner Production 4 (3-4): 167-174.

VERIFICATION STATEMENT CERTIFICATE

CERTIFICADO DE DECLARACIÓN DE VERIFICACIÓN

Certificate No. / Certificado nº: EPD07914

TECNALIA R&I CERTIFICACION S.L., confirms that independent third-party verification has been conducted of the Environmental Product Declaration (EPD) on behalf of:
TECNALIA *R&I CERTIFICACION S.L., confirma que se ha realizado verificación de tercera parte independiente de la Declaración Ambiental de Producto (DAP) en nombre de:*

RENOLIT Ibérica S.A.
Ctra. Del Montnegre S/N
08470 SANT CELONI (Barcelona) - SPAIN

for the following product(s):
para el siguiente(s) producto(s):

Flexible sheet for waterproofing – RENOLIT ALKORPLAN F Smart

Lámina flexible para impermeabilización – RENOLIT ALKORPLAN F Smart

with registration number **S-P-10294** in the International EPD® System *(www.environdec.com).*
*con número de registro **S-P-10294** en el Sistema International EPD® (www.environdec.com).*

it´s in conformity with:
es conforme con:

- **ISO 14025:2010 Environmental labels and declarations. Type III environmental declarations.**
- **General Programme Instructions for the International EPD® System v.4.0.**
- **PCR 2019:14 Construction products (EN 15804:A2) v 1.2.5.**
- **UN CPC 36390 Plates, sheets, film, foil and strip of plastics.**

Issued date / *Fecha de emisión:*	07/09/2023
Update date / *Fecha de actualización:*	07/09/2023
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Serial Nº / *Nº Serie:*	EPD0791400-E

Carlos Nazabal Alsua
Manager

CERTIFICACIÓN ISO 17065 Nº125 / C-PR283

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