Environmental Product Declaration

EPD of multiple products, based on worst-case product
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

Roklite Pro ATL1150RK.LAM/UVC

16 products in different surface and thickness, listed on page 4
from

Atlon Composite Technologies PTE Ltd

Programme:	The International EPD® System, www.environdec.com
Programme operator:	EPD International AB
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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

General information

Programme information

Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
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Accountabilities for PCR, LCA and independent, third-party verification
Product Category Rules (PCR)
CEN standard EN 15804 serves as the Core Product Category Rules (PCR)
Product Category Rules (PCR): PCR 2019:14 Construction products Version 1.3.3 [valid until: 2024-12-20]
PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.
Life Cycle Assessment (LCA)
LCA accountability: Si Huang, IVL Swedish Environmental Research Institute
Third-party verification
Independent third-party verification of the declaration and data, according to ISO 14025:2006, via: ☒ EPD verification by individual verifier Third-party verifier: Matthew Fishwick, Fishwick Environmental Ltd Approved by: The International EPD® System
Procedure for follow-up of data during EPD validity involves third party verifier: ☐ Yes ☒ No [Procedure for follow-up the validity of the EPD is at minimum required once a year with the aim of confirming whether the information in the EPD remains valid or if the EPD needs to be updated during its validity period. The follow-up can be organized entirely by the EPD owner or together with the original verifier via an agreement between the two parties. In both approaches, the EPD owner is responsible for the procedure being carried out. If a change that requires an update is identified, the EPD shall be re-verified by a verifier]

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

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical

declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

It should be noted that the EPD report cannot be used without including module C.

Company information

Owner of the EPD:
Atlon Composite Technologies PTE Ltd

Contact:
Mr. Simon Ryley, ryley.s@atlon.com

Description of the organisation:
Atlon Composite Technologies PTE Limited is a leading producer of high-performance composite panels. The product portfolio consists of a wide range of polymer and mineral based composite board materials aimed at servicing demanding industrial and commercial applications.

Product-related or management system-related certifications:
ISO9001:2015
ISO14001:2015

Name and location of production site:
Shandong Province, China

Product information

Product name:
Roklite Pro ATL1150RK products

Table 1 Product list

Products included in this EPD				
PVC/PET/PP products	ATL1150RK.PVC.LAM, 4mm	ATL1150RK.PVC.LAM, 6mm	ATL1150RK.PVC.LAM, 9mm	ATL1150RK.PVC.LAM, 12mm
	ATL1150RK.PET.LAM, 4mm	ATL1150RK.PET.LAM, 6mm	ATL1150RK.PET.LAM, 9mm	ATL1150RK.PET.LAM, 12mm
	ATL1150RK.PP.LAM, 4mm	ATL1150RK.PP.LAM, 6mm	ATL1150RK.PP.LAM, 9mm	ATL1150RK.PP.LAM, 12mm
UVC product	ATL1150RK.UVC, 4mm	ATL1150RK.UVC, 6mm	ATL1150RK.UVC, 9mm	ATL1150RK.UVC, 12mm

The products in this EPD differ only in thickness and the last process surface process. The density, raw material portion, manufacturing process, energy use of the substrate board, as well as the main function of products in this EPD are all the same. See details in Figure 1.

Product description:
Roklite Pro is a mineral-based composite sheet material made in a light green colour, with a thickness range of 4mm, 6mm, 9mm and 12mm. It is a multi-purpose mineral composite substrate with a smooth surface and a rough sanded reverse side. It is typically used for decorative wall or ceiling panel applications. It is highly durable, moisture and thermal resistant, and is non-combustible, making it an ideal option for applications requiring a superior fire rating.

It will not rot or generate mold/mildew even when exposed to moisture for extended periods of time, making it an excellent alternative to gypsum board. It also has excellent dimensional stability and flexibility, making it an excellent alternative to fibre cement board when greater flexibility is required. Roklite Pro can serve a wide range of applications including substrate for interior/exterior walls, laminated decorative interior walls and ceilings, tile backer for wet areas, flooring underlayment, fire-rated doors, soffits, and structural insulated panels.

When used for interior applications as a laminated decorative wall/ceiling panel, and when properly installed in typical residential conditions, the reference service life of Roklite Pro products is 20 years.

This EPD is the EPD of multiple products, based on worst-case product. The properties of all the products included is shown in the table below.

Table 2 Product property indicators

Properties	Standard	Values (4mm)	Values (6mm)	Values (9mm)	Values (12mm) worst-case product
Thickness(mm)	GB/T2463.2	4	6	9	12
Charpy notched impact strength (kg/m2)	GB/T 1043	6.6	7.3	4.5	4.2
Shore hardness(D)	GB/T2411	73	75	65	70
Flexural strength(Mpa)	GB/T9341	18.7	25.5	19.3	16.2
Dimensional stability(widthways)	GB/T8811	-0.11%	-0.28%	-0.11%	-0.09%
Dimensional stability(lengthways)	GB/T8811	-0.10%	-0.26%	-0.10%	-0.09%
Fire resistance	EN13501-1	Class A1	Class A1	Class A1	Class A1
Formaldehyde emission(mg/L)	GB/T 17657	≤0.3(Super EO)	≤0.3(Super EO)	⩽0.3(Super EO)	⩽0.3(Super EO)
Thickness Swelling(%)	GB/T 17657	1.37%	0.49%	0.04%	0.07%

Table 3 Product content of worst-case product

Product components	Weight, percentage	Post-consumer material, weight-% of whole product	Biogenic material, kg C/declared unit
Metals	0%	0.00%	0.00
Mineral materials	≥90%	0.00%	0.00
Glass fibre	≥1.5%	0.00%	0.00
Bio-based materials	≥5%	0.00%	0.596
PVC/PET/PP film	≤1%	0.00%	0.00
PUR adhesive	≤1%	0.00%	0.00
TOTAL	100%	0.00%	0.596
Packaging materials	**Weight, kg**	**Weight-% (versus the product)**	**Weight biogenic carbon, kg C/declared unit**
Wood pallet	0.7500	4.79%	0.441
Plastic straps	0.007	0.04%	0.000
Wood board	0.3000	1.92%	0.148
TOTAL	1.057	6.76%	0.589

Table 4 Product content of other products in this EPD

Product components	Percentage

Metals	0%
Mineral materials	≥90%
Glass fibre	≥1.5%
Bio-based materials	≥5%
PVC or PET or PP film	≤1%
PUR adhesive	≤1%
Paint	≤1%
TOTAL	100.00%

UN CPC code:
37520

Geographical scope:
A1-A3 China, A4 from China to GLO, A5 GLO, B GLO, C GLO, D GLO

LCA information

Declared unit:
1 m2*12 mm of the Roklite Pro ATL1150RK.PVC.LAM product, equal to 15.65 kg.

Reference service life:
20 years in typical residential conditions.

Time representativeness:
2023 (January to December).

Database(s) and LCA software used:
LCA Content 2023.1 Databases (2023.1 Edition) and ecoinvent v3.9.1 (cut-off), LCA for expert (Gabi).

Description of system boundaries:
Cradle to gate with options (A4, A5, module B, modules C1–C4, and module D), serving for type (b) EPD.

Most data used in A1-A3 modules were collected from Atlon and the upstream factory of the main raw material production. Data relevant to the production are average values for the production situation in year 2023 (from January to December). Atlon's production site treats air emission to meet the requirements of discharging after treatment. No wastewater was generated during the manufacturing processes. The main solid waste generated from the manufacturing process were product scrap and some package waste, which were pulverized and disposed of locally, and waste treatment of landfill was considered.

A4 is included in the system boundary with practical transportation information.

Table 5 Shipping information for the studied products

A4 Stages	Stage information	Type of data	Type of transportation	Design Load (t)	Share of total	Distance (km)
Stage 1	From factory to port	Specific	Truck	27	100.0%	217
Stage 2	From port to port	Specific	Sea	>10,000	40.0%	19,783
	From port to port	Specific	Sea	>10,000	15.0%	10,164

	From port to port	Specific	Sea	>10,000	15.0%	9,938
	From port to port	Specific	Sea	>10,000	15.0%	10,567
	From port to port	Specific	Sea	>10,000	15.0%	12,564
	From port to port	Average	Sea	>10,000	100.0%	14,398
Stage 3	From port to downstream warehouse	Assumption	Truck	34	100.0%	100

With regard to the A5 phase, the installation requires small consumption of glue and staple. There is no water use or energy use in this stage, nor is there product loss in this stage. Also, according to the information provided by Atlon, the product packaging is assumed to become waste in this stage and is treated to the end-of-waste state.

Table 6. Input for installing the studied products

A5 Input for construction	Unit	Amount	Percentage
Glue	kg	0.030	37.5%
Staple	kg	0.050	62.5%
TOTAL	kg	0.08	100%

Table 7. Waste generation during the construction stage

A5 Waste	Unit	Amount	Percentage	Note
Wood pallet	kg	0.7500	71.43%	Incineration
Plastic belt	kg	0.007	0.67%	Incineration
Wood board	kg	0.3000	28.57%	Incineration
TOTAL	kg	1.057	100%	

Table 8. Transportation of the construction stage

A5 Item	Data source	Type of transportation	Design Load (t)	Share of total amount	Distance (km)
Glue	Assumption	Truck	26	100%	100
Staple	Assumption	Truck	26	100%	100
Waste-wood	Assumption	Truck	26	100%	100
Waste-paper	Assumption	Truck	26	100%	100
Waste-plastics	Assumption	Truck	26	100%	100
Waste-iron	Assumption	Truck	26	100%	100

The products in this EPD does not generate emission or consume energy or water during the whole use phase, and there is no need for maintenance, repairs, replacements, and refurbishment during the life cycle until the building is scrapped. Therefore, the use phase environmental impact is deemed to be zero.

The product will be deconstructed manually without consuming any materials or energy, so the environmental burdens from the module C1 is deemed to be zero. For C2 module, conservative assumptions was made. For the waste processing C3 module, disposal C4 module, and D module (benefits and loads beyond the system boundary), the generic data has been applied. The wasted product will be sent to landfill according to the client, so the environmental impact of waste processing C3 module is deemed to be zero, the corresponding impact of waste disposal C4 module was calculated, and the environmental impact of D module is thus assumed to be zero.

Table 9 Waste transportation in module C2

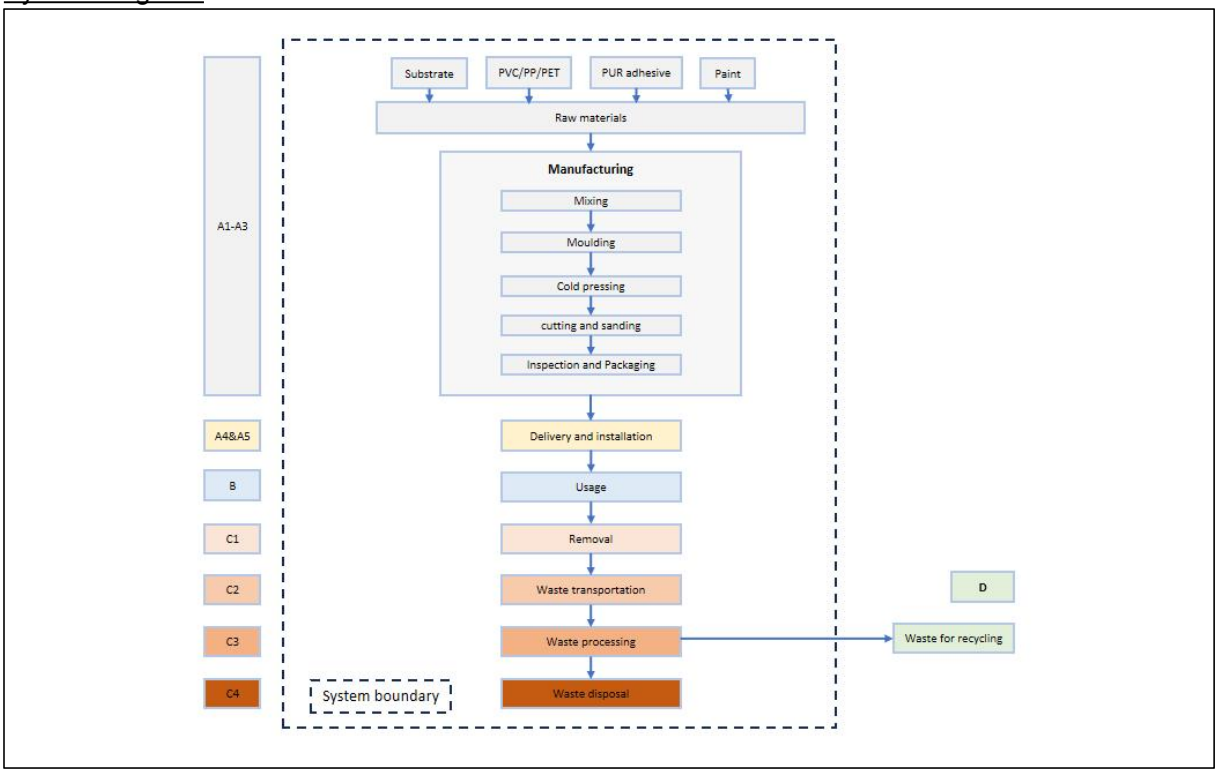
C2 Waste product	Amount (kg)	Distance (km)	Transportation way	Design loads (t)
Transportation	15.65	100	Truck + diesel + Euro 5	26

Table 10 Datasets selection for Module C4 calculation.

Module C4	Datasets	Data source	Time representativeness
Waste product disposal	RER: Inert matter (Unspecific construction waste) on landfill	Sphera	2022-2025

Note that the 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.

System diagram:



Manufacturing processes:

The Roklite Pro products in this EPD are produced in the same factory in Shandong with the same production process, and the main raw material substrate is produced in Jiangsu Province, China. The flow chart below introduces the production process briefly.

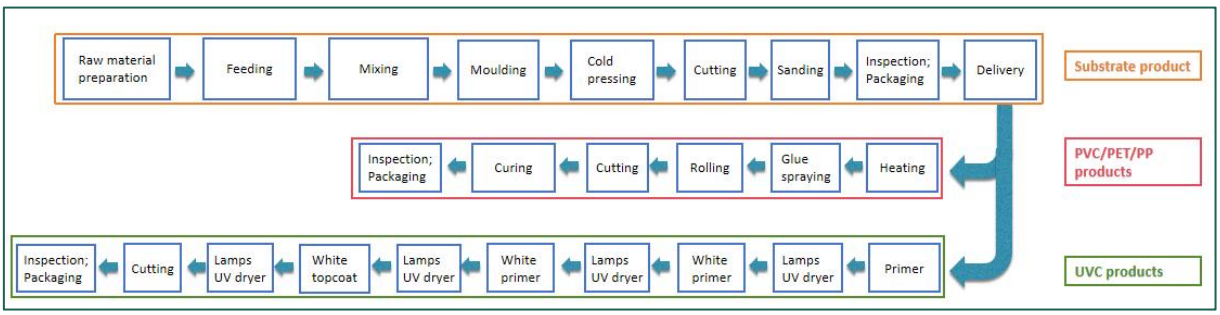


Figure 1 The main production process of the studied products.

The main raw materials for producing the studied products is substrate, with plastic film or paint on the substrate surface. Before being delivered to overseas market, the products will then be inspected and packed in Shandong factory. The main waste generated from the manufacturing process were product scrap and some package waste, which were pulverized and disposed of locally.

For the main raw material substrate, the manufacturing processes are also included with practical data. All the raw materials of substrate are mixed and then spread out on moulds. After cold pressing and shaping, the semi-finished board will then proceed through to edge cutting and surface sanding. The main energy source consumed during manufacturing is electricity (for manufacturing machine), solar power (for manufacturing machine), and small amount of diesel (for forklift). The main waste generated from the manufacturing process is product scrap, which will be used as raw materials for other products of the substrate production factory.

China is relatively large and the electricity generation structure varies from province to province, so the electricity data for China requires the use of a sub-national electricity mix according to the PCR requirements. Therefore, the electricity datasets used is from the Managed LCA Content 2023.1 Databases based on sub-national electricity grid composition from the China electric power yearbook 2022.

The studied products were produced in Shandong factory. According to the China electric power yearbook 2022, the electricity grid of Shandong province consists of 85.01% electricity from hard coal, 0.19% electricity from hydro power, 3.20% electricity from nuclear power, 6.60% electricity from wind power, and 5.00% electricity from solar power. So a model was made with datasets CN: Electricity from hard coal, CN: Electricity from hydro power, CN: Electricity from nuclear, CN: Electricity from wind power, and CN: Electricity from photovoltaic (reference year 2019-2025) in Gabi to calculate the environmental impact of the electricity consumed in Shandong province with specific electricity source portion.

For the main raw material substrate, it was produced in Jiangsu province. According to the China electric power yearbook 2022, the electricity grid of Jiangsu province consists of 80.77% electricity from hard coal, 0.53% electricity from hydro power, 8.28% electricity from nuclear power, 7.09% electricity from wind power, and 3.32% electricity from solar power. So a model was made with datasets CN: Electricity from hard coal, CN: Electricity from hydro power, CN: Electricity from nuclear, CN: Electricity from wind power, and CN: Electricity from photovoltaic (reference year 2019-2025) in Gabi to calculate the environmental impact of the electricity consumed in Jiangsu Province with specific electricity source portion. Note that the Guarantees of Origin market in China represents an extremely small proportion of production and consumption, and therefore the consumption mix is effectively the same as the residual mix.

Table 11 lists the energy source behind the electricity consumption mix of Shandong province and Jiangsu province, China and its climate impact using the indicator of GWP-GHG.

Table 11. Electricity structure of the Jiangsu province and the datasets chosen for it

Electricity generation sources	Dataset used in the model	GWP-GHG (CO_2 eq./kWh)	Percentage in Jiangsu province	Percentage in Shandong province
Electricity from fossil fuel(1)	CN: Electricity from hard coal Sphera	1.11	80.77%	85.01%
Electricity from hydro power	CN: Electricity from hydro power Sphera	0.00745	0.53%	0.19%

Electricity from nuclear power	CN: Electricity from nuclear power Sphera	0.00446	8.28%	3.20%
Electricity from wind power	CN: Electricity from wind power Sphera	0.0171	7.09%	6.60%
Electricity from photovoltaic	CN: Electricity from photovoltaic Sphera	0.0288	3.32%	5.00%

(1) In the 2022 China Electricity Yearbook, the percentage of electricity from fossil fuel for each province is not specified. A brief description of electricity from fossil fuel for the whole country is given in the yearbook, i.e. it covers coal, gas, oil, biomass, and a small amount of unidentified sources for generating electricity. Based on the information in the yearbook, i.e., electricity from hard coal accounts for more than 80% of the thermal power generation types, and considering that China is a country where coal-fired power generation is the main source of thermal power generation, the LCA practitioner (IVL) decided to use electricity from hard coal as 100% of the dataset selection for electricity from fossil fuel in this study for modelling.

The GWP-GHG of electricity mix is 0.902 CO2 eq./kWh for Jiangsu province and is 0.947 CO2 eq./kWh for Shandong province.

Allocation:

(1) Allocation between product and its joint co-product
Allocation rules for co-products are mentioned in the PCR. No co-product was produced during manufacturing of products in this EPD. No co-product allocation was applied, i.e. all burdens are allocated to the final studied products.

(2) Allocation between studied products and other products
In Shandong factory area, other products besides the studied products are produced. During the data collection, some data were collected at the factory area level (e.g., amount of energy consumption, auxiliaries used, and waste generated). For these data, allocation according to physical properties were applied. Since the calculation process is carried out by Atlon, IVL double checked the calculation and make sure the calculation is correct.

Cut-off:
The cut-off criteria established by the PCR is that data for elementary flows to and from the product system contributing to a minimum of 95% of the declared environmental impacts shall be included (not including processes that are explicitly outside the system boundary).

No cut-off rule is applied in this study.

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

	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[1)]	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Geography	CN	CN	CN	CN to GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO	GLO
Share of specific date	30%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation – products	63%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - sites	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

(1) Modules included in the EPD (X) and the modules not declared (ND).

At the time of data collection, no substance included in the Candidate List of Substances of Very High Concern (SVHC) for authorization under the REACH Regulations is present in the products covered by this LCA and EPD either above the threshold for registration with the European Chemicals Agency or above 0.1% (wt/wt).

For this EPD project, the infrastructure and capital goods are not included since they are used many times for several years for the product manufacturing.

All results in this report are calculated by the EN 15804+A2. The “EN 15804 reference package” is calculated based on EF 3.1.

Results of the environmental performance indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks. In the result tables below, results of the environmental impact indicators including abiotic depletion potential for non-fossil resources (ADP-minerals & metals), abiotic depletion potential for fossil resources (ADP-fossil), water (user) deprivation potential, deprivation-weighted, water consumption (WDP) shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

Mandatory impact category indicators according to EN 15804

Results per 1 m²*12 mm of the Roklite Pro ATL1150RK.PVC.LAM products

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-fossil	kg CO_2 eq.	2.21E+01	1.24E+00	5.08E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-01	0.00E+00	2.32E-01	0.00E+00
GWP-biogenic	kg CO_2 eq.	-3.77E+00	0.00E+00	1.03E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.75E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	2.32E-02	2.44E-03	1.09E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.79E-04	0.00E+00	7.30E-04	0.00E+00
GWP-total	kg CO_2 eq.	1.84E+01	1.24E+00	1.54E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.09E-01	0.00E+00	2.98E+00	0.00E+00
ODP	kg CFC 11 eq.	9.68E-08	6.41E-14	6.60E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-17	0.00E+00	5.98E-13	0.00E+00
AP	mol H^+ eq.	7.24E-02	3.38E-02	3.08E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E-04	0.00E+00	1.67E-03	0.00E+00
EP-freshwater	kg P eq.	2.03E-03	1.09E-06	3.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-07	0.00E+00	4.73E-07	0.00E+00
EP-marine	kg N eq.	1.50E-02	8.16E-03	6.32E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.54E-05	0.00E+00	4.31E-04	0.00E+00
EP-terrestrial	mol N eq.	1.63E-01	8.95E-02	5.82E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.41E-04	0.00E+00	4.74E-03	0.00E+00
POCP	kg NMVOC eq.	5.00E-02	2.29E-02	1.69E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.13E-04	0.00E+00	1.30E-03	0.00E+00
ADP-minerals&metals*	kg Sb eq.	9.73E-05	3.12E-08	1.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.21E-09	0.00E+00	1.09E-08	0.00E+00
ADP-fossil*	MJ	2.01E+02	1.54E+01	7.50E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+00	0.00E+00	3.13E+00	0.00E+00
WDP*	m^3	2.37E+00	4.14E-03	4.74E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.32E-04	0.00E+00	2.58E-02	0.00E+00
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals&metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption															

Additional mandatory and voluntary impact category indicators

Results per 1 m²*12 mm of the Roklite Pro ATL1150RK.PVC.LAM products

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	2.21E+01	1.23E+00	5.06E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-01	0.00E+00	2.32E-01	0.00E+00

Resource use indicators

Results per 1 m^2*12 mm of the Roklite Pro ATL1150RK.PVC.LAM products

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	3.63E+02	2.70E-01	1.08E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.98E-02	0.00E+00	5.10E-01	0.00E+00
PERM	MJ	1.44E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.63E+02	2.70E-01	1.08E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.98E-02	0.00E+00	5.10E-01	0.00E+00
PENRE	MJ	2.01E+02	1.54E+01	7.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+00	0.00E+00	3.13E+00	0.00E+00
PENRM	MJ	2.89E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	2.01E+02	1.54E+01	7.51E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+00	0.00E+00	3.13E+00	0.00E+00
SM	kg	1.00E-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	1.00E-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	1.00E-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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	6.14E-02	3.18E-04	1.37E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.13E-05	0.00E+00	7.91E-04	0.00E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water															

Waste indicators

Results per 1 m^2*12 mm of the Roklite Pro ATL1150RK.PVC.LAM products

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste disposed	kg	8.60E-07	2.35E-10	2.92E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.21E-11	0.00E+00	6.82E-11	0.00E+00

[1] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.

Non-hazardous waste disposed	kg	2.19E-01	1.64E-03	3.51E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-04	0.00E+00	1.57E+01	0.00E+00
Radioactive waste disposed	kg	9.69E-04	1.83E-05	4.91E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-06	0.00E+00	3.57E-05	0.00E+00

Output flow indicators

Results per 1 m²*12 mm of the Roklite Pro ATL1150RK.PVC.LAM products

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	1.00E-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	3.34E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	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 energy recovery	kg	1.00E-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	1.00E-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	1.00E-90	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Additional environmental information

Result variation between the worst-case product and other products in this EPD

LCA result of 1 m2*12 mm ATL1150RK.LAM/UVC for EPD2 (A-C)	Min	Worst-case	Differ
1. Environmental impact indicators			
00 Global warming potential (GWP-GHG) [kg CO2 eq.]	8.34E+00	2.42E+01	65%
01 EN15804+A2 Climate Change - total [kg CO2 eq.]	8.67E+00	2.43E+01	64%
02 EN15804+A2 Climate Change, fossil [kg CO2 eq.]	8.36E+00	2.42E+01	65%
03 EN15804+A2 Climate Change, biogenic [kg CO2 eq.]	1.29E-02	1.18E-01	89%
04 EN15804+A2 Climate Change, land use and land use change [kg CO2 eq.]	1.02E-02	2.83E-02	64%
05 EN15804+A2 Ozone depletion [kg CFC-11 eq.]	5.31E-08	1.03E-07	49%
06 EN15804+A2 Acidification [Mole of H+ eq.]	4.02E-02	1.11E-01	64%
07 EN15804+A2 Eutrophication, freshwater [kg P eq.]	6.69E-04	2.07E-03	68%
08 EN15804+A2 Eutrophication, marine [kg N eq.]	8.80E-03	2.43E-02	64%
09 EN15804+A2 Eutrophication, terrestrial [Mole of N eq.]	9.05E-02	2.63E-01	66%
10 EN15804+A2 Photochemical ozone formation, human health [kg NMVOC eq.]	2.60E-02	7.60E-02	66%
11 EN15804+A2 Resource use, mineral and metals [kg Sb eq.]	1.99E-05	1.15E-04	83%
12 EN15804+A2 Resource use, fossils [MJ]	7.31E+01	2.28E+02	68%
13 EN15804+A2 Water use [m³ world equiv.]	1.27E+00	2.87E+00	56%
2. Ressource use indicators			
01 EN15804+A2 Use of renewable primary energy (PERE) [MJ]	3.16E+02	3.65E+02	13%
02 EN15804+A2 Primary energy resources used as raw materials (PERM) [MJ]	4.81E+00	1.44E+01	67%
03 EN15804+A2 Total use of renewable primary energy resources (PERT) [MJ]	3.16E+02	3.65E+02	13%
04 EN15804+A2 Use of non-renewable primary energy (PENRE) [MJ]	7.31E+01	2.28E+02	68%
05 EN15804+A2 Non-renewable primary energy resources used as raw materials (PENRM) [MJ]	9.62E+00	2.89E+01	67%
06 EN15804+A2 Total use of non-renewable primary energy resources (PENRT) [MJ]	7.33E+01	2.28E+02	68%
07 EN15804+A2 Input of secondary material (SM) [kg]	3.33E-91	1.00E-90	
08 EN15804+A2 Use of renewable secondary fuels (RSF) [MJ]	3.33E-91	1.00E-90	
09 EN15804+A2 Use of non renewable secondary fuels (NRSF) [MJ]	3.33E-91	1.00E-90	
10 EN15804+A2 Use of net fresh water (FW) [m3]	3.17E-02	7.64E-02	58%
3. Output flows and waste categories			
01 EN15804+A2 Hazardous waste disposed (HWD) [kg]	9.88E-06	3.01E-05	67%
02 EN15804+A2 Non-hazardous waste disposed (NHWD) [kg]	5.28E+00	1.59E+01	67%
03 EN15804+A2 Radioactive waste disposed (RWD) [kg]	3.92E-04	1.07E-03	64%
04 EN15804+A2 Components for re-use (CRU) [kg]	3.33E-91	1.00E-90	
05 EN15804+A2 Materials for Recycling (MFR) [kg]	1.11E-01	3.34E-01	67%
06 EN15804+A2 Material for Energy Recovery (MER) [kg]	3.33E-91	1.00E-90	
07 EN15804+A2 Exported electrical energy (EEE) [MJ]	3.33E-91	1.00E-90	
08 EN15804+A2 Exported thermal energy (EET) [MJ]	3.33E-91	1.00E-90	

LCA result of 1 m2*12 mm ATL1150RK. LAM/UVC for EPD2 (A1-A3)	Min	Max	Differ
00 Global warming potential (GWP-GHG) [kg CO2 eq.] （A1-A3）	8.28E+00	2.21E+01	63%

Note that the only difference between the two product families in this EPD is the surface process. Results show that the environmental impact of plastic film per suare meter is higher than that of UVC coating, so the worst case result is for 1 m2*12 mm ATL1150RK.PVC.LAM product. For the minmum impact, the results of 4mm PVC product and the results of 4mm UVC product were compared, and combined all the minimum impact indicators in the above table.

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