Environmental Product Declaration

OFI PET Acoustic Panel

MODEL 1: 9mm
MODEL 2: 12mm
MODEL 3: 24mm



OFI PET ACOUSTIC PANEL

OFI SOLUTION

Nantong Ofisolution New Material Co., Ltd is specialized manufacturing eco-friendly PET acoustic panels and office ergonomic standing desk. Since 2003, Professional research, development, production, architectural design for office solution. Make people enjoy more eco-friendly and quiet environment with health worklife.

Acoustic panel is made from 100% PET, by needle punching processing. The whole production process is complete physical and eco-friendly.

We provide high performance acoustic absorbers for office, retail, restaurant, hotels, gyms etc. to improve speech, intelligibility, wellbeing, concentration and performance. It blends very well with natural materials such as stone, concrete and wood.

Now we provide Environmental Product Declarations (EPDs) to document the sustainability of our products.

UL CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

OFI SOLUTION

OFI PET Acoustic Panel
9 mm/12mm/24 mm

According to ISO 14025, EN 15804, and ISO21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL Environment 333 Pfingsten Road Northbrook, IL 60611 https://www.ul.com/ https://spot.ul.com/
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	General Program Instructions v.2.5 March 2020
MANUFACTURER NAME AND ADDRESS	Nantong Ofisolution New Material Co., Ltd. NO.198,Gongnong Road,Nantong,Jiangsu,China
DECLARATION NUMBER	4790099995.101.2
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Declared product: OFI PET acoustic panel (9mm,12mm,24mm) Declared unit: 1 m^2
REFERENCE PCR AND VERSION NUMBER	Part B for Non-Metal Ceiling Products to conform with ISO 21930:2017 and UL Part A v3.2
DESCRIPTION OF PRODUCT APPLICATION/USE	OFI PET acoustic panel is a type of building interior used in commercial offices, hotels, restaurants, retail, multifunctional hall, etc.
PRODUCT RSL DESCRIPTION (IF APPL.)	30 years
MARKETS OF APPLICABILITY	Europe, North America, Japan
DATE OF ISSUE	April 1, 2022
PERIOD OF VALIDITY	5 years
EPD TYPE	Product-specific
DATASET VARIABILITY	Mean, median, standard deviation
EPD SCOPE	Cradle to gate with options (A1, A2, A3, A4, A5, C1, C2, C3 C4)
YEAR(S) OF REPORTED PRIMARY DATA	2021
LCA SOFTWARE & VERSION NUMBER	Simapro 9.1
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent 3.6
LCIA METHODOLOGY & VERSION NUMBER	CML-IA baseline 4.2; TRACI 2.1 v1.05
The sub-category PCR review was conducted by:	UL PCR Review Panel epd@ul.com
This declaration was independently verified in accordance with ISO 14025: 2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," serves as the core PCR ☐ INTERNAL ☐ EXTERNAL	Cooper McCollum, UL Environment
The EPD conforms with (select one)	■ ISO 21930: 2017 ☐ EN 15804: 2013+A1: 2014 ☐ EN 15804: 2013+A2: 2019
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	SRF
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine, Thrive ESG

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: EPDs from different programs may not be comparable. Full conformance with a PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

1. Product Definition and Information

1.1. Description of Company/Organization

Nantong OFISOLUTION New Material Co.,Ltd. has introduced internationally advanced fully automated production equipment, professionally designed and produced recyclable PET sound-absorbing panels, desk top screens, and floor-to-ceiling partition screens to provide environmentally friendly acoustic solutions for open office spaces. With strict quality requirements, the company provides customers with professional sound absorption solutions, allowing people to enjoy a more environmentally friendly, quieter environment, and a healthy working life.

The factory is located in the Yinxi Innovation and Technology Industrial Park, Shaxi Town, Taicang, with convenient transportation and only one hour's drive from Shanghai.

1.2. Product Description

Product Identification

-The sound-absorbing board is made of 100% PET and is processed by needle punching.

-The porous nature of the sound-absorbing board makes its sound absorption, heat insulation and flame retardant effect reach ASTM E84 Class A and EN13501 Class B, and has passed OEKO-TEX100 certification.

-It blends perfectly with natural materials such as stone, concrete, and wood.

Product Specification

For the declared product, the following technical data in the delivery status must be provided with reference to the test standards:

Table 1. Technical Data

PROPERTY	VALUE	UNIT
Sound absorption coefficient (NRC) (ASTM C423)	85	%
Surface burning characteristics of building materials (ASTM E84)	Class A	
Fire hazard classification EN 13501	Class B	

Product Average

The results of this declaration represent an average performance for the listed products and manufacturing locations. The average product is calculated based on the weight of production.

1.3. Application

OFI PET acoustic panels are widely used in commercial offices, hotels, restaurants, retail, multifunctional hall, art gallery, library, gym, residential cinemas, theaters and auditoriums.



Figure 1. OFI PET acoustic panel in its various application

1.4. Declaration of Methodological Framework

This declaration is a product-specific EPD and is cradle-to-gate with options, including modules A1-A5 and C1-C4. The underlying LCA upon which this EPD is based included the following life cycle modules: Raw Material supply (A1); Inbound Transportation (A2); Manufacturing (A3); Distribution (A4); Installation (A5); End-of-life, Deconstruction (C1); Transport (C2); Waste processing (C3) and End-of-life, Disposal (C4). No known flows have been deliberately excluded. The product is expected to perform as claimed for the 10-year reference service life if it remains clean and dry in its installed state.

1.5. Technical Requirements

The size of the product is strictly required, the length and width error is controlled within ±2mm, and the thickness error is ±5%. There are no streaks, stray threads, or needle-punched holes on the surface, and the color difference of each batch is controlled within the scope of international standards. The respective standard is listed in the table 1 in Section 1.2 above for each attribute of the declared product.

ASTM E84-12 Standard Test Method for Surface Burning Characteristics of Building Materials

EN13501 Fire Classification of Construction Products and Building Elements

ASTM C423-17 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

1.6. Properties of Declared Product as Delivered

The declared product dimensions vary by installation. Standard sheet panel dimensions are summarized in Table 2.

Table 2. Standard OFI PET acoustic panel products dimensions included in this EPD

Parameter	Color Code	Thickness (mm)	Length (mm)	Width (mm)	Area (m^2)	Weight (kg)	Density (g/ m^2)
Value	OF-01	9	2440	1220	2.97	5.65	1900
	OF-05	24	2440	1220	2.97	10.7	3600
	HOF-05	12	2800	1225	3.43	8.57	2500

1.7. Material Composition

The PET acoustic panel is made of 100% polyester fiber (PET). The raw materials are polyester staple fiber accounts

for 60% of the mass and low-melting chemical fiber accounts for 40% of the mass, both of which are composed of PET.

1.8. Manufacturing

Manufacturing Locations

The factory that produces PET acoustic panels is located in the Yinxi Innovation and Technology Industrial Park, Shaxi Town, Taicang, China, with convenient transportation, only one hour away from Shanghai.

Manufacturing Process



Figure 2. Manufacturing process of PET acoustic panels

1.9. Packaging

In order to reduce the risk of damage during long-distance transportation, the PET acoustic panel products packaging is composed of paper boxes, PE packaging bags, wood pallets, glued cover plates, PVC stretch films, PET packing tapes, etc.

1.10. Transportation

The products are transported by sea, and they are transported by ships to overseas countries and regions such as Europe, North America, and Japan. The overseas centralized sales points are in Chicago (50%), Klaipeda (30%) and Osaka (20%). The weighted average distance from the manufacturing site to the customer is 500 km by truck and 11,900 km by ship.

1.11. Product Installation

OFI PET acoustic panels are made for easy handling and installation. Installation of OFI products is accomplished by manual labor using mostly hand tools, such as nail guns. This process does not require the use of adhesives. No

material or energy inputs are required on the jobsite. The size and shape of the material is planned at the time of purchase, so there is little excess scrap.

1.12. Use

There are no special conditions to be noted within the limits of normal and customary usage.

1.13. Reference Service Life and Estimated Building Service Life

The Reference Service Life (RSL) of the OFI PET acoustic panels is 10 years.

1.14. Reuse, Recycling, and Energy Recovery

At end-of-life, the products may be recycled or disposed of in a landfill or via incineration.

1.15. Disposal

Assuming that all material removed from the building is disposed of in accordance with the recommended disposal methods in PCR part A, 2.8.5, use 50 km as the average disposal distance. The waste treatment allocation scheme of this study was set as 26.3% recycling, 61.2% landfill, and 12.5% incineration.

2. Life Cycle Assessment Background Information

2.1. Functional or Declared Unit

The declared unit used in the study is defined as 1 m^2 of PET acoustic panel installed for use over a 10-year period. The reference flow for the product system is 1.90 kg/m^2 for the 9 mm product, 2.55 kg/m^2 for the 12 mm product and 3.60 kg/m^2 for the 24 mm product.

Table 3. The declared unit of the OFI PET acoustic panel (9mm, 12mm, 24mm)

NAME	VALUE			UNIT
FUNCTIONAL UNIT	1			ft^2
DECLARED UNIT	1			m^2
DECLARED THICKNESS	9	12	24	mm
WEIGHT PER DECLARED UNIT	1.90	2.55	3.60	kg/m^2

2.2. System Boundary

The scope of the EPD is cradle to installation with end of life. The life cycle phases included in the product system boundary are shown below.

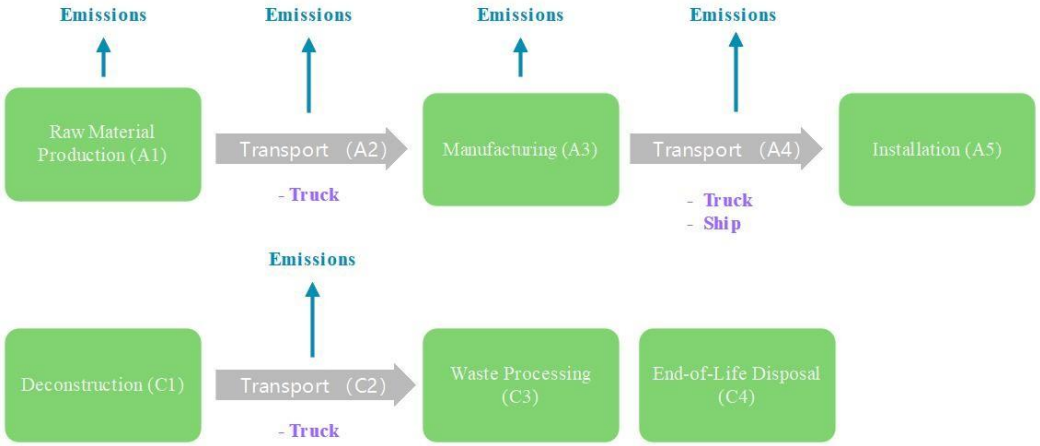


Figure 3. System boundary

2.3. Estimates and Assumptions

- The distance from the centralized warehouse to the installation site is assumed to be an average of 500 km by truck. A sensitivity analysis was performed.
- It is assumed that the product does not require any utilities or maintenance during its service life; the reference service life of the product is 10 years.
- For final disposal of the product and packaging material at end-of-life, all materials are assumed to be transported 50 km by diesel truck to a disposal plant.
- The waste treatment allocation scheme of this study was set as 26.3% recycling, 61.2% landfill, and 12.5% incineration. A sensitivity analysis was performed.

2.4. Cut-off Criteria

According to the section 2.9 of PCR (UL 10010 Version 3.2), the procedure detailed in ISO 21930, section 7.1.8 was followed regarding the exclusion of inputs and outputs. For energy, mass and environmental impacts, the cut-off criteria were 1% per the standard. Per the standard "the total of neglected input flows per module shall be a maximum of 5% of energy usage, mass and environmental impacts."

Flows excluded for this study include infrastructure, capital goods and workforce burdens. Inputs and outputs associated with infrastructure (construction, maintenance and demolition of buildings/plants, road surfaces, transport equipment, etc.) are not included. This choice is based on experience from previous LCAs where the contribution from these items was negligible due to the long lifetime of the equipment compared to the high production volume of material during that lifetime.

2.5. Data Sources

OFISOLUTION provides preliminary data for the raw materials and energy in the production process, and the source of the secondary LCI data is the Ecoinvent database. On-site data mainly include the types and usage of raw materials in raw material production, energy consumption in parts processing and product assembly, transportation data in sales and transportation, energy consumption in product use, and waste generation in product disposal; Background data

mainly include environmental impact factors in raw material production, parts processing and product assembly, sales and transportation, product use, and product disposal.

The raw material data comes from the factory's bill of material, the transportation data comes from the factory's logistics order records, and the energy consumption in the manufacturing process comes from the distribution of the company's electricity meter record data, which is verified by the calculation of equipment parameters.

2.6. Data Quality

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty. Primary data was based on measured and calculated data from the OFISOLUTION plant which produced most of the product in calendar year 2021. It meets requirements for completeness along with temporal, geographical and technological representativeness.

2.7. Period under Review

The period of review is calendar year 2021.

2.8. Allocation

Where it was not possible to avoid allocation, allocation was made based on product mass which is suggested by the PCR. Due to the different specifications (height, width, thickness, density) through the same process, manufacturing resource use was allocated to the products based on mass. Impacts from transportation were allocated based on the mass of material and distance transported.

3. Life Cycle Assessment Scenarios

Table 4. Transport to the building site (A4)

NAME	VALUE	UNIT
Fuel type	Diesel fuel	
Liters of fuel	9mm-Road: 1.13E+00 9mm-Ocean: 3.08E-03 12mm-Road: 1.61E+00 12mm-Ocean: 4.41E-03 24mm-Road: 2.14E+00 24mm-Ocean: 5.84E-03	l/100km
Vehicle type	Truck/Container ship	
Transport distance	Road: 500 Ocean: 11900	km
Capacity utilization (including empty runs, mass based)	Road: 95 Ocean: 90	%
Gross density of products transported	9mm: 2.11E+02 12mm: 3.23E+02 24mm: 4.00E+02	kg/m^3
Weight of products transported (if gross density not reported)	9mm: 1.90E+00 12mm: 2.45E+00 24mm: 3.60E+00	kg
Volume of products transported (if gross density not reported)	-	m^3
Capacity utilization volume factor (factor: =1 or <1 or ≥ 1 for compressed or nested packaging products)	1	-

Table 5. Installation into the building (A5)

NAME	VALUE	UNIT
Ancillary materials	0.00E+00	kg
Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer)	0.00E+00	m^3
Other resources	0.00E+00	kg
Electricity consumption	0.00E+00	kWh
Other energy carriers	0.00E+00	MJ
Product loss per functional unit	0.00E+00	kg
Waste materials at the construction site before waste processing, generated by product installation	0.00E+00	kg
Output materials resulting from on-site waste processing (specified by route; e.g. for recycling, energy recovery and/or disposal)	0.00E+00	kg
Biogenic carbon contained in packaging	-	kg CO_2
Direct emissions to ambient air, soil and water	0.00E+00	kg
VOC content	0.00E+00	µg/m^3

Table 6. End of life (C1-C4)

NAME		VALUE	UNIT
Assumptions for scenario development (description of deconstruction, collection, recovery, disposal method and transportation)		See description above	
Collection process (specified by type)	Collected separately	-	kg
	Collected with mixed construction waste	9mm: 1.90E+00 12mm: 2.45E+00 24mm: 3.60E+00	kg
Recovery (specified by type)	Reuse	-	kg
	Recycling	9mm: 5.00E-01 12mm: 7.33E-01 24mm: 9.47E-01	kg
	Landfill	-	kg
	Incineration	-	kg
	Incineration with energy recovery	-	kg
	Energy conversion efficiency rate	-	
Disposal (specified by type)	Product or material for final deposition	Landfill: 9mm: 1.16E+00 12mm: 1.67E+00 24mm: 2.20E+00 Incineration: 9mm: 2.40E-01 12mm: 3.41E-01 24mm: 4.50E-01	kg
Removals of biogenic carbon (excluding packaging)		-	kg CO_2

4. Life Cycle Assessment Results

Table 7. Description of the system boundary modules

	PRODUCT STAGE			CONSTRUCTION		USE							END OF LIFE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
EPD Type	X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	MND

4.1. Life Cycle Impact Assessment Results

The following results were obtained as a result of the life cycle impact assessment (LCIA). The LCIA results are shown through the CML-IA baseline 4.2 and TRACI 2.1. The C1 and C3 stages have no environmental impact and are not listed in the tables. The LCIA results are relative expressions and do not predict impacts on category endpoints, the exceedance of thresholds, safety margins or risks.

Table 8. North American Impact Assessment Results (9 mm)

TRACI v2.1	A1	A2	A3	A4	A5	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	6.39E+00	1.33E-01	3.24E+00	3.73E-01	3.13E-02	0.00E+00	1.62E-02	0.00E+00	7.47E-01
ODP [kg CFC-11 eq]	4.06E-07	3.15E-08	5.10E-08	8.29E-08	2.43E-10	0.00E+00	3.79E-09	0.00E+00	6.15E-09
AP [kg SO_2 eq]	2.51E-02	6.11E-04	1.58E-02	6.61E-03	1.84E-05	0.00E+00	7.43E-05	0.00E+00	2.55E-04
EP [kg N eq]	1.31E-02	1.55E-04	5.12E-03	5.11E-04	2.44E-04	0.00E+00	1.89E-05	0.00E+00	1.70E-02
POCP [kg O_3 eq]	3.30E-01	1.46E-02	2.35E-01	1.26E-01	3.52E-04	0.00E+00	1.77E-03	0.00E+00	6.62E-03
ADP_{fossil} [MJ, LHV]	1.97E+01	2.84E-01	5.93E-01	7.42E-01	2.25E-03	0.00E+00	3.42E-02	0.00E+00	6.05E-02

Table 9. EU Impact Assessment Results (9 mm)

CML v4.2	A1	A2	A3	A4	A5	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	6.48E+00	1.33E-01	3.29E+00	3.73E-01	3.85E-02	0.00E+00	1.62E-06	0.00E+00	7.55E-01
ODP [kg CFC-11 eq]	3.18E-07	2.37E-08	2.35E-08	6.24E-08	1.92E-10	0.00E+00	2.85E-09	0.00E+00	4.79E-09
AP [kg SO_2 eq]	2.47E-02	5.23E-04	1.47E-02	6.17E-03	1.23E-05	0.00E+00	6.37E-05	0.00E+00	2.00E-04
EP [kg PO_4^{-3} eq]	6.92E-03	1.24E-04	3.24E-03	7.71E-04	9.04E-05	0.00E+00	1.51E-05	0.00E+00	6.30E-03
POCP [kg ethene eq]	1.49E-03	1.81E-05	5.46E-04	1.66E-04	9.22E-06	0.00E+00	2.21E-06	0.00E+00	2.52E-05
$ADP_{element}$ [kg Sb-eq]	1.19E-04	3.20E-06	4.49E-06	5.92E-06	2.39E-08	0.00E+00	4.34E-07	0.00E+00	3.61E-07
ADP_{fossil} [MJ, LHV]	1.42E+02	1.99E+00	2.94E+01	5.10E+00	1.68E-02	0.00E+00	2.40E-01	0.00E+00	4.36E-01

Table 10. North American Impact Assessment Results (12 mm)

TRACI v2.1	A1	A2	A3	A4	A5	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	8.62E+00	1.33E-01	3.24E+00	5.12E-01	3.13E-02	0.00E+00	2.33E-02	0.00E+00	9.78E-01
ODP [kg CFC-11 eq]	5.76E-07	3.15E-08	5.10E-08	9.91E-08	2.43E-10	0.00E+00	5.11E-09	0.00E+00	8.98E-09
AP [kg SO_2 eq]	3.62E-02	6.11E-04	1.58E-02	8.94E-03	1.84E-05	0.00E+00	9.21E-05	0.00E+00	3.52E-04
EP [kg N eq]	1.88E-02	1.55E-04	5.12E-03	7.36E-04	2.44E-04	0.00E+00	2.51E-05	0.00E+00	2.45E-02
POCP [kg O_3 eq]	4.78E-01	1.46E-02	2.35E-01	1.87E-01	3.52E-04	0.00E+00	2.27E-03	0.00E+00	8.32E-03
ADP_{fossil} [MJ, LHV]	2.86E+01	2.84E-01	5.93E-01	9.49E-01	2.25E-03	0.00E+00	4.55E-02	0.00E+00	8.17E-02

Table 11. EU Impact Assessment Results (12 mm)

CML v4.2	A1	A2	A3	A4	A5	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	8.62E+00	1.33E-01	3.29E+00	4.21E-01	3.85E-02	0.00E+00	1.29E-04	0.00E+00	9.77E-01
ODP [kg CFC-11 eq]	4.21E-07	2.37E-08	2.35E-08	8.43E-08	1.92E-10	0.00E+00	3.49E-09	0.00E+00	6.64E-09
AP [kg SO_2 eq]	3.51E-02	5.23E-04	1.47E-02	9.01E-03	1.23E-05	0.00E+00	9.06E-05	0.00E+00	2.74E-04
EP [kg PO_4^{-3} eq]	8.71E-03	1.24E-04	3.24E-03	9.22E-04	9.04E-05	0.00E+00	2.19E-05	0.00E+00	8.85E-03
POCP [kg ethene eq]	1.98E-03	1.81E-05	5.46E-04	2.11E-04	9.22E-06	0.00E+00	3.03E-06	0.00E+00	3.58E-05
$ADP_{element}$ [kg Sb-eq]	1.67E-04	3.20E-06	4.49E-06	8.07E-06	2.39E-08	0.00E+00	6.11E-07	0.00E+00	4.92E-07
ADP_{fossil} [MJ, LHV]	2.04E+02	1.99E+00	2.94E+01	7.13E+00	1.68E-02	0.00E+00	3.23E-01	0.00E+00	5.81E-01

Table 12. North American Impact Assessment Results (24 mm)

TRACI v2.1	A1	A2	A3	A4	A5	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	1.21E+01	1.33E-01	3.24E+00	7.06E-01	3.13E-02	0.00E+00	3.06E-02	0.00E+00	1.40E+00
ODP [kg CFC-11 eq]	7.66E-07	3.15E-08	5.10E-08	1.57E-07	2.43E-10	0.00E+00	7.17E-09	0.00E+00	1.15E-08
AP [kg SO_2 eq]	4.74E-02	6.11E-04	1.58E-02	1.25E-02	1.84E-05	0.00E+00	1.41E-04	0.00E+00	4.79E-04
EP [kg N eq]	2.46E-02	1.55E-04	5.12E-03	9.69E-04	2.44E-04	0.00E+00	3.58E-05	0.00E+00	3.20E-02
POCP [kg O_3 eq]	6.23E-01	1.46E-02	2.35E-01	2.39E-01	3.52E-04	0.00E+00	3.36E-03	0.00E+00	1.24E-02
ADP_{fossil} [MJ, LHV]	3.72E+01	2.84E-01	5.93E-01	1.41E+00	2.25E-03	0.00E+00	6.48E-02	0.00E+00	1.13E-01

Table 13. EU Impact Assessment Results (24 mm)

CML v4.2	A1	A2	A3	A4	A5	C1	C2	C3	C4
GWP 100 [kg CO_2 eq]	1.22E+01	1.33E-01	3.29E+00	7.07E-01	3.85E-02	0.00E+00	3.07E-02	0.00E+00	1.42E+00
ODP [kg CFC-11 eq]	5.99E-07	2.37E-08	2.35E-08	1.18E-07	1.92E-10	0.00E+00	5.39E-09	0.00E+00	8.98E-09
AP [kg SO_2 eq]	4.67E-02	5.23E-04	1.47E-02	1.17E-02	1.23E-05	0.00E+00	1.41E-04	0.00E+00	3.76E-04
EP [kg PO_4^{-3} eq]	1.30E-02	1.24E-04	3.24E-03	1.46E-03	9.04E-05	0.00E+00	2.86E-05	0.00E+00	1.18E-02
POCP [kg ethene eq]	2.82E-03	1.81E-05	5.46E-04	3.15E-04	9.22E-06	0.00E+00	4.19E-06	0.00E+00	4.72E-05
$ADP_{element}$ [kg Sb-eq]	2.25E-04	3.20E-06	4.49E-06	1.12E-05	2.39E-08	0.00E+00	8.21E-07	0.00E+00	6.76E-07
ADP_{fossil} [MJ, LHV]	2.68E+02	1.99E+00	2.94E+01	9.66E+00	1.68E-02	0.00E+00	4.54E-01	0.00E+00	8.17E-01

4.2. Life Cycle Inventory Results

Table 14. Resource Use (9 mm)

PARAMETER	A1	A2	A3	A4	A5	C1	C2	C3	C4
RPR_E [MJ, LHV]	4.42E+00	2.23E-02	2.97E+00	4.55E-02	5.64E-04	0.00E+00	2.71E-03	0.00E+00	1.10E-02
RPR_M [MJ, LHV]	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
RPR_T [MJ, LHV]	4.42E+00	2.23E-02	2.97E+00	4.55E-02	5.64E-04	0.00E+00	2.71E-03	0.00E+00	1.10E-02
$NRPR_E$ [MJ, LHV]	1.56E+02	2.04E+00	3.13E+01	5.20E+00	1.81E-02	0.00E+00	2.46E-01	0.00E+00	4.61E-01
$NRPR_M$ [MJ, LHV]	5.00E+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
$NRPR_T$ [MJ, LHV]	2.06E+02	2.04E+00	3.13E+01	5.20E+00	1.81E-02	0.00E+00	2.46E-01	0.00E+00	4.61E-01
SM [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	0.00E+00
RSF [MJ, LHV]	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, LHV]	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]	3.00E+00	6.97E-03	3.54E-01	1.24E-02	1.19E-03	0.00E+00	8.12E-04	0.00E+00	4.44E-02

Table 15. Output Flows and Waste Categories (9 mm)

PARAMETER	A1	A2	A3	A4	A5	C1	C2	C3	C4
HWD [kg]	2.54E-04	5.20E-06	4.26E-06	8.89E-06	3.62E-08	0.00E+00	6.40E-07	0.00E+00	8.73E-07
NHWD [kg]	6.25E-01	1.17E-01	2.76E-01	1.21E-01	1.40E-02	0.00E+00	1.15E-02	0.00E+00	1.32E+00
HLRW [kg] or [m^3]	1.63E-04	1.33E-05	1.72E-05	3.49E-05	8.62E-08	0.00E+00	1.60E-06	0.00E+00	2.26E-06
CRU [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	0.00E+00
R [kg]	8.17E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-01
MER [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	0.00E+00
EE [MJ, LHV]	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

Table 16. Resource Use (12 mm)

PARAMETER	A1	A2	A3	A4	A5	C1	C2	C3	C4
RPR_E [MJ, LHV]	6.03E+00	2.23E-02	2.97E+00	6.44E-02	5.64E-04	0.00E+00	3.78E-03	0.00E+00	1.53E-02
RPR_M [MJ, LHV]	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
RPR_T [MJ, LHV]	6.03E+00	2.23E-02	2.97E+00	5.96E-02	5.64E-04	0.00E+00	3.78E-03	0.00E+00	1.53E-02
$NRPR_E$ [MJ, LHV]	2.21E+02	2.04E+00	3.13E+01	7.18E+00	1.81E-02	0.00E+00	1.42E-01	0.00E+00	6.32E-01
$NRPR_M$ [MJ, LHV]	7.04E+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
$NRPR_T$ [MJ, LHV]	2.92E+02	2.04E+00	3.13E+01	7.18E+00	1.81E-02	0.00E+00	1.42E-01	0.00E+00	6.32E-01
SM [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	0.00E+00
RSF [MJ, LHV]	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, LHV]	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]	4.11E+00	6.97E-03	3.54E-01	1.89E-02	1.19E-03	0.00E+00	9.84E-04	0.00E+00	6.21E-02

Table 17. Output Flows and Waste Categories (12 mm)

PARAMETER	A1	A2	A3	A4	A5	C1	C2	C3	C4
HWD [kg]	3.43E-04	5.20E-06	4.26E-06	9.97E-06	3.62E-08	0.00E+00	8.11E-07	0.00E+00	9.98E-07
NHWD [kg]	8.18E-01	1.17E-01	2.76E-01	1.64E-01	1.40E-02	0.00E+00	1.52E-02	0.00E+00	1.78E+00
HLRW [kg] or [m^3]	2.11E-04	1.33E-05	1.72E-05	4.98E-05	8.62E-08	0.00E+00	2.12E-06	0.00E+00	3.08E-06
CRU [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	0.00E+00
R [kg]	9.23E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.03E-01
MER [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	0.00E+00
EE [MJ, LHV]	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

Table 18. Resource Use (24 mm)

PARAMETER	A1	A2	A3	A4	A5	C1	C2	C3	C4
RPR_E [MJ, LHV]	7.90E+00	2.23E-02	2.97E+00	8.61E-02	5.64E-04	0.00E+00	5.14E-03	0.00E+00	2.06E-02
RPR_M [MJ, LHV]	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
RPR_T [MJ, LHV]	7.90E+00	2.23E-02	2.97E+00	8.61E-02	5.64E-04	0.00E+00	5.14E-03	0.00E+00	2.06E-02
$NRPR_E$ [MJ, LHV]	2.95E+02	2.04E+00	3.13E+01	9.85E+00	1.81E-02	0.00E+00	4.66E-01	0.00E+00	8.65E-01
$NRPR_M$ [MJ, LHV]	9.50E+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
$NRPR_T$ [MJ, LHV]	3.90E+02	2.04E+00	3.13E+01	9.85E+00	1.81E-02	0.00E+00	4.66E-01	0.00E+00	8.65E-01
SM [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	0.00E+00
RSF [MJ, LHV]	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, LHV]	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]	5.66E+00	6.97E-03	3.54E-01	2.35E-02	1.19E-03	0.00E+00	1.54E-03	0.00E+00	8.32E-02

Table 19. Output Flows and Waste Categories (24 mm)

PARAMETER	A1	A2	A3	A4	A5	C1	C2	C3	C4
HWD [kg]	4.80E-04	5.20E-06	4.26E-06	1.68E-05	3.62E-08	0.00E+00	1.21E-06	0.00E+00	1.64E-06
NHWD [kg]	1.18E+00	1.17E-01	2.76E-01	2.29E-01	1.40E-02	0.00E+00	2.17E-02	0.00E+00	2.47E+00
HLRW [kg] or [m^3]	3.07E-04	1.33E-05	1.72E-05	6.61E-05	8.62E-08	0.00E+00	3.02E-06	0.00E+00	4.24E-06
CRU [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	0.00E+00
R [kg]	1.55E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.47E-01
MER [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	0.00E+00
EE [MJ, LHV]	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

5. LCA Interpretation

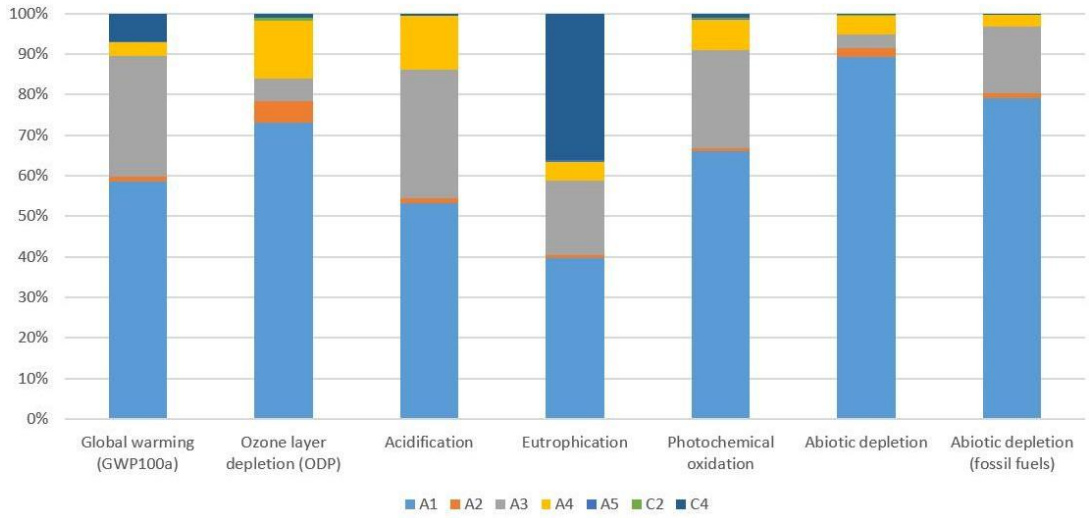


Figure 4. Life Cycle Impact Assessment of 1m^2 OFI PET acoustic panel (9 mm) relative importance in percentage terms for the different life stages. [Based on CML-IA baseline V4.2 / EU25]

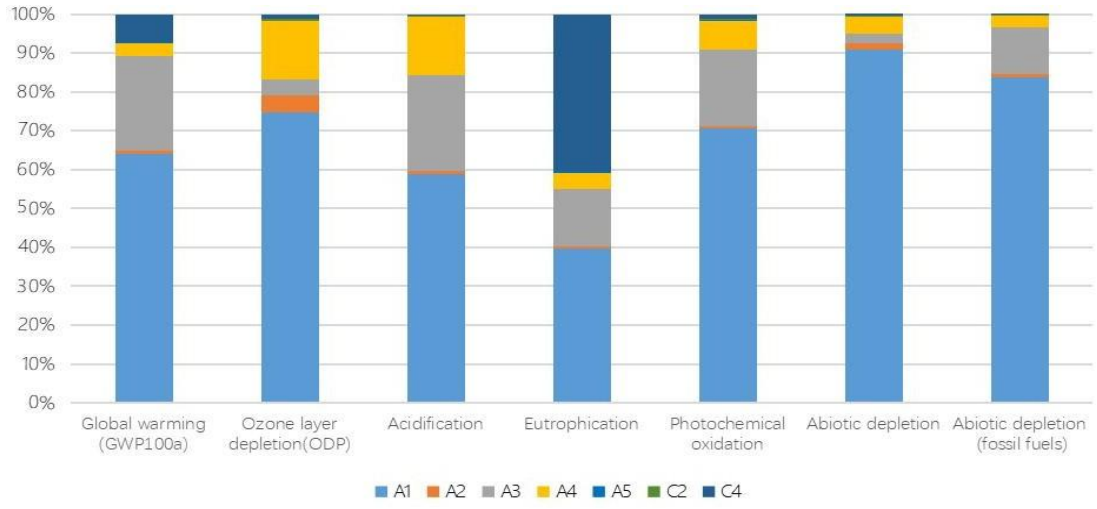


Figure 5. Life Cycle Impact Assessment of 1m² OFI PET acoustic panel (12mm) relative importance in percentage terms for the different life stages. [Based on CML-IA baseline V4.2 / EU25]

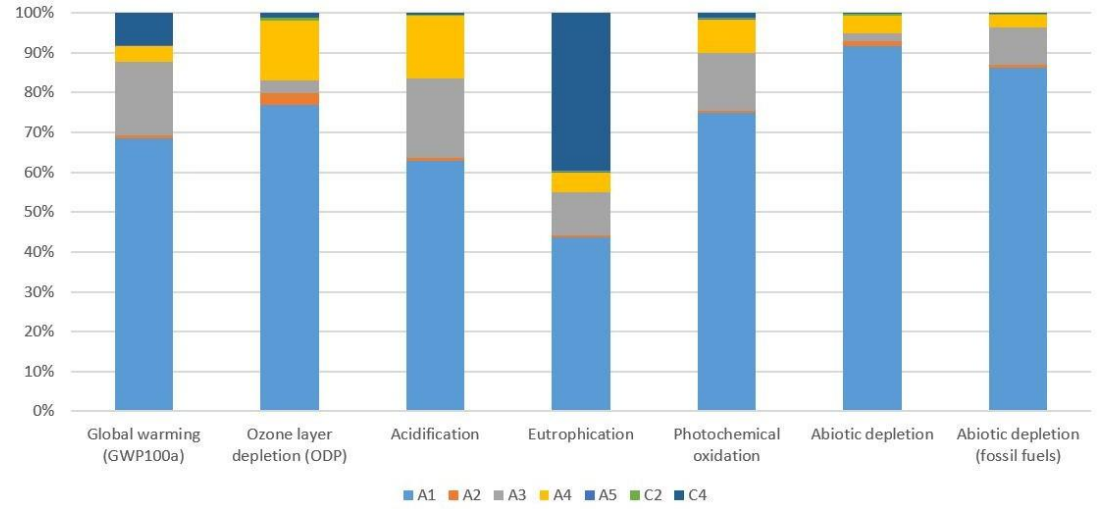


Figure 6. Life Cycle Impact Assessment of 1m² OFI PET acoustic panel (24 mm) relative importance in percentage terms for the different life stages. [Based on CML-IA baseline V4.2 / EU25]

According to the impact assessment results, it can be seen that the production stage (A1-A3) of PET acoustic panel products is the main source of environmental contribution, contributed over 80% of environmental impact in all categories except Eutrophication. The results also consistent with the expected inventory analysis. The transportation

of the product to the installation site (A4) has the second highest environmental impact. The disposal process of products has a large environmental contribution to Eutrophication.

The environmental impact of 24mm PET acoustic panel is higher than that of 9mm and 12mm acoustic panel products, and the contribution distributions of different processes are similar. This is consistent with the expected result.

The sensitivity analysis shows that change in assumptions such as transportation distance and disposal scenario can lead to certain fluctuation of the final LCA results, hence it is recommended to collect data more accurately and improve data quality to get up-to-date results in case the assumption or process parameters would be changed in the future, or in case that data with higher quality would be available.

The LCA study has been carried out based on available information, regional and global database and experience to achieve more accuracy, completeness and representative of the results.

6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

OFISOLUTION has a comprehensive environmental, health, and safety management program. All products go through a safety, health, and environmental review prior to sale. No environmental or health impacts are expected during the manufacture of the PET acoustic panels.

6.2. Environment and Health During Installation

No environmental or health impacts are expected during the installation of the PET acoustic panels.

6.3. Extraordinary Effects

No extraordinary effects or environmental impacts are expected due to destruction of the product by fire, water, or mechanical means.

6.4. Delayed Emissions

No delayed emissions are expected from this product.

7. References

PCR Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL Environment (December 12, 2018, version 3.2)

PCR Part B: Mechanical, Specialty, Thermal and Acoustic Insulation EPD Requirements, UL Environment, UL 1001003 (September 3, 2019, version 1.0)

ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and Framework

ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.

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

ASTM C423, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method

ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials UL General Program Rules v. 2.5 March 2020

8. Contact Information

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