



## ENVIRONMENTAL PRODUCT DECLARATION

Product names:

**XYLOFON: HIGH-PERFORMANCE  
RESILIENT SOUNDPROOFING PROFILE**

[shore35- shore50- shore70- shore80- shore90]

Site Plants:

**Cortaccia (BZ)**

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


Program Operator	EPDIItaly
Publisher	EPDIItaly

Declaration Number	2022Xylofon0368
Registration Number	EPDITALY0368

Issue Date	24/11/2022
Valid to	24/11/2027



## General information

<b>EPD OWNER:</b>	ROTHO BLAAS SRL
<b>PLANT INVOLVED in the declaration:</b>	ROTHO BLAAS SRL Via dell'Adige N. 2/1 - I-39040. Cortaccia (BZ)
<b>SCOPE OF APPLICATION:</b>	This Environmental Product Declaration (EPD) is valid for High-performance resilient soundproofing profile (shore35- shore50- shore70- shore80- shore90) designed by Rothoblaas in Europe. The type of declaration is related to 5 specific products by Rothoblaas. The life cycle assessment (LCA) is representative for the products introduced in the declaration for the given system boundaries.
<b>PROGRAM OPERATOR:</b>	EPDITALY. via Gaetano De Castillia 10. 20124 Milano. Italia.
<b>INDIPENDENT CHECK:</b>	<p>This declaration has been developed referring to EPDItaly. following the General Program Instruction; further information and the document are available at: <a href="http://www.epditaly.it">www.epditaly.it</a>. This EPD document is valid within the following geographical area: worldwide according to sales market conditions.</p> <p>CEN standard EN 15804 served as the core PCR (PCR ICMQ-001/15 rev 3.0). PCR review was conducted by Michele Paleari. Contact via <a href="mailto:info@epditaly.it">info@epditaly.it</a></p> <p>Independent verification of the declaration and data. according to EN ISO 14025:2010.</p> <p>Third party verifier: ICMQ SpA. via De Castillia. 10 20124 Milano (<a href="http://www.icmq.it">www.icmq.it</a>)</p> <p><input type="checkbox"/> EPD process certification (Internal) <input checked="" type="checkbox"/> EPD verification (External)</p> <p><b>Accredited by: Accredia</b></p>
<b>CPC CODE:</b>	<b>3699-</b> Articles of plastics n.e.c.
<b>CORPORATE CONTACT:</b>	info@rothoblaas.com
<b>TECHNICAL SUPPORT:</b>	Sphera <a href="https://www.sphera.com">https://www.sphera.com</a> 
<b>COMPARABILITY:</b>	Environmental statements published within the same product category. but from different programs. may not be comparable. In particular. EPDs of construction products may not be comparable if they do not comply with EN 15804+A2.
<b>ACCOUNTABILITY:</b>	ROTHO BLAAS SRL relieves EPDItaly from any non-compliance with environmental legislation. The holder of the declaration will be responsible for the information and supporting evidence;



	EPDItaly declines all responsibility for the manufacturer's information, data and results of the life cycle assessment.
<b>REFERENCE DOCUMENT:</b>	This declaration has been developed following the General Program Instruction document of EPDItaly, available at <a href="http://www.epditaly.it">www.epditaly.it</a> .
<b>PRODUCT CATEGORY RULES (PCR):</b>	PCR ICMQ-001/15 rev 3.0 EN 15804+A2 is the framework reference for PCRs.

## Company



Rothoblaas is a multinational Italian company that has made innovative technology its mission. making its way to the forefront for timber buildings and construction safety in just a few years. Thanks to its comprehensive product range and the technically-prepared and widespread sales network. The company promotes the transfer of its knowhow to the customers and aims to be a prominent and reliable partner in developing and innovating products and building methods. All of this contributes to a new culture of sustainable construction focused on increasing comfortable living and reducing CO<sub>2</sub> emissions.

ROTHOBLAAS provides a complete range of solutions:



**Fixing systems**



**Systems for air sealing and waterproofing**



**Noise reduction systems**



**Fall Protection Systems**



**Machinery and equipment for woodworking**



**Specific, tailored services and design support**

More information about the product can be found in the product technical sheets (<https://www.rothoblaas.com/>).

## Goal and scope of EPD

The entire life cycle of the product is considered (Type of EPD: cradle to grave) and the modules described below are declared in this EPD:

Modules **A1-A3** include processes that provide energy and material input for the product manufacturing, including production wastes (A1), transport up to the Rothoblaas site (A2), wastes processing linked to warehouses activities and additional packaging from Rothoblaas (A3).

Module **A4** includes the transport from the Rothoblaas plant to the customer or to the point of product installation.

Module **A5** considers all soundproofing profiles installation steps (including auxiliaries production such as clips) also packaging waste processing (recycling, incineration, disposal). Credits from energy substitution are declared in module D. During this phase a soundproofing profile overlap of 1% is considered.

Module **B1** considers the use of the installed product. During the use of soundproofing profiles a scenario of zero impact is considered.

Module **B2** includes the maintenance of the product. A scenario of zero impact is considered.

Modules **B3-B4-B5** are related to the repair, replacement and refurbishment of the products. If the products are properly installed no repair, replacement or refurbishment processes are necessary. A scenario of zero impact is then considered.

Modules **B6-B7** consider energy use and operational water to operate building integrated technical systems. No operational energy or water use are considered. A scenario of zero impact is then considered.

Module **C1** considers deconstruction, including dismantling or demolition of the product from the building site. The energy consumption related to shredding activities is considered.

Module **C2** considers transportation of the discarded soundproofing profiles to a recycling or disposal process.

Module **C3** considers waste processing for products recycling and incineration.

Module **C4** includes all waste disposal processes, including pre-treatment and management of the disposal site.

Module **D** includes benefits from all net flows in the end-of-life stage that leave the product boundary system after having passed the end-of-waste stage. Benefits from packaging incineration (electricity and thermal energy) are declared within module D.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

X = modules included in the study



According to the PCR ICMQ-001/15 rev. 3.0. the EPD is based on a “cradle to grave” Life Cycle Assessment (LCA) study.

It is an EPD for 5 soundproofing profiles products designed by Rothoblaas s.r.l. plant located in Bolzano (BZ) and sold worldwide. All data refer to 2021 production and sales. Modules included are A1. A2. A3. A4. A5. B. C and D. All manufacturing activities and energy production are in A1 as the producer is a supplier, while additional packaging and manufacturing activities linked to warehousing are in module A3. The transport from the supplier to Rothoblaas is in A2. Transport to clients (A4) and installation (A5) are included together with end-of-life scenarios (benefits and loads included according to D module).

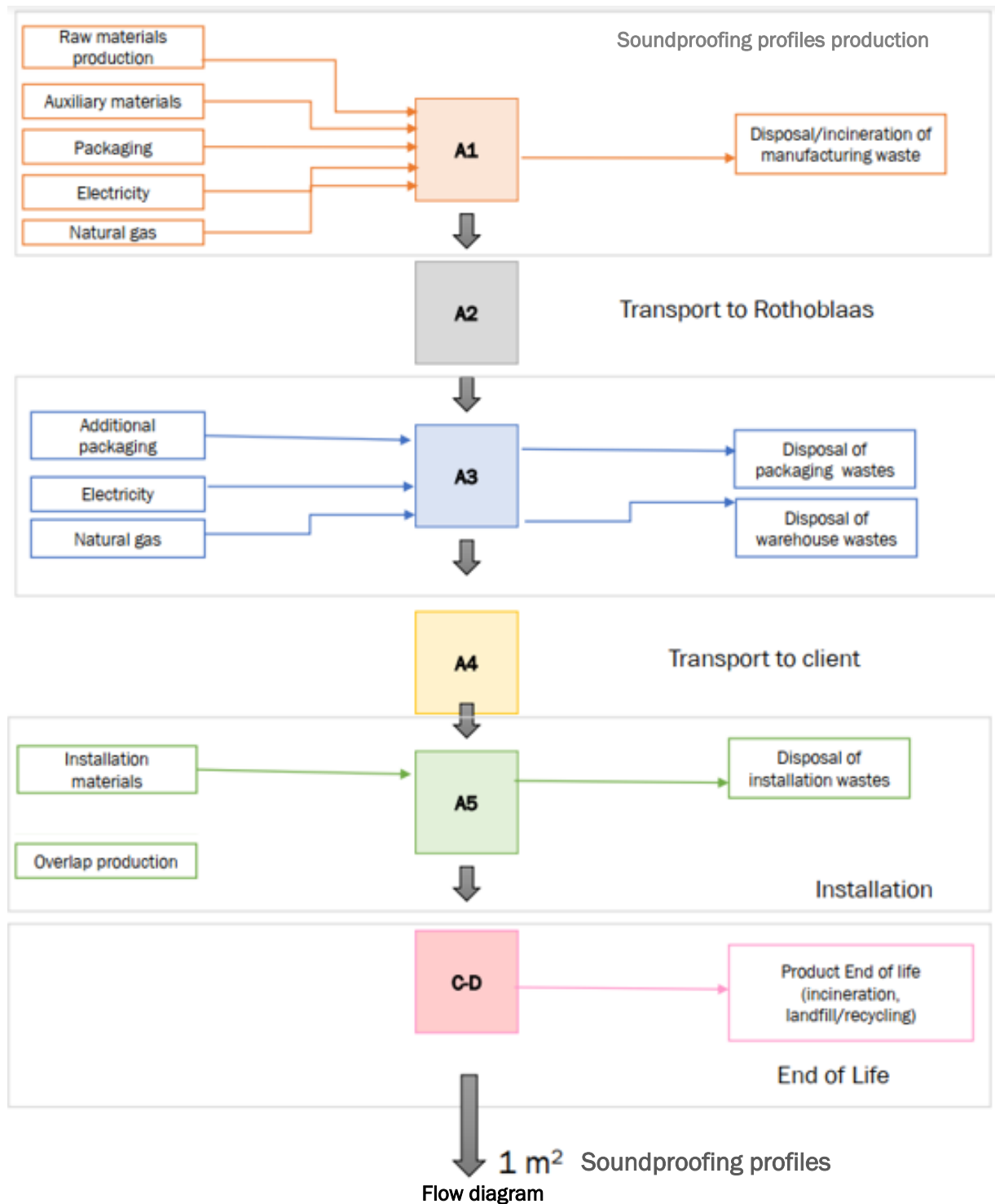
The declaration is 1a (Declaration of a specific product from a manufacturer’s plant).

The production facility is in Europe and the distribution is managed by Rothoblaas s.r.l. located in Cortaccia (BZ). The market range is Worldwide.

**Geographical validity:** Worldwide

**Database:** GaBi Database DB 2022.1

**Software:** GaBi professional 10 software.



## Product description

### 1.1. Detailed product description

## XYLOFON

### HIGH-PERFORMANCE RESILIENT SOUNDPROOFING PROFILE

#### PERFORMANCE

It significantly reduces the transmission of airborne and structural noise (from 5 dB to over 15 dB).

#### 6 mm

The low thickness of the 5 versions supports a wide load range (up to 6 N/mm<sup>2</sup>) without affecting design choices. Also appropriate for LVL.

#### MONOLITHIC

The monolithic structure of the polyurethane ensures stability, water-tightness and the absence of subsidence over time.

#### INSTALLATION

The profiles are easily processed and installed using the most common site tools; their reliability over time is guaranteed by the homogeneity of polyurethane, a stable and waterproof material.

#### MATERIAL AND DURABILITY

Polyurethane mixture between 35 and 90 shore.  
Product free of VOCs and harmful substances.  
Extremely chemically stable and without deformations over time.

### 1.2. Technical data

#### TECHNICAL SPECIFICATIONS

Property	Standard	Value	Value	Value	Value	Value
Hardness	-	35 shore	50 shore	70 shore	80 shore	90 shore
Elastic modulus at 10% (compression)	ISO 604	2,74 MPa	6,74 MPa	20,5 MPa	24,3 MPa	43,5 MPa
Dynamic stiffness s <sup>(2)</sup>	ISO 9052	1262 MN/m <sup>3</sup>	1455 MN/m <sup>3</sup>	1822 MN/m <sup>3</sup>	2157 MN/m <sup>3</sup>	> 2200 MN/m <sup>3</sup>
Creep <sup>(3)</sup>	EN 1606	< 0,5 %	< 0,5 %	< 0,5 %	< 0,5 %	< 0,5 %
Compression deformation DVR <sup>(4)</sup>	ISO 1856	1,5 %	0,5 %	0,3 %	0,9 %	3,7 %
Dynamic elastic modulus E', 10 Hz (DMTA)	ISO 4664	2,16 MPa	3,53 MPa	10,1 MPa	19 MPa	43 MPa
Dynamic shear modulus G', 10 Hz (DMTA)	ISO 4664	1,13 MPa	1,18 MPa	3,24 MPa	6,5 MPa	16,7 MPa
Damping factor Tan δ	ISO 4664	0,177	0,132	0,101	0,134	0,230
Max processing temperature (TGA)	-	200 °C	> 200 °C	> 200 °C	> 200 °C	> 200 °C
Reaction to fire	EN 13501-1	class E	class E	class E	class E	class E
Thermal conductivity (λ)	-	0,2 W/mK	0,2 W/mK	0,2 W/mK	0,2 W/mK	0,2 W/mK



### 1.3. Products Distribution

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Soundproofing profile are distributed by Rothoblaas which are sold on whole pallets. Packaging includes polyethylene film and cardboard to protect separate rolls, PET bands and pallets.

The amount of final packaging on Rothoblaas products are the following:

- 100%\*Wood Supplier packaging + Rothoblaas wood packaging
- PE Supplier packaging
- 100%\* PET Supplier packaging + Rothoblaas PET packaging
- Rothoblaas cardboard packaging (the original cardboard packaging is removed).

### 1.4. Installation

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The soundproofing profiles installation requires only steel clips on products. No water or electrical energy is used to install other products. A 1% scrap is considered in the installation phase.

### 1.5. Functional unit

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The functional unit is defined as 1 m<sup>2</sup> of soundproofing profile as described below.

Functional unit – reference flow	Mass [kg/FU]	FU [m <sup>2</sup> ] <sup>1</sup>	Conversion factor dl 1 kg
Xylofon shore 35	7.26	1	0.138
Xylofon shore 50	7.26	1	0.138
Xylofon shore 70	7.26	1	0.138
Xylofon shore 80	7.26	1	0.138
Xylofon shore 90	7.26	1	0.138

Dangerous materials
The product does not contain any substances included in the "Candidate List of Substances of Very High Concern for Authorization" compliant with /REACH/ and with EC 1272/2008

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<sup>1</sup> Functional unit does not include packaging.

**Condition of use:**

Operational use falls outside the system boundaries of this LCA project; hence it is not relevant for the EPD. Maintenance is not needed for the soundproof profile product and they are generally replaced at the building end of life. A general scenario of zero impact for resilient soundproofing profiles is considered.

**Reference service life**

Soundproofing profiles are regarded as having 50 years Reference service life (RLS ) independent of their material as we assume same service life as the building.

## 1.6. End of life

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After the demolition and deconstruction phase according to Building & Construction wastes statistics, resilient soundproofing profiles can be incinerated, sent to landfill or incineration.

## LCA results – Environmental impact per functional unit

The tables below show the results of the high performance resilient soundproofing profiles LCA study (Life Cycle Assessment).

Additional environmental impact indicators are not declared according to EN 15804 + A2 chapter 7.2.3.2.

**Table 1 Environmental impacts: 1 m<sup>2</sup> shore 35**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	2.31E01	9.90E-01	-6.32E-01	1.00E00	3.21E00	0	8.32E-02	2.03E-01	5.77E00	3.30E-01	-2.69E00
GWP fossil	[kg CO <sub>2</sub> -eq.]	2.43E01	9.81E-01	3.20E-01	9.92E-01	3.98E-01	0	8.32E-02	2.01E-01	5.77E00	3.29E-01	-2.68E00
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.20E00	3.17E-03	-9.52E-01	3.21E-03	2.81E00	0	4.91E-05	5.68E-04	3.92E-04	6.43E-04	-3.34E-03
GWP luluc	[kg CO <sub>2</sub> -eq.]	1.56E-02	6.59E-03	7.96E-04	6.65E-03	2.62E-04	0	5.40E-06	1.12E-03	1.02E-05	1.60E-04	-1.16E-04
ODP	[kg CFC-11-eq.]	1.14E-10	9.60E-14	1.50E-12	9.72E-14	1.33E-12	0	8.22E-13	1.20E-14	4.22E-13	4.42E-13	-1.27E-11
AP	[mole of H <sup>+</sup> -eq.]	4.78E-02	3.50E-03	1.12E-03	3.56E-03	9.23E-04	0	1.22E-04	5.70E-04	3.40E-03	9.76E-04	-2.69E-03
EP - freshwater	[kg P eq.]	1.28E-04	3.49E-06	3.32E-06	3.53E-06	2.99E-06	0	3.73E-08	5.98E-07	1.14E-07	6.15E-05	-6.94E-07
EP - marine	[kg N eq.]	1.38E-02	1.62E-03	4.69E-04	1.65E-03	2.96E-04	0	3.34E-05	2.57E-04	1.65E-03	2.16E-04	-7.68E-04
EP - terrestrial	[mole of N eq.]	1.46E-01	1.81E-02	4.99E-03	1.84E-02	3.15E-03	0	3.57E-04	2.89E-03	1.90E-02	2.37E-03	-8.33E-03
POCP	[kg NMVOC eq.]	5.25E-02	3.15E-03	1.36E-03	3.22E-03	1.16E-03	0	9.43E-05	5.11E-04	4.23E-03	6.95E-04	-2.21E-03
ADPF*	[MJ]	6.85E02	1.28E01	3.96E00	1.30E01	7.83E00	0	1.76E00	2.68E00	1.49E00	4.67E00	-4.48E01
ADPE*	[kg Sb eq.]	5.18E-06	9.85E-08	3.97E-06	9.96E-08	5.27E-07	0	9.89E-09	1.67E-08	1.16E-08	2.28E-08	-1.97E-07
WDP*	[m <sup>3</sup> world eq.]	4.16E00	1.09E-02	3.49E-02	1.10E-02	1.20E-01	0	6.21E-03	1.80E-03	5.68E-01	-3.24E-03	-8.96E-02

\* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP=Water (user) deprivation potential, deprivation-weighted water consumption
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**Table 2: Environmental impacts: 1 m<sup>2</sup> shore 50**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	2.23E+01	9.90E-01	-6.32E-01	1.11E+00	3.20E+00	0	8.32E-02	2.03E-01	5.77E+00	3.30E-01	-2.69E+00
GWP fossil	[kg CO <sub>2</sub> -eq.]	2.35E+01	9.81E-01	3.20E-01	1.10E+00	3.90E-01	0	8.32E-02	2.01E-01	5.77E+00	3.29E-01	-2.68E+00
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.23E+00	3.17E-03	-9.52E-01	3.57E-03	2.81E+00	0	4.91E-05	5.68E-04	3.92E-04	6.43E-04	-3.34E-03
GWP luluc	[kg CO <sub>2</sub> -eq.]	1.70E-02	6.59E-03	7.96E-04	7.39E-03	2.77E-04	0	5.40E-06	1.12E-03	1.02E-05	1.60E-04	-1.16E-04
ODP	[kg CFC-11-eq.]	1.61E-10	9.60E-14	1.50E-12	1.08E-13	1.80E-12	0	8.22E-13	1.20E-14	4.22E-13	4.42E-13	-1.27E-11
AP	[mole of H <sup>+</sup> -eq.]	4.89E-02	3.50E-03	1.12E-03	3.99E-03	9.34E-04	0	1.22E-04	5.70E-04	3.40E-03	9.76E-04	-2.69E-03
EP - freshwater	[kg P eq.]	1.31E-04	3.49E-06	3.32E-06	3.92E-06	3.01E-06	0	3.73E-08	5.98E-07	1.14E-07	6.15E-05	-6.94E-07
EP - marine	[kg N eq.]	1.40E-02	1.62E-03	4.69E-04	1.84E-03	2.98E-04	0	3.34E-05	2.57E-04	1.65E-03	2.16E-04	-8.56E-04
EP - terrestrial	[mole of N eq.]	1.47E-01	1.81E-02	4.99E-03	2.06E-02	3.17E-03	0	3.57E-04	2.89E-03	1.90E-02	2.37E-03	-9.29E-03
POCP	[kg NMVOC eq.]	4.91E-02	3.15E-03	1.36E-03	3.62E-03	1.13E-03	0	9.43E-05	5.11E-04	4.23E-03	6.95E-04	-2.49E-03
ADPF*	[MJ]	6.67E+02	1.28E+01	3.96E+00	1.44E+01	7.65E+00	0	1.76E+00	2.68E+00	1.49E+00	4.67E+00	-5.00E+01
ADPE*	[kg Sb eq.]	4.96E-06	9.85E-08	3.97E-06	1.11E-07	5.24E-07	0	9.89E-09	1.67E-08	1.16E-08	2.28E-08	-2.20E-07
WDP*	[m <sup>3</sup> world eq.]	4.25E+00	1.09E-02	3.49E-02	1.23E-02	1.21E-01	0	6.21E-03	1.80E-03	5.68E-01	-3.24E-03	-1.03E-01

\* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP=Water (user) deprivation potential, deprivation-weighted water consumption
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**Table 3 - Environmental impacts: 1 m<sup>2</sup> shore 70**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	2.35E+01	9.94E-01	-6.32E-01	1.12E+00	3.22E+00	0	8.32E-02	2.03E-01	5.77E+00	3.30E-01	-2.69E+00
GWP fossil	[kg CO <sub>2</sub> -eq.]	2.47E+01	9.84E-01	3.20E-01	1.11E+00	4.03E-01	0	8.32E-02	2.01E-01	5.77E+00	3.29E-01	-2.68E+00
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.24E+00	3.19E-03	-9.52E-01	3.59E-03	2.81E+00	0	4.91E-05	5.68E-04	3.92E-04	6.43E-04	-3.34E-03
GWP luluc	[kg CO <sub>2</sub> -eq.]	1.62E-02	6.61E-03	7.96E-04	7.44E-03	2.68E-04	0	5.40E-06	1.12E-03	1.02E-05	1.60E-04	-1.16E-04
ODP	[kg CFC-11-eq.]	1.24E-10	9.63E-14	1.50E-12	1.09E-13	1.42E-12	0	8.22E-13	1.20E-14	4.22E-13	4.42E-13	-1.27E-11
AP	[mole of H <sup>+</sup> -eq.]	5.00E-02	3.52E-03	1.12E-03	4.00E-03	9.45E-04	0	1.22E-04	5.70E-04	3.40E-03	9.76E-04	-2.69E-03
EP - freshwater	[kg P eq.]	1.13E-04	3.50E-06	3.32E-06	3.95E-06	2.83E-06	0	3.73E-08	5.98E-07	1.14E-07	6.15E-05	-6.94E-07
EP - marine	[kg N eq.]	1.46E-02	1.62E-03	4.69E-04	1.85E-03	3.05E-04	0	3.34E-05	2.57E-04	1.65E-03	2.16E-04	-8.56E-04
EP - terrestrial	[mole of N eq.]	1.54E-01	1.82E-02	4.99E-03	2.07E-02	3.23E-03	0	3.57E-04	2.89E-03	1.90E-02	2.37E-03	-9.29E-03
POCP	[kg NMVOC eq.]	4.78E-02	3.16E-03	1.36E-03	3.62E-03	1.12E-03	0	9.43E-05	5.11E-04	4.23E-03	6.95E-04	-2.49E-03
ADPF*	[MJ]	7.01E+02	1.29E+01	3.96E+00	1.45E+01	8.00E+00	0	1.76E+00	2.68E+00	1.49E+00	4.67E+00	-5.00E+01
ADPE*	[kg Sb eq.]	4.67E-06	9.89E-08	3.97E-06	1.11E-07	5.22E-07	0	9.89E-09	1.67E-08	1.16E-08	2.28E-08	-2.20E-07
WDP*	[m <sup>3</sup> world eq.]	3.84E+00	1.10E-02	3.49E-02	1.24E-02	1.17E-01	0	6.21E-03	1.80E-03	5.68E-01	-3.24E-03	-1.03E-01

\* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP=Water (user) deprivation potential, deprivation-weighted water consumption
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**Table 4 - Environmental impacts: 1 m<sup>2</sup> shore 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	2.50E+01	9.94E-01	-6.32E-01	1.54E+00	3.23E+00	0	8.32E-02	2.03E-01	5.77E+00	3.30E-01	-2.69E00
GWP fossil	[kg CO <sub>2</sub> -eq.]	2.61E+01	9.84E-01	3.20E-01	1.52E+00	4.16E-01	0	8.32E-02	2.01E-01	5.77E+00	3.29E-01	-2.68E00
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.19	3.19E-03	-9.52E-01	4.92E-03	2.81E+00	0	4.91E-05	5.68E-04	3.92E-04	6.43E-04	-3.34E-03
GWP luluc	[kg CO <sub>2</sub> -eq.]	1.48E-02	6.61E-03	7.96E-04	1.02E-02	2.55E-04	0	5.40E-06	1.12E-03	1.02E-05	1.60E-04	-1.16E-04
ODP	[kg CFC-11-eq.]	1.30E-10	9.63E-14	1.50E-12	1.49E-13	1.48E-12	0	8.22E-13	1.20E-14	4.22E-13	4.42E-13	-1.27E-11
AP	[mole of H <sup>+</sup> -eq.]	4.99E-02	3.52E-03	1.12E-03	5.46E-03	9.44E-04	0	1.22E-04	5.70E-04	3.40E-03	9.76E-04	-2.69E-03
EP - freshwater	[kg P eq.]	9.84E-05	3.50E-06	3.32E-06	5.4E-06	2.69E-06	0	3.73E-08	5.98E-07	1.14E-07	6.15E-05	-6.94E-07
EP - marine	[kg N eq.]	1.49E-02	1.62E-03	4.69E-04	2.52E-03	3.08E-04	0	3.34E-05	2.57E-04	1.65E-03	2.16E-04	-8.56E-04
EP - terrestrial	[mole of N eq.]	1.57E-01	1.82E-02	4.99E-03	2.82E-02	3.26E-03	0	3.57E-04	2.89E-03	1.90E-02	2.37E-03	-9.29E-03
POCP	[kg NMVOC eq.]	4.93E-02	3.16E-03	1.36E-03	4.94E-03	1.13E-03	0	9.43E-05	5.11E-04	4.23E-03	6.95E-04	-2.49E-03
ADPF*	[MJ]	7.37E+02	1.29E+01	3.96E+00	1.99E+01	8.35E+00	0	1.76E+00	2.68E+00	1.49E+00	4.67E+00	-5.00E01
ADPE*	[kg Sb eq.]	4.63E-06	9.89E-08	3.97E-06	1.53E-07	5.21E-07	0	9.89E-09	1.67E-08	1.16E-08	2.28E-08	-2.20E-07
WDP*	[m <sup>3</sup> world eq.]	3.49E+00	1.10E-02	3.49E-02	1.70E-02	1.14E-01	0	6.21E-03	1.80E-03	5.68E-01	-3.24E-03	-1.03E-01

\* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP=Water (user) deprivation potential, deprivation-weighted water consumption
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**Table 5 - Environmental impacts: 1 m<sup>2</sup> shore 90**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
GWP total	[kg CO <sub>2</sub> -eq.]	2.60E+01	9.94E-01	-6.32E-01	1.26E+00	3.24E+00	0	8.32E-02	2.03E-01	5.77E+00	3.30E-01	-2.69E00
GWP fossil	[kg CO <sub>2</sub> -eq.]	2.72E+01	9.84E-01	3.20E-01	1.25E+00	4.27E-01	0	8.32E-02	2.01E-01	5.77E+00	3.29E-01	-2.68E00
GWP biogenic	[kg CO <sub>2</sub> -eq.]	-1.16E+00	3.19E-03	-9.52E-01	4.04E-03	2.82E+00	0	4.91E-05	5.68E-04	3.92E-04	6.43E-04	-3.34E-03
GWP luluc	[kg CO <sub>2</sub> -eq.]	1.38E-02	6.61E-03	7.96E-04	8.37E-03	2.45E-04	0	5.40E-06	1.12E-03	1.02E-05	1.60E-04	-1.16E-04
ODP	[kg CFC-11-eq.]	1.29E-10	9.63E-14	1.50E-12	1.22E-13	1.47E-12	0	8.22E-13	1.20E-14	4.22E-13	4.42E-13	-1.27E-11
AP	[mole of H <sup>+</sup> -eq.]	4.98E-02	3.52E-03	1.12E-03	4.50E-03	9.43E-04	0	1.22E-04	5.70E-04	3.40E-03	9.76E-04	-2.69E-03
EP - freshwater	[kg P eq.]	8.76E-05	3.50E-06	3.32E-06	4.44E-06	2.58E-06	0	3.73E-08	5.98E-07	1.14E-07	6.15E-05	-6.94E-07
EP - marine	[kg N eq.]	1.52E-02	1.62E-03	4.69E-04	2.08E-03	3.10E-04	0	3.34E-05	2.57E-04	1.65E-03	2.16E-04	-8.56E-04
EP - terrestrial	[mole of N eq.]	1.59E-01	1.82E-02	4.99E-03	2.33E-02	3.29E-03	0	3.57E-04	2.89E-03	1.90E-02	2.37E-03	-9.29E-03
POCP	[kg NMVOC eq.]	5.04E-02	3.16E-03	1.36E-03	4.08E-03	1.14E-03	0	9.43E-05	5.11E-04	4.23E-03	6.95E-04	-2.49E-03
ADPF*	[MJ]	7.63E+02	1.29E+01	3.96E+00	1.63E+01	8.61E+00	0	1.76E+00	2.68E+00	1.49E+00	4.67E+00	-5.00E01
ADPE*	[kg Sb eq.]	4.59E-06	9.89E-08	3.97E-06	1.25E-07	5.21E-07	0	9.89E-09	1.67E-08	1.16E-08	2.28E-08	-2.20E-07
WDP*	[m <sup>3</sup> world eq.]	3.24E+00	1.10E-02	3.49E-02	1.39E-02	1.11E-01	0	6.21E-03	1.80E-03	5.68E-01	-3.24E-03	-1.03E-01

\* 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 according to EN 15804+A2:2019 chapter 7.2.3.2.

Caption	GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP=Water (user) deprivation potential, deprivation-weighted water consumption
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## LCA results – Resource use per functional unit

Table 10 - Resource use: 1 m<sup>2</sup> shore 35

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	4.96E01	8.89E-01	-5.95E-01	8.98E-01	6.40E00	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PERM	[MJ]	1.05E01	0	9.83E00	0	-5.58E00	0	0	0	0	0	0
PERT	[MJ]	6.01E01	8.89E-01	9.24E00	8.98E-01	8.17E-01	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PENRE	[MJ]	4.09E02	1.29E01	4.68E00	1.30E01	5.48E00	0	1.76E00	2.68E00	1.49E00	4.68E00	-5.00E01
PENRM	[MJ]	2.77E02	0	-7.16E-01	0	2.35E00	0	0	0	0	0	0
PENRT	[MJ]	6.85E02	1.29E01	3.96E00	1.30E01	7.83E00	0	1.76E00	2.68E00	1.49E00	4.68E00	-5.00E01
SM	[kg]	1.76E-01	0	3.91E-01	0	6.17E-03	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2.17E-01	1.03E-03	1.80E-03	1.04E-03	4.07E-03	0	3.86E-04	1.72E-04	1.34E-02	6.05E-05	-6.20E-03

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water
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\* Reference to only foreground system



**Table 11 - Resource use: 1 m<sup>2</sup> shore 50**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	5.04E+01	8.89E-01	-5.95E-01	9.98E-01	6.41E+00	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PERM	[MJ]	1.05E+01	0	9.83E+00	0	-5.58E+00	0	0	0	0	0	0
PERT	[MJ]	6.10E+01	8.89E-01	9.24E+00	9.98E-01	8.26E-01	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PENRE	[MJ]	3.91E+02	1.29E+01	4.68E+00	1.45E+01	5.30E+00	0	1.76E00	2.68E00	1.49E00	4.68E+00	-5.00E01
PENRM	[MJ]	2.77E+02	0	-7.16E-01	0	2.35E+00	0	0	0	0	0	0
PENRT	[MJ]	6.67E+02	1.29E+01	3.96E+00	1.45E+01	7.65E+00	0	1.76E00	2.68E00	1.49E00	4.68E+00	-5.00E01
SM	[kg]	1.76E-01	0	3.91E-01	0	6.17E-03	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2.27E-01	1.03E-03	1.80E-03	1.15E-03	4.16E-03	0	3.86E-04	1.72E-04	1.34E-02	6.05E-05	-6.20E-03

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water
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\* Reference to only foreground system

**Table 12 - Resource use: 1 m<sup>2</sup> shore 70**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	5.21E+01	8.92E-01	-5.95E-01	1.01E+00	6.42E+00	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PERM	[MJ]	1.10E+01	0	9.83E+00	0	-5.58E+00	0	0	0	0	0	0
PERT	[MJ]	6.31E+01	8.92E-01	9.24E+00	1.01E+00	8.47E-01	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PENRE	[MJ]	4.25E+02	1.29E+01	4.68E+00	1.46E+01	5.65E+00	0	1.76E00	2.68E00	1.49E00	4.68E+00	-5.00E01
PENRM	[MJ]	2.77E+02	0	-7.16E-01	0	2.35E+00	0	0	0	0	0	0
PENRT	[MJ]	7.02E+02	1.29E01	3.96E00	1.46E01	8.00E00	0	1.76E00	2.68E00	1.49E00	4.68E+00	-5.00E01
SM	[kg]	2.09E-01	0	3.91E-01	0	6.50E-03	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2.36E-01	1.03E-03	1.80E-03	1.16E-03	4.26E-03	0	3.86E-04	1.72E-04	1.34E-02	6.05E-05	-6.20E-03

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water
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\* Reference to only foreground system

**Table 13 - Resource use: 1 m<sup>2</sup> shore 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	5.28E+01	8.92E-01	-9.95E-01	1.38E+00	6.43E+00	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PERM	[MJ]	1.10E+01	0	9.83E+00	0	-5.58E+00	0	0	0	0	0	0
PERT	[MJ]	6.39E+01	5.84E-01	9.24E+00	1.38E+00	8.55E-01	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PENRE	[MJ]	4.61E+02	8.45E00	4.68E+00	2.00E+01	6.00E+00	0	1.76E00	2.68E00	1.49E00	4.68E00	-5.00E01
PENRM	[MJ]	2.77E+02	0	-7.16E-01	0	2.35E+00	0	0	0	0	0	0
PENRT	[MJ]	7.37E+02	1.29E+01	3.96E+00	2.00E+01	8.35E+00	0	1.76E00	2.68E00	1.49E00	4.68E00	-5.06E01
SM	[kg]	2.09E-01	0	3.91E-01	0	6.50E-03	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2.36E-01	1.03E-03	1.80E-03	1.59E-03	4.25E-03	0	3.86E-04	1.72E-04	1.34E-02	6.05E-05	-6.20E-03

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water
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\* Reference to only foreground system

Table 14- Resource use: 1 m<sup>2</sup> shore 90

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
PERE	[MJ]	5.33E+01	8.92E-01	-5.95E-01	1.13E+00	6.44E+00	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PERM	[MJ]	1.10E+01	0	9.83E+00	0	-5.58E+00	0	0	0	0	0	0
PERT	[MJ]	6.44E+01	8.92E-01	9.24E+00	1.13E+00	8.60E-01	0	2.55E-01	1.52E-01	2.59E-01	3.84E-01	-4.02E00
PENRE	[MJ]	4.87E+02	1.29E+01	4.68E+00	1.64E+01	6.26E+00	0	1.76E00	2.68E00	1.49E00	4.68E+00	-5.00E01
PENRM	[MJ]	2.77E+02	0	-7.16E-01	0	2.35E+00	0	0	0	0	0	0
PENRT	[MJ]	7.63E+02	1.29E01	3.96E00	1.07E01	8.61E+00	0	1.76E00	2.68E00	1.49E00	4.68E+00	-5.00E01
SM	[kg]	2.09E-01	0	3.91E-01	0	6.50E-03	0	0	0	0	0	0
RSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
NRSF*	[MJ]	0	0	0	0	0	0	0	0	0	0	0
FW	[kg]	2.35E-01	1.03E-03	1.80E-03	1.31E-03	4.25E-03	0	3.86E-04	1.72E-04	1.34E-02	6.05E-05	-6.20E-03

Caption	PERE = Use of renewable primary energy as energy carrier; PERM = Use of renewable primary energy as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy as energy carrier; PENRM = Use of non-renewable primary energy as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water
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\* Reference to only foreground system

## LCA results – Output flows and waste categories per functional unit

Table 19 - Output flows and waste categories: 1 m<sup>2</sup> shore 35

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	1.98E-07	6.81E-11	1.11E-09	6.89E-11	2.08E-09	0	1.26E-10	1.29E-11	2.05E-10	7.21E-10	-6.03E-09
NHWD	[kg]	3.45E-01	2.10E-03	4.37E-02	2.12E-03	3.17E-01	0	3.75E-04	3.85E-04	2.90E-02	4.63E00	-1.18E-02
RWD	[kg]	4.72E-02	2.39E-05	1.55E-04	2.42E-05	4.98E-04	0	2.93E-04	3.31E-06	6.14E-05	5.74E-05	-4.53E-03
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	3.02E-01	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	3.05E-01	0	0	0	1.29E00	0	0	0	9.97E00	0	0
EET	[MJ]	5.46E-01	0	0	0	1.87E00	0	0	0	1.78E01	0	0

Caption

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

Table 20 - Output flows and waste categories: 1 m<sup>2</sup> shore 50

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	1.21E-06	6.81E-11	1.11E-09	7.66E-11	1.22E-08	0	1.26E-10	1.29E-11	2.05E-10	7.21E-10	-6.03E-09
NHWD	[kg]	3.32E-01	2.10E-03	4.37E-02	2.36E-03	3.17E-01	0	3.75E-04	3.85E-04	2.90E-02	4.63E+00	-1.18E-02
RWD	[kg]	4.80E-02	2.39E-05	1.55E-04	2.69E-05	5.06E-04	0	2.93E-04	3.31E-06	6.14E-05	5.74E-05	-4.53E-03
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	3.02E-01	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	3.05E-01	0	0	0	1.29E00	0	0	0	9.97E00	0	0
EET	[MJ]	5.46E-01	0	0	0	1.87E00	0	0	0	1.78E01	0	0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy
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**Table 21 - Output flows and waste categories: 1 m<sup>2</sup> shore 70**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	2.81E-07	6.84E-11	1.11E-09	7.71E-11	2.91E-09	0	1.26E-10	1.29E-11	2.05E-10	7.21E-10	-6.03E-09
NHWD	[kg]	3.17E-01	2.11E-03	4.37E-02	2.37E-03	3.17E-01	0	3.75E-04	3.85E-04	2.90E-02	4.63E+00	-1.18E-02
RWD	[kg]	5.22E-02	2.40E-05	1.55E-04	2.70E-05	5.49E-04	0	2.93E-04	3.31E-06	6.14E-05	5.74E-05	-4.53E-03
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	3.02E-01	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	3.05E-01	0	0	0	1.29E+00	0	0	0	9.97E00	0	0
EET	[MJ]	5.46E-01	0	0	0	1.87E+00	0	0	0	1.78E01	0	0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy
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**Table 22 - Output flows and waste categories: 1 m<sup>2</sup> shore 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	3.20E-07	6.84E-11	1.11E-09	1.06E-10	3.30E-09	0	1.26E-10	1.29E-11	2.05E-10	7.21E-10	-6.03E-09
NHWD	[kg]	3.10E-01	2.11E-03	4.37E-02	3.26E-03	3.17E-01	0	3.75E-04	3.85E-04	2.90E-02	4.63E+00	-1.18E-02
RWD	[kg]	5.45E-02	2.40E-05	1.55E-04	3.71E-05	5.71E-04	0	2.93E-04	3.31E-06	6.14E-05	5.74E-05	-4.53E-03
CRU	[kg]	0	0	0	0	0	0	0	0	0	0	0
MFR	[kg]	0	0	0	0	3.02E-01	0	0	0	0	0	0
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0
EEE	[MJ]	3.05E-01	0	0	0	1.29E+00	0	0	0	9.97E00	0	0
EET	[MJ]	5.46E-01	0	0	0	1.87E+00	0	0	0	1.78E01	0	0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy
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**Table 23: Output flows and waste categories: 1 m<sup>2</sup> shore 90**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
HWD	[kg]	2.39E-07	6.84E-11	1.11E-09	8.67E-11	2.50E-09	0	1.26E-10	1.29E-11	2.05E-10	7.21E-10	-6.03E-09
NHWD	[kg]	3.04E-01	2.11E-03	4.37E-02	2.67E-03	3.17E-01	0	3.75E-04	3.85E-04	2.90E-02	4.63E+00	-1.18E-02
RWD	[kg]	5.62E-02	2.40E-05	1.55E-04	3.04E-05	5.88E-04	0	2.93E-04	3.31E-06	6.14E-05	5.74E-05	-4.53E-03
CRU	[kg]	0	0	0	0	0	0	9.94E-12	0	0	0	0
MFR	[kg]	0	0	0	0	3.02E-01	0	5.06E-10	0	0	0	0
MER	[kg]	0	0	0	0	0	0	1.62E-01	0	0	0	0
EEE	[MJ]	3.05E-01	0	0	0	1.29E+00	0	1.09E-09	0	0	9.97E00	0
EET	[MJ]	5.46E-01	0	0	0	1.87E+00	0	4.29E-02	0	0	1.78E01	0

Caption	HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy
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## Biogenic C Content

**Table 22- Biogenic carbon content of product and packaging: 1 m<sup>2</sup> shore 35**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	2.8E-001	0	2.6E-001	0	5.4E-003	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 23- Biogenic carbon content of product and packaging: 1 m<sup>2</sup> shore 50**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	2.8E-001	0	2.6E-001	0	5.4E-003	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 23- Biogenic carbon content of product and packaging: 1 m2 shore 70**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3.5E-001	0	2.60E-01	0	5.50E-03	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**. Table 24 - Biogenic carbon content of product and packaging: 1 m<sup>2</sup> shore 80**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3.5E-001	0	2.60E-01	0	5.50E-03	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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**Table 25 - Biogenic carbon content of product and packaging: 1 m<sup>2</sup> shore 90**

Parameter	Unit	A1	A2	A3	A4	A5	B1-B7	C1	C2	C3	C4	D
Biog. C in packaging	[kg]	3.5E-001	0	2.60E-01	0	5.50E-03	0	0	0	0	0	0
Biog. C in product	[kg]	0	0	0	0	0	0	0	0	0	0	0

Caption	Biog. C in packaging = Biogenic carbon content in packaging; Biog. C in product = Biogenic carbon content in product
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## Calculation rules

### Assumptions

Where possible, a conservative approach has been adopted overestimating burdens to prove irrelevance. In other cases, alternative data were selected based on scientific experience in order to improve the accuracy of the model. Where it was not possible to know the exact materials composition in the supply chain (due to commercial or industrial confidential suppliers' reasons or due to missing datasets), these have been approximated with LCIs of similar materials estimated by the combination of available dataset or reconstructed with literature data.

The list of assumptions in the LCA study are as follows:

1. Lead batteries have been taken into account as a conservative choice
2. Where potential benefits from energy recovery in A5 and C modules are considered, for rest of world countries (other than Europe) these are calculated based on the European grid mix
3. For boilers (natural gas fed) an efficiency factor equal to 0,95 is considered
4. The functional unit is defined without packaging
5. In case of transports on truck where the payload was neither available nor conceivable, utilization factor of 0,61 has been considered (empty way back)
6. We assume that supplier packaging waste are raw materials' packaging and they are also input in the manufacturing process.
7. Distance to disposal site after demolition is assumed to be 100 km
8. Utilization factor for trucks from Fimor supplier to Rothoblaas is supposed to be 35%.

### Cut off rules

In the assessment aspects that have been cut-off are water consumption (as it has nothing to do with logistics activities linked to the products under study and it only relates to sanitary use) and toner waste as the amount is very low; both amount are irrelevant once allocated to the products' contribution.

Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of this assessment, together with wastes linked to activities not related to resilient soundproofing profiles.

### Data quality

The data quality can be considered as good. The LCA models have been checked and most relevant flows were considered. Technological, geographical and temporal representativeness is appropriate.

### Examination period

Primary data collected in the context of this study refer to 2021.

### Allocation – upstream data

Information about single datasets is documented in <http://database-documentation.gabi-software.com/support/gabi/>.

## Scenarios and additional technical information

- Module A1 refers to all raw materials impacts production with supplier's packaging and all types of energy inputs, all production activities, waste treatment and process emissions from the supplier's plant. Primary data have been collected from supplier.

- Module A2 includes the product transport from the supplier to Rothoblaas plant

- Module A3 comprises all activities related to warehousing and additional packaging from Rothoblaas. Soundproofing profiles are distributed by Rothoblaas that sells rolls individually or as whole pallets. Packaging includes polyethylene film, cardboard to protect separate rolls, PET bands and pallets.

Additional packaging from Rothoblaas comprises pallets, PET strips and PE film and is added whenever original packaging from supplier is not kept. Cardboard is always added by Rothoblaas because removed from the products during the manufacturing phase (module A3). Final packaging is calculated as follows:

### Final product packaging

Material	Final packaging
Wooden pallet	100%*Wood Supplier packaging + Rothoblaas wood packaging
PE film packaging	PE Supplier packaging
PET stripes packaging	100%* PET Supplier packaging + Rothoblaas PET packaging
Cardboard packaging	Rothoblaas cardboard packaging

- Module A4 takes into account the transport to the final customer/distributor. In 2021. Soundproofing profiles were sold mainly to Europe. The distribution scenario is shown below:

Product	EU	Truck [km]	Ferry [km]
Xylofon shore 35	100%	1'117.49	5.16
Xylofon shore 50	100%	1'240.76	11.81
Xylofon shore 70	100%	1'250.16	7.79
Xylofon shore 80	100%	1'714.54	7.21
Xylofon shore 90	100%	1'405.32	10.65

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

Installation			
Material	Number [pcs/m2]	Amount	Note
Stainless steel clips	30	0.10 g/m2	For all products

- For Module A5 the following end of life scenarios have been considered for packaging disposal path

Scenario	[%] Europe	Packaging material	Source
Recycling	40.6	Plastic	/PLASTIC WASTE FROM B&C IN EU 2018/
Incineration	36.5	Plastic	/PLASTIC WASTE FROM B&C IN EU 2018/
Landfill	22.9	Plastic	/PLASTIC WASTE FROM B&C IN EU 2018/
Recycling	82	Paper and cardboard	/PLASTIC WASTE FROM B&C IN EU 2018/
Incineration	9.3	Paper and cardboard	/PLASTIC WASTE FROM B&C IN EU 2018/
Landfill	8.7	Paper and cardboard	/PLASTIC WASTE FROM B&C IN EU 2018/
Recycling	31.1	Wood	/PLASTIC WASTE FROM B&C IN EU 2018/
Incineration	31.1	Wood	/PLASTIC WASTE FROM B&C IN EU 2018/
Landfill	37.8	Wood	/PLASTIC WASTE FROM B&C IN EU 2018/

- Module B (maintenance and operational use): Operational use and Maintenance are not relevant for soundproofing profiles. A general scenario of zero impact for the system is considered for all B modules (B1-B2-B3-B4-B5-B6-B7).
- Module C1 (Deconstruction / demolition) has been included and deconstruction impacts have been considered.
- Module C3 (incineration) and C4 (landfilling) consider the end-of-life scenarios of the product, considering all components of the installed resilient soundproofing profiles. The percentages to the given scenarios have been taken from statistics related to Building & Construction wastes, but excluding the recycling option as not realistic for polyurethane-based materials.

#### End of life scenarios for plastic B&C wastes

Scenario	Europe	Re-calculated scenarios Europe
Source	/ Errore. L'origine riferimento non è stata trovata./	/
Recycling	26%	0
Incineration	47.5%	36%
Landfill	26.5%	54%

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

## Other additional environmental information

### **Emissions to indoor air:**

No direct emissions at the building site. Rothoblaas srl confirms that the products don't contain any substances mentioned on the REACH-list.

### **Emissions to soil and water:**

No direct emissions at the building site. Rothoblaas srl confirms that the products don't contain any substances mentioned on the REACH-list.

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