Lignum Tech

ENVIRONMENTAL PRODUCT DECLARATION:

Industrialized sawn timber curtain wall-type self-supporting façade

DAPcons®.100.245

DECLARACIÓN AMBIENTAL DE PRODUCTO
ENVIRONMENTAL PRODUCT DECLARATION

According to the standards:
ISO 14025 and UNE-EN 15804:2012+A2:2020/AC:2021

cateb Arquitectura Tècnica Barcelona

ECO PLATFORM EPD VERIFIED

dapcons®

DECLARACIÓN AMBIENTAL DE PRODUCTO
ENVIRONMENTAL PRODUCT DECLARATION

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According to the standards:

ISO 14025 and UNE-EN 15804:2012+A2:2020/AC:2021

GENERAL INFORMATION

Product

Industrialized sawn timber curtain wall-type self-supporting façade

Company

Product description

The complete façade consists of a self-supporting curtain wall made of structural sawn timber, 140x90mm squared, structural OSB-3 board, and a waterproofing and breathable sheeting, with customizable cladding according to the project. The interior is finished with plasterboard and a vapor barrier (components not included in the scope of this declaration)..

Reference RCP

RCP 100 (version 3.2 - 21/12/2023) Construction products in general

Production plant

LIGNUM TECH
C/Cubillo Parcela nº28-29,
Polígono Industrial Sepes, 16004 Cuenca - Spain

Validity

From: 31/07/2025 Until: 31/07/2030

The validity of DAPcons®.100.245 is subject to the conditions of the regulation DAPcons®. The current edition of this DAPcons® is the one that appears in the registry maintained by Cateb; for informational purposes, it is included on the Program website www.dapcons.com

EXECUTIVE SUMMARY

Industrialized sawn timber curtain wall-type self-supporting façade

	DAPconstruction® Programme Operator Environmental Product Declarations in the Construction sector www.dapcons.com
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	Author of the Life cycle assessment: ReMa-INGENIERÍA, S.L. Calle Crevillente, 1, entlo., 12005 - Castelló, España

Declared product

Industrialized sawn timber curtain wall-type self-supporting façade

Geographic representation

This declaration has been prepared using production data from the LIGNUM TECH plant located in Cuenca (Spain)

Variability between different products

This document declares the results of an individual product.

Declaration number

DAPcons®.100.245

Issue date

19/02/2025

Validity

This verified declaration authorizes its holder to carry the logo of the operator of the ecolabelling program DAPconstruction®. The declaration is applicable exclusively to the mentioned product and for five years from the date of registration. The information contained in this statement was provided under the responsibility of: **LIGNUM TECH SL**

Programme Administrator Signature

Celestí Ventura Cisternas. President of Cateb

36548201M CELESTINO VENTURA (R: Q0875009C) 36548201M CELESTINO VENTURA (R: Q0875009C) 31.07.2025 12:20:54 +0200

Verifier Signature

Ferran Pérez Ibáñez. Institut de Tecnologia de la Construcció de Catalunya - ITeC. Verifier accredited by the administrator of the DAPcons® Programme

FERNANDO PÉREZ IBÁÑEZ FERNANDO PÉREZ IBÁÑEZ 31.07.2025 12:20:35 +0200

ENVIRONMENTAL PRODUCT DECLARATION

1. PRODUCT DESCRIPTION AND USE

The Lignum Tech modular façade is an industrialized façade that consists of a self-supporting curtain wall made of structural sawn timber, 140x90mm squared, structural OSB-3 board, and a waterproofing and breathable sheeting, with customizable cladding according to the project. The interior is finished with plasterboard and a vapor barrier (components not included in the scope of this declaration)..

GENERAL CHARACTERISTICS:
Approximate weight: 48 kg/m^2 (60 kg/m^2 with elements installed on site, without finishing or carpentry).
Thickness: The module has a minimum thickness of 260 mm, including the 46+15 mm cladding.
The total thickness of the solution will depend on the technical specifications required for the project.

The results from tests conducted in an accredited laboratory indicate a fire rating of EI-90 and a weighted sound reduction index Rw of 59 dB. The global weighted sound reduction index A (Ra) is 56.6 dBA, and the global weighted sound reduction index A for dominant exterior automobile noise (Ratr) is 48.9 dBA.

1.1 Content information

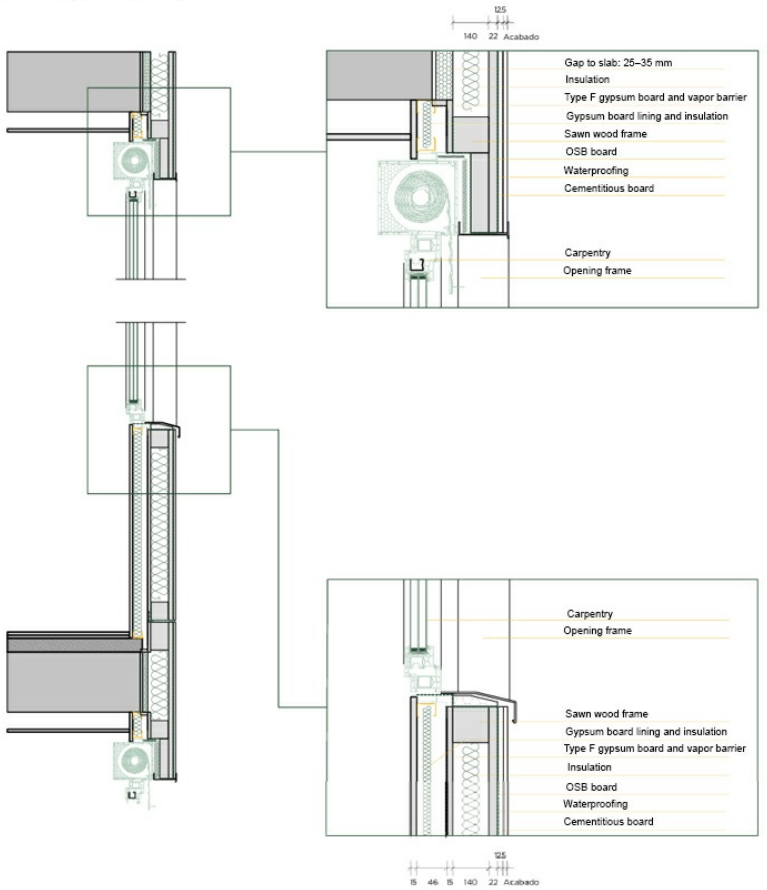
Product components

- Pine wood: 80%
- Rock wool: 15%
- Metal components: 4%
- Plastic components: 1%

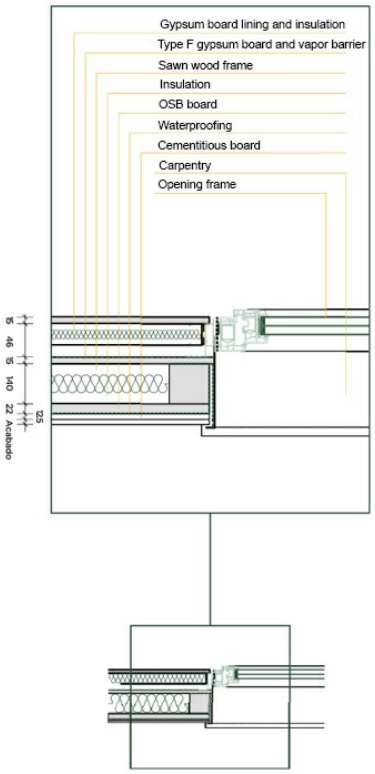
Packaging materials

-

VERTICAL SECTION



HORIZONTAL SECTION



AIR PERMEABILITY	CLASS AE (750 Pa)
WATER TIGHTNESS	CLASS RE (750 Pa)
WIND LOAD RESISTANCE (DESIGN LOAD)	-1600 Pa
WIND LOAD RESISTANCE (DEFECTION LOAD)	-4000 Pav
TRANSMITTANCE	U ≤ 0,202 w/m²K
SOFT AND RIGID BODY IMPACT	CATEGORIES I-IVWTHOUT DEFECTS
REACTION TO FIRE BUILDINGS > 10m	B-s1,d0
FIRE RESISTANCE	As of EI-90
AIRBORNE SOUND INSULATION IN dBA, DEPENDING ON DAY NOISE INDEX LD	Ratr 40-48,9 dBA

2. DESCRIPTION OF THE STAGES OF THE LIFE CYCLE

2.1. Manufacturing (A1, A2 y A3)

Raw Materials and transport (A1 y A2)

The façade is composed of the following elements:

• Main structure:

Laricio pine wood (sourced from the Cuenca mountain range).

• Enclosure:

22 mm OSB board with load-bearing function for thermal and acoustic insulation.

• Waterproofing:

Breathable membrane (protects the façade against moisture).

• Insulation:

140 mm rock wool.

• Fixings and anchoring to façade

The transport of raw materials is carried out using a trailer truck with a maximum load capacity of 27 tons, compliant with Euro VI regulations.

Manufacturing (A3)

The assembly of the different façade components is carried out mainly through automated processes, with the cutting and mounting of components performed using the following machines:

1. Batten cutting machine for the structural frame
2. Structural frame assembly machine
3. Cutting machine for boards and finishes
4. Board-to-structure assembly machine
5. Batten assembly machine
6. Finishes assembly machine

The only energy consumption in the assembly process is electricity. For the purpose of inventorying the environmental loads associated with electricity production and distribution, the electricity mix of the supplier has been used. In 2024, this mix was 100% renewable (92% wind and 8% solar photovoltaic, according to the CNMC's guarantees of origin redemptions).

2.2. Construction process stage (A4 y A5)

Transport to the building site (A4)

Undeclared

Product installation process and construction (A5)

Undeclared

2.3. Product use (B1-B7)

Use (B1)

Undeclared

Maintenance (B2)

Undeclared

Repair (B3)

Undeclared

Replacement (B4)

Undeclared

Refurbishment (B5)

Undeclared

Operational energy use (B6)

Undeclared

Operational water use (B7)

Undeclared

2.4. End of life (C1-C4)

Deconstruction and demolition (C1)

For the dismantling of the panel, it is assumed that a tower crane is used with the same energy consumption as during installation.

Transport to waste processing (C2)

The product waste is transported by a truck with a maximum load capacity of 27 tons, compliant with Euro VI regulations. The distance between the waste generation site and the waste management facility has been estimated at an average of 350 km for recovery/recycling and 50 km for landfill disposal. The end-of-life waste management scenario considered is as follows:

(%) Recycling - Recovery - Landfill

Wood: 64 - 16 - 20

Plastic: 0 - 0 - 100

Rock wool: 80 - 0 - 20

Steel/Aluminum: 0 - 0 – 100

Waste processing for reuse, recovery and/or recycling (C3)

Waste management for reuse, recovery, and recycling (C3): It is assumed that the waste reaches end-of-waste status upon entering the recycling/recovery plants. The only burdens allocated at this stage are the biogenic carbon outputs contained in the components to be recycled or recovered, as specified in UNE-EN 16485:2014.

Disposal (C4)

Landfill (%): Wood 20%, Plastic 100%, Rock wool 20%, and Steel/Aluminum 100%

2.5. Reuse/recovery/recycling potential (D)

In this Module D, the existence of environmental burdens and credits (i.e., avoided environmental impacts) outside the system boundaries is declared, due to the reuse, recovery, or recycling of some of the system's output flows. The declared values represent the net impacts, calculated by subtracting the impacts of producing the primary materials or fuels displaced or substituted by the recycled ones from the impacts of the recycling and energy recovery processes, taking into account the quality difference between the primary and secondary materials.

In this case, the burdens and benefits from the recycling and energy recovery of wood, gypsum board, and rock wool waste have been accounted for.

3. LIFE CYCLE ASSESSMENT

The life cycle assessment on which this declaration is based has been carried out in accordance with ISO 14040, ISO 14044, and UNE-EN 15804 standards. Regarding the biogenic carbon content of the product, the guidelines set out in UNE-EN 16485:2014 Sawn timber and round wood – Environmental product declarations – Product category rules for wood and wood-based products for use in construction have been followed.
This study was conducted using the LCA software tool SimaPro 9.6.0.1, developed in compliance with UNE-EN ISO 14040-14044 standards, and the Ecoinvent v3.10 (2023) database. The LCA is of the "cradle to factory gate with modules C1–C4 and D" type, meaning it covers the product's manufacturing stage, i end-of-life, and burdens and benefits beyond the system boundaries, while excluding the installation and use phases. Specific data from the LIGNUM TECH plant (Cuenca) for the year 2024 were used to inventory the manufacturing stage.

3.1. Declared Unit

1 m^2 of industrialized façade made of sawn timber, self-supporting curtain wall type

Additional comments

The weight of the industrialized façade is 48.02 kg/m^2 (60 kg/m^2 including the components installed on site).

3.2. Scope and modules that are declared

Table 2. Declared modules

Product stage			Construction Process Stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw materials supply	Transport	Manufacturing	Transport	Construction - Installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction	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	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

X = Declared module **MND** = Undeclared module

3.3. LCA results of potential environmental impact referred to the declared unit (ACV)

Table 3. Parameters of environmental impact

Parameter	Unit	Life cycle stage														Module D
		Product stage	Construction Process Stage		Use stage							End of life stage				
		A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
Climate change - total (GWP-total)	kg CO2 eq	-4,26E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,08E+00	1,14E+00	5,62E+01	1,48E+01	-3,90E+00
Climate change - fossil (GWP-fossil)	kg CO2 eq	2,78E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,03E+00	1,14E+00	6,60E-02	1,55E-01	-3,89E+00
Climate change - biogenic (GWP-biogenic)	kg CO2 eq	-7,04E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,15E-02	3,07E-04	5,61E+01	1,46E+01	0,00E+00
Climate change - land use and changes in land use (GWP-luluc)	kg CO2 eq	7,91E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,01E-02	5,90E-05	7,17E-06	3,89E-05	-1,45E-02
Ozone layer depletion (ODP)	kg CFC 11 eq	7,38E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,34E-08	2,47E-08	8,23E-10	2,36E-09	-4,08E-08
Acidification (AP)	mol H+ eq	1,69E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	8,14E-03	1,74E-03	8,76E-04	6,77E-04	-1,21E-02
Eutrophication of fresh water (EP-freshwater)	kg P eq	1,74E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,54E-05	1,78E-06	5,07E-07	1,39E-06	-2,93E-04
Eutrophication of sea water (EP-marine)	kg N eq.	4,05E-02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,66E-03	4,95E-04	4,44E-04	4,31E-04	-2,50E-03
Terrestrial eutrophication (EP-terrestrial)	mol N eq.	5,47E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,85E-02	5,56E-03	4,71E-03	2,94E-03	-2,70E-02
Photochemical ozone formation (POCP)	kg NMVOC eq	1,59E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,83E-03	3,48E-03	1,16E-03	1,17E-03	-1,35E-02
Depletion of abiotic resources - minerals and metals (ADP-minerals&metals)	kg Sb eq	2,08E-04	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,60E-07	1,56E-07	2,45E-08	3,16E-08	-9,97E-08
Depletion of abiotic resources - fossil fuels (ADP-fossil)	MJ, net calorific value	4,36E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,33E+01	1,62E+01	5,37E-01	2,02E+00	-5,58E+01
Water consumption (WDP)	m3 worldwide eq. private	4,84E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,18E+00	1,46E-02	2,97E-02	-1,32E+00	-4,26E-01
Eco-toxicity - freshwater (ETP-fw)	CTUe	3,97E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,65E+00	7,75E-01	6,01E-01	1,09E+00	-6,46E+00
Human toxicity, cancer effect (HTP-c)	CTUh	3,36E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,03E-10	1,07E-09	2,86E-10	9,43E-11	-9,75E-10
Human toxicity, non-cancer effects (HTP-nc)	CTUh	2,37E-07	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,59E-09	1,30E-09	1,16E-08	2,52E-09	-1,13E-08
The Indicador includes all greenhouse gases included in GWP-total but excludes biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. This Indicador is thus equal to the GWP Indicador originally defined in EN 15804:2012+A1:2013. Can be obtained from IPCC characterization factors.																
Global Warming Potential (GHG)	kg CO2 eq	2,78E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,03E+00	1,14E+00	6,60E-02	1,55E-01	-3,89E+00

A1 Supply of raw materials. **A2** Transport to waste processing. **A3** Manufacturing. **A4** Transport to waste processing. **A5** Installation and construction processes. **B1** Use. **B2** Maintenance. **B3** Repair. **B4** Replacement. **B5** Refurbishment. **B6** Operational energy use. **B7** Operational water use. **C1** Deconstruction and demolition. **C2** Transport to waste processing. **C3** Waste management for reuse, recovery and recycling. **C4** Fine removal. **D** Environmental benefits and burdens beyond the system boundary. **MND** Undeclared module.

Table 4. Parameters for the use of resources, waste and output material flows

Parameter	Unit	Life cycle stage														Module D
		Product stage	Construction Process Stage		Use stage							End of life stage				
		A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
Use of renewable primary energy excluding renewable primary energy resources used as feedstock	MJ, net calorific value	7,70E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,09E+01	6,07E-02	6,18E-03	1,95E-02	-1,18E+02
Use of renewable primary energy used as raw material	MJ, net calorific value	7,52E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	1,52E+03	MND	MND	MND	MND	MND	MND	MND	MND	MND	2,09E+01	6,07E-02	6,18E-03	1,95E-02	-1,18E+02
Non-renewable primary energy use, excluding non-renewable primary energy resources used as feedstock	MJ, net calorific value	5,06E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,59E+01	1,72E+01	5,91E-01	2,15E+00	-6,05E+01
Use of non-renewable primary energy used as raw material	MJ, net calorific value	4,28E+01	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-renewable primary energy (primary energy and renewable primary energy resources used as feedstock)	MJ, net calorific value	4,57E+02	MND	MND	MND	MND	MND	MND	MND	MND	MND	7,59E+01	1,72E+01	5,91E-01	2,15E+00	-6,05E+01
Use of secondary materials	kg	6,96E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of renewable secondary fuels	MJ, net calorific value	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Use of non-renewable secondary fuels	MJ, net calorific value	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Net use of freshwater resources	m3	2,01E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	3,07E-02	5,33E-04	9,77E-04	-3,07E-02	-1,70E-02
Hazardous waste removed	kg	4,23E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	1,29E-04	1,09E-04	3,09E-06	1,31E-05	-1,73E-04
Non-hazardous waste eliminated	kg	6,91E-01	MND	MND	MND	MND	MND	MND	MND	MND	MND	4,04E-04	1,68E-05	4,96E-02	1,86E-05	-4,23E-04
Radioactive waste disposed of	kg	3,62E-03	MND	MND	MND	MND	MND	MND	MND	MND	MND	6,42E-04	1,45E-06	8,28E-08	3,66E-07	-8,84E-05
Components for reuse	kg	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling	kg	7,03E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,03E+01	0,00E+00	0,00E+00
Materials for energy recovery (energy recovery)	kg	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	6,13E+00	0,00E+00	0,00E+00
Exported energy	MJ by energy vector	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	3,21E+01	0,00E+00	3,21E+01
Exported electrical energy (AEE)	MJ	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	1,07E+01	0,00E+00	1,07E+01
Exported thermal energy (EET)	MJ	0,00E+00	MND	MND	MND	MND	MND	MND	MND	MND	MND	0,00E+00	0,00E+00	2,14E+01	0,00E+00	2,14E+01

A1 Supply of raw materials. **A2** Transport to waste processing. **A3** Manufacturing. **A4** Transport to waste processing. **A5** Installation and construction processes. **B1** Use. **B2** Maintenance. **B3** Repair. **B4** Replacement. **B5** Refurbishment. **B6** Operational energy use. **B7** Operational water use. **C1** Deconstruction and demolition. **C2** Transport to waste processing. **C3** Waste management for reuse, recovery and recycling. **C4** Fine removal. **D** Environmental benefits and burdens beyond the system boundary. **MND** Undeclared module.

Table 5. Kg of biogenic carbon

Carbon content (biogenic) - packaging	0,00E+00
Carbon content (biogenic) - product	1,91E+01

3.4. Recommendations of this EPD

The comparison of construction products must be made using the same functional unit and at the building level, meaning that the product's performance over its entire life cycle must be considered.
Environmental product declarations from different Type III eco-label programs are not directly comparable, as the calculation rules may differ.
This declaration represents the performance of the product Industrialized façade made of sawn timber, self-supporting curtain wall type, manufactured by LIGNUM TECH.

3.5. Cut-off rules

More than 95% of all mass and energy inputs and outputs of the system have been included. Excluded elements include, among others, fugitive emissions at the factory and the production of machinery and industrial equipment.

3.6. Additional environmental information

During the product's life cycle, no hazardous substances listed in the "Candidate List of Substances of Very High Concern (SVHC) for authorisation" are used.

3.7. Other data

The waste from LIGNUM TECH's ventilated façade is classified as hazardous and non-hazardous waste in the European Waste List under the following EWC codes: 17 02 01 Wood, 17 06 03* Other insulation materials consisting of or containing hazardous substances, 17 02 03 Plastic, 17 04 02 Aluminium, and 17 04 05 Iron and steel.

4. ADDITIONAL TECHNICAL INFORMATION AND SCENARIOS

4.1. Transport to the building site (A4)

Undeclared

4.2. Installation processes (A5)

Undeclared

4.3. Reference life (B1)

Undeclared

4.4. Maintenance (B2), Repair (B3), Replacement (B4), or Refurbishment (B5)

Maintenance (B2)

Undeclared

Repair (B3)

Undeclared

Replacement (B4)

Undeclared

Refurbishment (B5)

Undeclared

4.6. Operational energy use (B6) and operational water use (B7)

Undeclared

4.7. End of life (C1-C4)

	Process				
	Collection processes (specified by types)	Recovery systems (specified by type)			Elimination
	kg collected with mixed construction waste	kg for reuse	kg for recycling	kg for energy recovery	kg for final disposal
	48.02	0	30.32	6.13	11.57
Assumptions for scenario development	• The plastic, steel, and aluminum components, being small in size, cannot be recovered during deconstruction and end up in landfill. • The wood and rock wool components are partially recovered: o Wood components: 20% to landfill, 64% for reuse/recycling, shredded and used to produce particleboard products. The remaining 16% is used for energy recovery. o Rock wool components: 100% of the recovered material is recycled. The transport of waste materials is carried out using a 27-ton EURO VI truck, and the average distance from the demolition site to the waste management facility has been estimated at 50 km for landfill and 350 km for recovery/recycling.				

5. ADDITIONAL INFORMATION

• The Lignum Tech Industrialized Façade has the VERDE, LEED v4, and BREEAM environmental certification sheets from GBCe (Green Building Council España).
• The wood used in the manufacturing of this product is supplied by the company AYUNTAMIENTO DE CUENCA MADERAS, S.A. and has the following certifications:

o FSC Chain of Custody Certificate (SGSCH-060565),
o CE Markings C22/PNSY:PNNL/DRY GRADED (DoP ACMSA/MEG/PNSY:PNNL/2) and C18/PNSY:PNNL/DRY GRADED (DoP ACMSA/MEG/PNSY:PNNL/6), and
o Quality seals 21-01-5 and 21-01-1 for structural use sawn timber issued by the Technical Research Association of the Wood Industries (AITIM).

6. PCR AND VERIFICATION

This statement is based on Document

RCP 100 (version 3.2 - 21/12/2023) Construction products in general

Independent verification of the declaration and data, in accordance with ISO 14025 and IN RCP 100 (version 3.2 - 21/12/2023)

☑ External

Third party Verifier

Ferran Pérez Ibáñez
Accredited by the administrator of the DAPcons® Programme

Verification date:

31/07/2025

References

- Report LIFE CYCLE ASSESSMENT OF THE PRODUCT Industrialized façade made of sawn timber, self-supporting curtain wall type – LIGNUM TECH. May 2025. ReMa-INGENIERÍA, S.L. (UNPUBLISHED)
- HBEFA. Handbook of Emission Factors for Road Transport, version 4.2 published in 2022. http://www.hbefa.net/
- SPHERA. Documentation for Duty Vehicle Processes in GaBi. February 2022.
- Autoridad Federal de Transporte Motorizado de Alemania (KRAFTFAHRT-BUNDESAMT)
- DAP “ROCKWOOL stone wool insulation (medium bulk density range) DEUTSCHE ROCKWOOL GmbH & Co. KG” (Programme holder: (IBU, Declaration number: EPD-DRW-20240317-IBC3-EN, Issue date: 30/08/2024)

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