DAPHabitat System

Environmental Product Declaration

www.daphabitat.pt

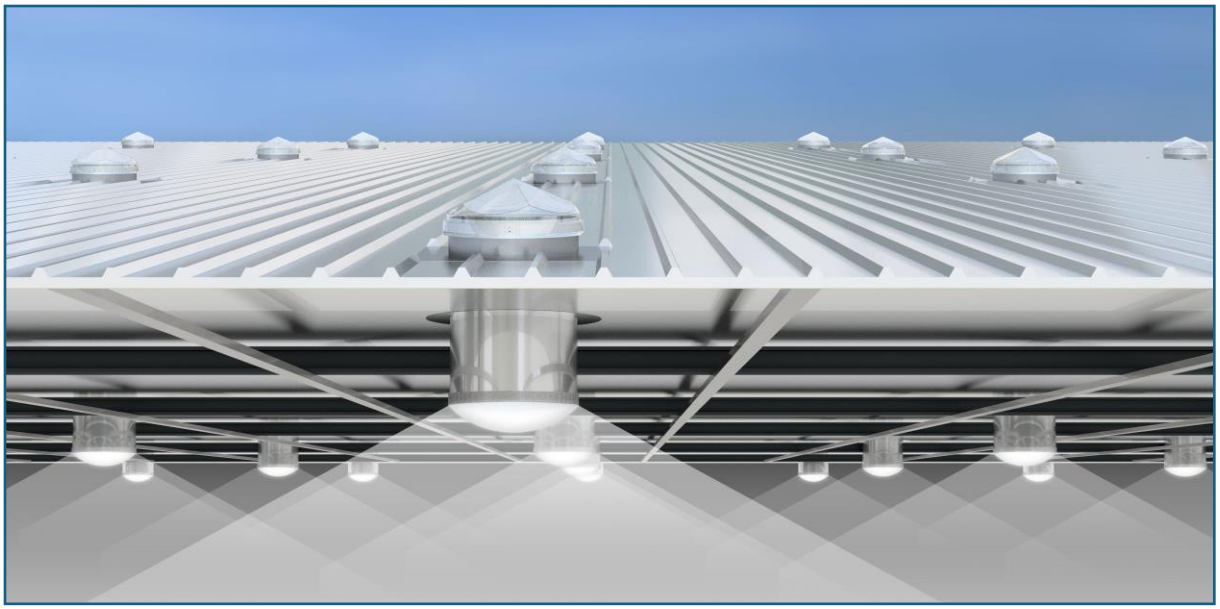
[according to ISO 14025, EN 15804:2012+A2:2019 e EN 15942]

Declaration number: DAP 007:2025/v1.1

SOLAR LIGHT TUBE TS350 & TS250

Issue date: 19/12/2025 **Valid until:** 21/05/2030

Chatron Lda.



Version 1.5 Edition June 2024

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1. GENERAL INFORMATION

1.1. The DAPHabitat System

Programme operator:	Associação Plataforma para a Construção Sustentável www.clusterhabitat.pt geral@clusterhabitat.pt Cluster Habitat Sustentável
Address:	Departamento Engenharia Civil Universidade de Aveiro 3810-193 Aveiro
Email address:	deptecnico@clusterhabitat.pt
Telephone number:	(+351) 234 401 576
Website:	www.daphabitat.pt
Logo:	dap habitat

1.2. EPD owner

Name of the owner:	Chatron Lda.
Production site:	Travessa da Zona Industrial-1, nº 95 Rossio 3730-601 Vale de Cambra, Portugal
Address (head office):	Not applicable
Telephone number:	(+351) 256 472 888
Email address:	comercial@chatron.pt
Website:	https://www.chatron.pt
Logo:	CHATRON®
Information concerning the applicable management Systems:	NP EN ISO 9001:2015 – Quality Management System
Specific aspects regarding production:	CAE 25120 - Manufacture of metal doors, windows and similar elements CAE 22230 - Manufacture of plastic articles for construction
Organization's environmental policy:	Commitments made by Chatron as part of its environmental protection policy: • Minimize environmental impact, while increasing positive social impact. • Contribute to reducing carbon emissions and energy consumption and strengthen the sustainability of the industries that adopt our solutions.

- Continuously contribute ideas and solutions to achieve the Sustainable Development Goals (SDGs).
- Actively promoting sustainability in our projects, processes and infrastructures
- Empowering the next generations, recognizing their role in the future of the planet

1.3. Information concerning the EPD

Authors:	1. Sustenuto BV – MSc. Mark Wildschut 2. Chatron Lda.
Contact of the authors:	1. mark.wildschut@sustenuto.com 2. comercial@chatron.pt
First issue date:	21/05/2025
Issue date:	19/12/2025
Registration date:	02/07/2025
Registration number:	DAP 007:2025/v1.1 (previous versions are not valid).
Valid until:	21/05/2030
Representativity of the EPD (location, manufacturer, group of manufacturers):	Designed solely for the Chatron Lda. Portugal production facility.
Type of EPD	"Cradle to Grave" (A1-D) excluding module B

1.4. Verification demonstration

External independent verification, accordingly, with the standard ISO 14025:2010 and EN 15804:2012+A2:2019

Certification Body	Verifier
This EPD was validated by the Declaration of Conformity formally sent to the DAPHabitat System Programme Operator by Agrodome B.V.	**Agrodome BV**
(Agrodome B.V)	(Fred van den Burgh)

1.5. EPD registration

Programme operator

(Plataforma para a Construção Sustentável)

1.6. PCR (Product Category Rules) basic model

No Product relevant PCR currently available. CEN standard EN 15804 serves as the core Product Category Rules (PCR).

1.7. Information concerning the produc/product class

Identification of the product:

Chatron® TS350 Solar Light Tube

The results may be used for the Chatron® TS250 Solar Light Tube.

Illustration of the product:

Brief description of the product:

The Solar Light Tube can bring natural light into indoor spaces. It is used for installation on roofs and can be adapted to different roof slopes. The product has a dome and a diffuser made from polycarbonate, a connection accessory made from polyethylene, a reflective tube made of aluminium reflective material, and a cover base made of galvanized steel. The Solar Light Tube is applicable to different roofing materials, different slopes and buildings. The product is available in diameters of 250mm, 350mm, 530mm and 750mm. The TS350 is used in the report as a 'worst case' scenario for the TS250. Other products are covered by a separate EPD. The products have identical bill of materials. The packaging usually consists of: Cardboard and Plastic tape which is included in the assessment.

Dimensions
Diameter 350 mm
Length (including dome) 885 mm
Weight 5,13 kg/DU
Packaging weight, cardboard box (650x650x630mm) 1,5 kg/DU

Composition of the Chatron® TS 350 Solar Light Tube

Material	Share
Galvanized Metal sheet	48%
Reflective aluminium sheet	19%
Polycarbonate sheet	7%
Polycarbonate dome (injection moulded)	20%
Polyethylene connection accessory (injection moulded)	6%
Screws	<1%
Aluminium Tape	<1%
Synthetic rubber	<1%

Main technical characteristics of the product:

The technical data and performance data of the production according to DOP (Declaration of performance) and ETA22/0030 of 29/12/2022, made in compliance with EAD 220021-00-0402. More information can be downloaded from https://www.chatron.pt/en.

Table 1: Technical characteristic

Name	TS250	TS350	Unit
Reaction to fire light collector EN 13501-1	B-s1, d2	B-s1, d2	-

Reaction to fire light diffuser ST EN 13501-1	B-s1, d0	B-s1, d0	-
Reaction to fire reflective tube EN 13501-1	A1	A1	-
Water tightness EN 12208	E1050	E1050	Class
Resistance to upward and downward load EN 12210	C3	C3	Class
Air permeability EN12207	3	3	Class
Sound insulation EN ISO 14140-1	47.3±1.3	50.4±1.4	Db
Thermal transmittance ISO 10077-2:2017	1.85	2.09	W/m2K
Impact resistance soft body EN1873:2014+A1:2016	SB1200	SB1200	-
Impact resistance hard body EN1873:2014+A1:2016	Satisf.	Satisf.	-

Table 2: Light transmission by model in Lux with their performance measured at 2pm.

Model	TS250	TS350	TS530	TS750
120.000 (Lux)	4.600	9.400	20.000	30.000
85.000 (Lux)	2.900	6.700	13.000	24.000
45.000 (Lux)	1.350	2.900	6.350	11.620
20.000 (Lux)	540	1.300	2.500	5.300

Description of the product's application/use:	The Solar Light Tube can bring natural light into indoor spaces, used for installation on roofs and can be adapted to different roof slopes.
Placing on the market / Rules of application in the market / Technical rules of the product:	CE marking according to ETA 22/0030 in compliance with EAD 220021-00-0402 Technical characteristics certified according to standards: EN13501-1 | EN12208 | EN12210 | EN12207 | EN ISO 14140-1 | ISO 10077-2:2017 | EN1873:2014+A1:2016
Quality control	CE marking according to ETA 22/0030 in compliance with EAD 220021-00-0402.
Special delivery conditions:	Not applicable
Components and substances to declare:	The product does not exceed limits set by the European Chemicals Agency and listed in the "Candidate list of Substances of Very High Concern for authorisation".
Where explanatory material may be obtained:	More information can be downloaded from https://www.chatron.pt/en.
History of the LCA studies:	Not applicable

1.8. Calculation rules of the LCA

Declared unit:

The declared unit (DU) is one Chatron® TS350 Solar Light Tube (piece)

Declared unit	Value	Unit
Chatron® TS350 Solar Light Tube	1,00	piece

System boundaries:

The environmental performance of building materials is categorized in four modules corresponding to different lifecycle phases in the building material; Modules A (production of materials and construction), B (use phase), C (end-of-life phase of the building) and D (loads and benefits outside the system boundary). Energy input in A3 from reference year: 2024 of the Portugal national grid consumption mix, based on Ecoinvent v3.9.1 data *updated 15-01-25*: Electricity, high voltage {PT}|

	market for electricity, high voltage | Cut-off, U. With an emission of 0.327 kgCO2eq per kWh purchased electricity. The LCA includes the cradle to grave (A1-D) minus B1-B7. All declared values relate to the specified declared unit.
Criteria for the exclusion:	The product is 100% characterized. A <1% cut-off has been used in line with 15804+A2 in the production process due to which the following processes where not included: - On-site inputs used for maintenance of the production facility's machinery (A3), for example: machine parts and replacement of drill bits. - Water consumption, waste, and effluents at the production facility, as they are not directly related to the production process - Other flows deemed negligible in the modelling due to their contribution falling below the cut-off criteria
Assumption and limitations:	The company, process and product data come from Chatron Lda. The calculation is made based on information provided by the current suppliers. And is assumed to be a 'worst-case' with assumed recycled content based on average recycling rates and content and is modelled to the location's average grid and energy recovery based on sales data.
Quality and other characteristics about the information used in the LCA:	Completeness of env. Interventions: All environmental interventions have a value Completeness of economic flows: All flows are qualified and quantified Mass balance at process level: Closure >99% The information used in this LCA of the production process of the products is based on measurements and observations from 2024 (energy, waste percentages, quantities net per element, production volume). All data have been checked for topicality with the client. To ensure the quality of data were sufficient, data quality checks were completed in relation to time-related coverage, geographical coverage, technology coverage, completeness, and representativeness. Data quality indicators were applied using a data quality matrix whereby key data were assigned scores between 1 (best) and 5 (worst). Data was deemed appropriate for independent EPD generation.
Allocation rules:	As no linear scaling can be produced between input materials, the product results cannot be scaled down to the smaller models TS250, TS350, TS530. And no scaling can be done other than the declared unit. The value per piece of the TS350 may be used for the TS250 until a separate EPD has been produced.
Software used for the assessment:	SimaPro version 9.6.0.1
Background database used for the LCA:	Ecoinvent database version 3.9.1
Comparability of EPD for construction products:	The EPD of construction products and services are not comparable if they are not produced according to EN 15804 and 15942 and according to the comparability conditions determined by ISO 14025.

1.9. Technical information for Reference Service Life (RSL)

Information of the RSL	The expected service life is set to 25 years based on the technical documentation from Chatron Lda. The warranty from the manufacturer (not to be confused with the RSL) is 10 years for the Domes, connecting accessory, diffusers and reflector tube. And 5 years for the Cover bases.

1.10. Flow diagram of input and output of the process

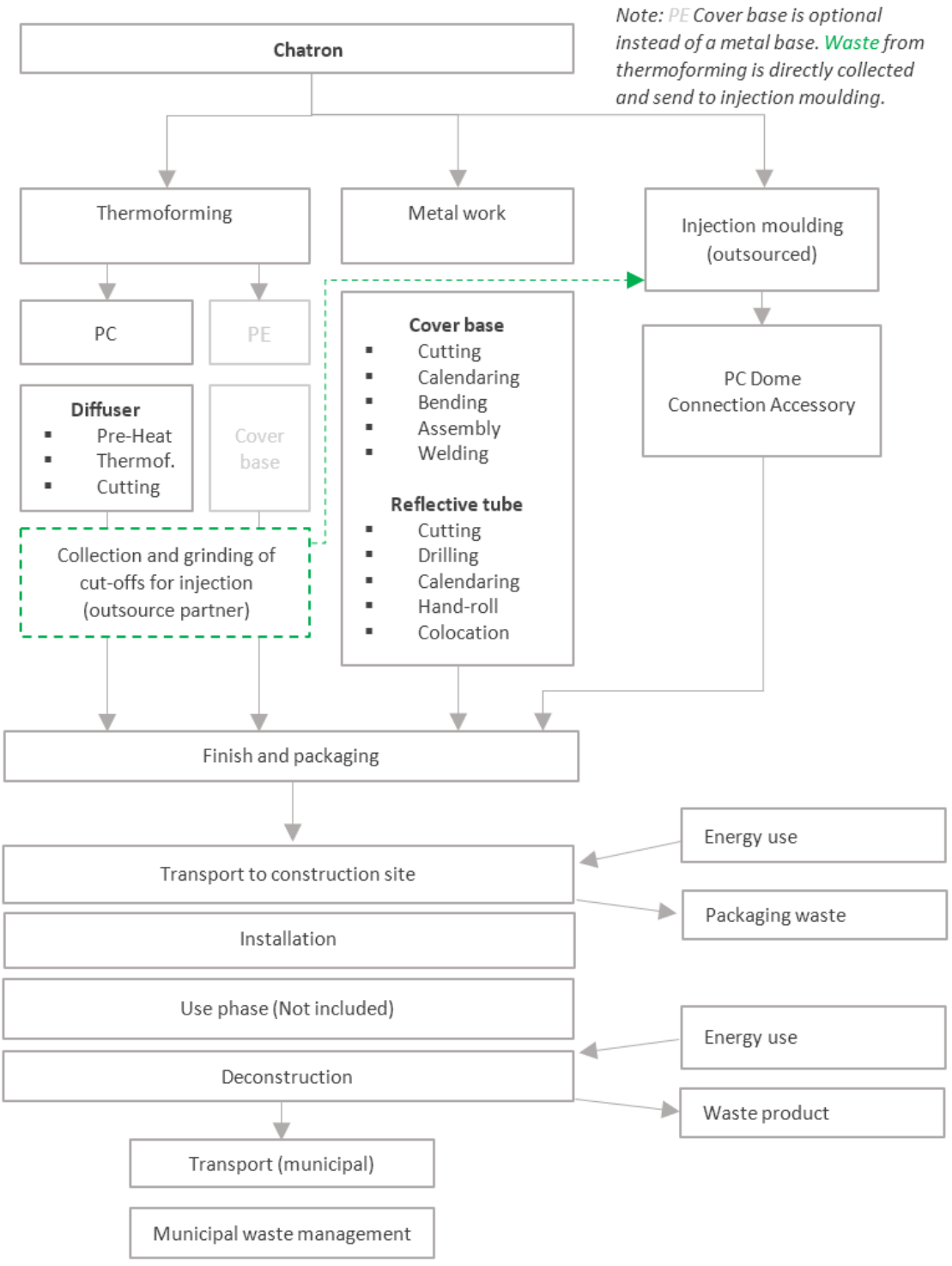

Figure 1: Flow diagram.

2. CORE ENVIRONMENTAL IMPACT INDICATORS

2.1. Description of the system boundaries

(✓= included; ND = module not declared)

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
Raw material supply	Transport	Manufacturing	Transport	Construction installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
✓	✓	✓	✓	✓	ND	ND	ND	ND	ND	ND	ND	✓	✓	✓	✓	✓

Description of the lifecycle stages under study

Raw materials (A1)

Galvanized metal, reflective aluminium and polycarbonate sheets are supplied to Chatron which are processed into the final product at the factory site. Injection moulding is also outsourced, the dome is purchased 'finished' aside from the diffuser. Impacts for these products are included in A1.

Transport (A2)

The products are transported by their suppliers to the Chatron manufacturing site by Lorry (truck). Input weights of the final product, including extra input correlated to the waste created during production in A3. The process is calculated for average load factor and an empty return trip and is based on global average efficiencies between EURO3-EURO6.

Production phase (A3)

Production waste is calculated according to the nett vs gross dimensions and calculated based on geometry of the cut-outs for the sheets. The waste included is solely based on the TS350. This method is deemed most appropriate due to the conversion steps in the metal workshop aiming for efficiency in the cutouts. The Polycarbonate and polyethylene cut-offs after are grinded to a pulp and directly supplied to their partner in injection moulding.

All processes during A3 are considered not to have any emissions or environmental impacts outside of impacts from the utility use as no direct emissions and discharges are made to the environment.

Energy consumption: Energy consumption is based on annual invoice data for the production facility (year 2024) as well as evidence of PV generation (on-site) and effective usage. Water usage and electricity for office heating the

Description of the lifecycle stages under study

site is not included at this heating is solely for office warmth and water only for sanitation, no cooling water is used in the process. Gas is not used as heating is electrical. Evidence of PV installation and generation is supplied.

Transport to site (A4)

The transport to the construction site has been set to the default value of 1 km. The impact can be calculated per project location.

Construction phase (A5)

The Chatron Solar Light Tubes are light, therefore they can be carried and placed by hand. Only some minor hand tools are used. This is a finished product (not pre-fab) thus no waste is included in this stage aside from the packaging. Packaging waste is modelled in A5 using the waste streams as discussed in C2-C4. Benefits and burdens (D) are added to lifecycle stage D. See table in module D: *Waste treatments per material and calorific value* for EOL scenarios.

Disassembly and demolition (C1)

Assumed same as installation A5, disassembly can be done by hand.

Transport (C2)

Transport phase assumptions: the default values are used. This is 50 km to sorting installation and 100 km from demolition or sorting location to processing locations. Transport (tkm) is calculated based on EOL destinations described in C3-C4 in combination with the table below.

Waste treatment (C3-C4)

EOL scenarios modelled to market average values as this is not handled by Chatron. See table in module D: *Waste treatments per material and calorific value* for EOL scenarios.

Benefits: Reuse, Recovery, recycling, potential (D)

The income and expenses outside the system boundary relate to combustion in which energy use is avoided using EU averages we set this to an efficiency during waste incineration of 13% electrical and 25.57% in heat. The recycling flows have been adjusted based on the input of secondary materials and the quality loss.

Waste treatments per material and calorific value

	MJ	Landfill	Incineration	Recycling	Reuse
Galvanized Metal sheet	NA	5%	5%	90%	0%
Reflective aluminium sheet	NA	3%	3%	94%	0%
Polycarbonate	30.3	0%	90%	10%	0%
PC Dome from injection	30.3	0%	90%	10%	0%
PE Connection accessory from injection	42.47	10%	85%	5%	0%
Screw	NA	5%	5%	90%	0%
Aluminium Tape	42.47	100%	0%	0%	0%
Synthethic rubber	27.2	0%	100%	0%	0%
EPDM membrame	27.2	10%	85%	5%	0%
Cardboard box	15.92	20%	15%	65%	0%

Substantiation and value correction factor Q

A substantiation factor (quality loss from reuse/recycling) has been taking into account for the products described in the table below. The secondary materials (recycled content) are based on the Ecoinvent profiles and subtracted for use in module D (net secondary material).

Value correction factor and secondary materials (input/outputs)

*Output = (recycle% - Secondary%) * Q factor*

The value correction factor are based on the information in the ecoinvent processes and a lump sum value of 0.9 has been used. For streams that are directly recycled at the manufactory site a Q factor of 1 and 100% recycling is used as these are still unpolluted materials in a direct loop with a recycling partner.

Chatron® TS350 Solar Light Tube

2.2. Core environmental impact indicators

	Global warming potential - total;	Global warming potential fossil;	Global warming potential - biogenic;	Global warming potential land use and land use change;	Depletion potential of the stratospheric ozone layer;	Acidification potential;
	GWP-total	GWP-fossil	GWP-biogenic	GWP-luluc	ODP	AP
Unit	kg CO_2 eq.	kg CO_2 eq.	kg CO_2 eq.	kg CO_2 eq.	kg CFC 11 eq.	mol H^+ eq.
Modules A1-A3	2,98E+01	3,16E+01	-1,90E+00	1,03E-01	1,13E-06	1,81E-01
Module A4	9,85E-04	9,80E-04	1,53E-06	3,49E-06	1,74E-11	4,69E-06
Module A5	3,51E+00	1,58E+00	1,93E+00	1,63E-03	3,48E-08	7,68E-03
Module B1-B7	ND	ND	ND	ND	ND	ND
Module C1	2,57E-02	2,55E-02	1,60E-04	6,52E-05	3,91E-10	1,50E-04
Module C2	1,24E-01	1,24E-01	1,93E-04	4,41E-04	2,20E-09	5,92E-04
Module C3	4,11E+00	4,11E+00	1,08E-03	3,40E-04	8,89E-08	1,60E-03
Module C4	7,83E-03	7,81E-03	1,77E-05	2,14E-06	4,83E-11	1,72E-05
Module D	-8,66E+00	-8,51E+00	-5,57E-02	-9,42E-02	-3,24E-07	-3,52E-02

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTES[1]

Units expressed by functional unit or declared unit.

	Eutrophication potential aquatic freshwater;	Eutrophication potential aquatic marine;	Eutrophication potential terrestrial;	Formation potential of tropospheric ozone;	Abiotic depletion potential for non-fossil resources;	Abiotic depletion potential for fossil resources potential;	Water (user) deprivation potential;
	EP-freshwater	EP-marine	EP-terrestrial	POCP	ADP-minerals&metals	ADP-fossil	WDP
Unit	Unit	kg N eq.	mol N eq.	Kg COVNM eq.	kg Sb eq.	MJ, P.C.I	m3 World eq. deprived
Modules A1-A3	1,52E-03	3,10E-02	4,40E-01	1,30E-01	2,09E-04	4,64E+02	1,34E+01
Module A4	9,75E-09	1,78E-06	1,90E-05	6,49E-06	3,07E-09	1,40E-02	8,61E-05
Module A5	4,52E-05	2,39E-03	1,53E-02	8,75E-03	2,00E-05	4,09E+01	9,29E-01
Module B1-B7	ND	ND	ND	ND	ND	ND	ND
Module C1	2,24E-06	1,86E-05	2,15E-04	6,53E-05	1,76E-07	3,25E-01	5,24E-03
Module C2	1,23E-06	2,25E-04	2,40E-03	8,20E-04	3,87E-07	1,77E+00	1,09E-02
Module C3	1,00E-05	4,75E-04	5,26E-03	1,52E-03	1,66E-06	2,90E+00	1,73E-01
Module C4	5,41E-08	6,67E-06	5,99E-05	2,18E-05	4,57E-09	4,75E-02	1,81E-03
Module D	-1,06E-04	-4,80E-03	-5,93E-02	-3,12E-02	-5,21E-05	-1,26E+02	-4,73E-01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTES[2]: P.C.I. – Net calorific value

Units expressed by functional unit or declared unit.

"The results obtained for the indicators "Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)", "Abiotic depletion potential for fossil resources potential (ADP-fossil)" and "Water (user) deprivation potential (WDP)" should be used with caution since the uncertainties associated with them are high or there is little experience with the indicator."

2.3. Additional environmental impact indicators

	Potential incidence of disease due to PM emissions	Potential Human exposure efficiency relative to U235	Potential Comparative Toxic Unit for ecosystems	Potential Comparative Toxic Unit for humans, cancer effects	Potential Comparative Toxic Unit for humans, not cancer effects	Potential soil quality index
	PM	IRP	ETP-fw	HTP-c	HTP-nc	SQP
Unit	Disease incidence	kBq U 235 eq.	CTUe	CTUh	CTUh	-
Modules A1-A3	2,37E-06	8,40E-01	5,20E+02	1,09E-07	5,39E-07	2,55E+02
Module A4	9,67E-11	5,47E-06	1,04E-02	5,19E-13	1,13E-11	1,11E-02
Module A5	1,09E-07	4,42E-02	1,88E+01	7,50E-10	1,94E-08	7,20E+00
Module B1-B7	ND	ND	ND	ND	ND	ND
Module C1	3,72E-10	6,04E-04	7,69E-02	9,77E-12	4,06E-10	7,85E-02
Module C2	1,22E-08	6,91E-04	1,31E+00	6,55E-11	1,42E-09	1,40E+00
Module C3	1,55E-08	8,49E-03	3,81E+01	6,65E-10	7,70E-09	1,15E+00
Module C4	3,24E-10	3,98E-05	2,67E-01	1,71E-12	3,03E-11	8,51E-02
Module D	-4,64E-07	-3,69E-01	-4,75E+01	3,26E-10	-1,60E-08	-1,02E+01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTES[3]: Units expressed by declared unit.

The impact indicator “POTENTIAL HUMAN EXPOSURE EFFICIENCY RELATIVE TO U235” focuses mainly on the possible impact of a low dose of ionising radiation on human health resulting from the nuclear fuel cycle. It does not consider effects arising from possible nuclear accidents, occupational exposure or the disposal of radioactive waste in underground facilities. Potential ionising radiation from soil, radon and some building materials is also not measured by this indicator.

The results of the indicators “POTENTIAL COMPARATIVE TOXIC UNIT FOR ECOSYSTEMS (ETP-FW)”, “POTENTIAL COMPARATIVE TOXIC UNIT FOR HUMANS, CANCER EFFECTS”, “POTENTIAL COMPARATIVE TOXIC UNIT FOR HUMANS, NOT CANCER EFFECTS” and “POTENTIAL SOIL QUALITY INDEX” should be used with caution as the uncertainties associated with them are high or there is little experience with the indicator.

2.4. Indicators describing resource use

	Primary energy					
	EPR	RR	RR	RR	RR	TRNR
Unit	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.	MJ, P.C.I.
Modules A1-A3	5,24E+01	2,39E+01	7,62E+01	4,09E+02	5,50E+01	4,64E+02
Module A4	1,98E-04	0,00E+00	1,98E-04	1,41E-02	0,00E+00	1,41E-02
Module A5	2,56E+01	-2,39E+01	1,74E+00	2,73E+01	1,36E+01	4,09E+01
Module B1-B7	ND	ND	ND	ND	ND	ND
Module C1	6,96E-02	0,00E+00	6,96E-02	3,25E-01	0,00E+00	3,25E-01
Module C2	2,51E-02	0,00E+00	2,51E-02	1,77E+00	0,00E+00	1,77E+00
Module C3	2,91E-01	0,00E+00	2,91E-01	6,82E+01	-6,53E+01	2,90E+00
Module C4	1,51E-03	0,00E+00	1,51E-03	3,38E+00	-3,33E+00	4,75E-02
Module D	-2,63E+01	0,00E+00	-2,63E+01	-1,21E+02	-4,88E+00	-1,26E+02

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

NOTE[4]: Units expressed by declared unit.

EPR = use of renewable primary energy excluding renewable primary energy resources used as raw materials; RR = use of renewable primary energy resources used as raw materials; TRR = total use of renewable primary energy resources (EPR + RR); EPNR = use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; RNR = use of non-renewable primary energy resources used as raw materials; TRNR = total use of non-renewable primary energy resources (EPRN + RNR);

	Secondary materials and fuels, and use of water			
	MS	CSR	CSNR	Net use of fresh water
Unit	kg	MJ, P.C.I.	MJ, P.C.I.	m^3
Modules A1-A3	1,91E+00	0,00E+00	0,00E+00	3,92E-01
Module A4	0,00E+00	0,00E+00	0,00E+00	3,61E-06
Module A5	-1,14E+00	0,00E+00	0,00E+00	2,44E-02
Module B1-B7	ND	ND	ND	ND
Module C1	0,00E+00	0,00E+00	0,00E+00	5,17E-04
Module C2	0,00E+00	0,00E+00	0,00E+00	4,56E-04
Module C3	-7,40E-01	0,00E+00	0,00E+00	5,11E-03
Module C4	-3,36E-02	0,00E+00	0,00E+00	4,58E-05
Module D	0,00E+00	0,00E+00	0,00E+00	-1,78E-01

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

MS = use of secondary material; CSR = use of renewable secondary fuels; CSNR = use of non-renewable secondary fuels.

NOTE[5]: Units expressed by declared unit.

2.5. Other environmental information describing different waste categories

	Hazardous waste disposed	Non-hazardous waste disposed	Radioactive waste disposed
Unit	kg	kg	kg
Modules A1-A3	8,68E-03	6,27E+00	6,04E-04
Module A4	8,95E-08	9,27E-04	3,21E-09
Module A5	1,18E-04	7,81E-01	3,11E-05
Module B1-B7	ND	ND	ND
Module C1	6,56E-07	1,77E-03	4,56E-07
Module C2	1,13E-05	1,17E-01	4,06E-07
Module C3	1,11E-05	2,55E-01	5,99E-06
Module C4	2,14E-07	2,01E-01	2,47E-08
Module D	-8,29E-04	-1,07E+00	-2,96E-04

LEGEND:

- Product stage
- Construction process stage
- Use stage
- End of life stage
- Benefits and loads beyond the system boundary

2.6. Environmental information describing output flows

	Components for re-use	Materials for recycling	Materials for energy recovery	Exported energy	
				Electric	Thermal
Unit	kg	kg	kg	MJ	MJ
Modules A1-A3	0,00E+00	3,85E+00	1,61E-01	0,00E+00	0,00E+00
Module A4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module A5	0,00E+00	9,75E-01	2,29E-01	4,89E-01	9,62E-01
Module B1-B7	ND	ND	ND	ND	ND
Module C1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C2	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module C3	0,00E+00	3,29E+00	1,64E+00	6,25E+00	1,23E+01
Module C4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Module D	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00

2.7. Information describing the biogenic carbon content at the factory gate

Biogenic carbon content*	Units**	Modules A1-A3 (results)
Biogenic carbon content in product	0 Kg C	0 Kg C
Biogenic carbon content in accompanying packaging	0,48 Kg C	0,48 Kg C
* 1 kg biogenic carbon is equivalent to 44/12 kg of CO2. ** This information can be omitted whenever the content of biogenic carbon in the product, or in the respective packaging, is less than 5% of the mass of the product, or the respective packaging.		

3. SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

3.1. Module A4 Transport to the building site – Construction process stage

Parameter	Units*/comments	Results expressed per declared unit
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long-distance truck, boat, etc.	Litre of fuel type per distance, or vehicle type**	Lorry EURO (unspecified)
Distance	km	1
weight*km	tkm	0,0066
Capacity utilization (including empty returns)	-	Average load factor, including empty return trip
Bulk density of transported products	24,15 kg/m3	6,63 kg/piece incl packaging
Volume capacity utilization factor (factor: =1 or < 1 or ≥ 1 for compressed or nested packaged products)	Not applicable	

3.2. Module A5 Installation of the product in the building – Construction process stage

Parameter	Units*/comments	Results expressed per declared unit
Ancillary materials for installation (specified by material)	Kg adhesive used, included in study	0,5
Water use	m^3	-
Other resource use	kg	-
Quantitative description of energy type (regional mix) and consumption during the installation process	kWh regional mix based on sales, covering >80%	0,042
Waste of materials on the building site before waste processing, generated by the product's installation (specified by type)	kg	-
Output materials (specified by type) as result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	kg	-
Direct emissions to ambient air, soil and water	kg	-

3.3. Module C1 Demolition – End-of-Life Stage

Parameter	Units*/comments	Results expressed per declared unit
Material collected separately	kg	5,126
Material collected and mixed with	Material collected and mixed with	-
Additional considerations	Appropriate units	-

3.4. Module C2 Transport – End-of-Life Stage

Parameter	Units*/comments	Results expressed per declared unit
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long-distance truck, boat, etc.	Litre of fuel type per distance, or vehicle type**	Lorry EURO (unspecified EI3.9)
Distance	50 km to sorting installation and 100 km from demolition or sorting location to processing locations	-
weight*km	tkm	0,8328
Capacity utilization (including empty returns)	including empty return trip	Average load factor (EI3.9)
Volume capacity utilization factor (factor: =1 or < 1 or ≥ 1 for compressed or nested packaged products)	Not applicable	

3.5. C3 Waste processing for reuse, recovery, and recycling – End-of-Life Stage

Parameter	Units*/comments	Results expressed per declared unit
Material for reuse	kg	0,00
Material for recycling	kg	3,29
Material for energy recovery	kg	1,64
Additional considerations	Appropriate units	-

3.6. C4 Disposal – End-of-Life Stage

Parameter	Units*/comments	Results expressed per declared unit
Material for final disposal	kg	0,25
Final considerations	Appropriate units	-

3.7. Scenarios and Technical Information for Module D

Parameter	Units*/comments	Results expressed per declared unit
Net output flow specified by material	Appropriate units	Same as input, mass balance closure <1%
Avoided production	Appropriate units	Calculated according to table below

End-of-waste status location	Not applicable	-
Functional equivalence point	Not applicable	-
Considerations	Appropriate units	-

*Avoided products are used to compensate/benefit for the material flows. Value correction factor and secondary materials (input/outputs). Output = (recycle% - Secondary%) * Q factor*

Material	Output	Secon. %	Recycl %.	Q
Galvanized Metal sheet (metal part)	62%	21%	90%	0.9
Galvanized Metal sheet (zinc part)	81%	0%	90%	0.9
Reflective aluminium sheet	61%	26%	91%	0.9
Polycarbonate(PC) (off-site)	9%	0%	10%	0.9
PC Dome from injection	9%	0%	10%	0.9
PE Connection accessory from injection	5%	0%	5%	0.9
Screw	37%	49%	91%	0.9
Aluminium Tape	0%	0%	0%	0.9
Synthetic Rubber	0%	0%	0%	0.9
EPDM membrane (A5)	5%	0%	5%	0.9
Cardboard box	-10%	76%	65%	0.9
Cardboard waste (on-site)	22%	76%	100%	0.9
Polycarbonate (on-site)	100%	0%	100%	1.0

3.8. Additional Environmental Information on the Release of Hazardous Substances to Air, Soil, and Water During the Use Stage

Not Applicable.

4. REFERENCES

- ✓ Instruções Gerais do Sistema DAPHabitat, Versão 3.0, june 2024 (em www.daphabitat.pt);
- ✓ RCP – modelo base para produtos e serviços de construção. Sistema DAPHabitat. Versão 3.0, june 2024 (em www.daphabitat.pt);
- ✓ EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products;
- ✓ EN 15942:2021 Sustainability of construction works – Environmental product declarations – Communication format business-to-business.
- ✓ ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework
- ✓ ISO 14044:2006-10, Environmental management - Life cycle assessment – Requirements and guidelines
- ✓ ISO 14025:2011-10: Environmental labels and declarations — Type III environmental declarations — Principles and procedures
- ✓ NMD v1.2 Stichting Nationale Milieudatabase: Bepalingsmethode Milieuprestatie Bouwwerken version 1.2 (January 2025)
- ✓ EN 17213:2020: Windows and doors – Environmental Product Declarations – Product category rules for windows and pedestrian doorsets
- ✓ Eurostat (2022), Management of waste by waste management operations and type of material - Sankey diagram data, retrieved on 02/02/25.