ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025 / ISO 21930

Fibreglass Windows

BOAVISTA Windows

EPD HUB, HUB-0509

Publishing date 16 June 2023, last updated date 16 June 2023, valid until 16 June 2028

Created with One Click LCA

GENERAL INFORMATION

MANUFACTURER

Manufacturer	BOAVISTA Windows
Address	Rua de Santa Apolónia Nº 274 Armazém M, 4410-022 Vila Nova de Gaia, Portugal
Contact details	hello@boavistawindows.com
Website	https://boavistawindows.com/pt/home/

EPD STANDARDS, SCOPE AND VERIFICATION

Program operator	EPD Hub, hub@epdhub.com
Reference standard	EN 15804+A2:2019 and ISO 14025
PCR	EPD Hub Core PCR version 1.0, 1 Feb 2022
Sector	Construction product
Category of EPD	Third party verified EPD
Scope of the EPD	Cradle to gate with options, A4-A5, and modules C1-C4, D
EPD author	Khadija Benis, Alina Chervinska – Greenlab
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
EPD verifier	Silvia Vilcekova, as an authorized verifier acting for EPD Hub Limited

The manufacturer has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

PRODUCT

Product name	Fiberglass Windows
Place of production	Portugal
Period for data	2022
Averaging in EPD	Multiple products
Variation in GWP-fossil for A1-A3	0.7 %

ENVIRONMENTAL DATA SUMMARY

Declared unit	1m^2 of a double-glazed window consisting of a window frame and glass of a standard window size of 1.23 m x 1.48 m
Declared unit mass	34.8 kg
GWP-fossil, A1-A3 (kgCO_2e)	95.7
GWP-total, A1-A3 (kgCO_2e)	96.6
Secondary material, inputs (%)	9.41
Secondary material, outputs (%)	74.3
Total energy use, A1-A3 (kWh)	365.0
Total water use, A1-A3 (m3e)	4.3

PRODUCT AND MANUFACTURER

ABOUT THE MANUFACTURER

BOAVISTA Windows is a brand of advanced window systems with fiberglass window frames, founded in 2011. BOAVISTA's certified Management System shows its commitment with sustainability. The Integrated Management system is certified in accordance with ISO 9001, 14001 and 45001 standards, since 2021. Boavista Windows is also a Zero Carbon company, since 2019. This means that all carbon emissions made throughout each calendar year are duly rewarded with the planting of trees in different forest areas spread throughout the national territory. The products respect the current applicable product standards and have CE and UKCA markings. With a wide range of window frame solutions, the BOAVISTA systems are designed with the goal of bringing together optimal performance, aesthetics, and sustainability. The products are designed to be resistant to the elements, such as the chemically aggressive salted breeze.

PRODUCT DESCRIPTION

This EPD is developed from the weighted average of two types of double-glazed windows - a tilt-and-turn window and a sliding window, both of which are produced at the same site. The same main materials are used in their production, and they have similar dimensions. The averaging was done based on the annual production volume of each, it being 60% of sliding windows and 40% of tilt-and-turn windows.

The BWSL45 Sliding BOAVISTA Window has a large array of application thanks to its modular configuration and high thermal performance. The sliding motion is robust and suitable for optimizing inner building space. It can be combined with fixed sashes and other systems like the Tilt-and-Turn. The watertightness of the window is assured through a twofold weatherstrip. It uses a standard hardware with one locking point that can be upgraded to two or three points as well as cylinder lock to increase security.

The BWTT60 Tilt-and-Turn BOAVISTA Window has a good thermal and acoustic performance due to double glazing. Available in resistance class RC2 (standard EN1627). The watertightness and longevity of the window are assured with the weatherstripping being formed by a twofold neoprene seal.

Further information can be found at
https://boavistawindows.com/pt/home/

PRODUCT RAW MATERIAL MAIN COMPOSITION

Raw material category	Amount, mass- %	Material origin
Metals	5	Portugal, Spain
Minerals	64.2	Portugal
Fossil materials	30.8	Portugal, Canada
Bio-based materials	0	

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0
Biogenic carbon content in packaging, kg C	0.0094

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit	1m^2 of double-glazed window consisting of a window frame and glass of a standard window size of 1.23 m x 1.48 m
Mass per declared unit	34.8 kg

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0,1 % (1000 ppm).

PRODUCT LIFE-CYCLE

SYSTEM BOUNDARY

This EPD covers the life-cycle modules listed in the following table.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D		
x	x	x	x	x	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x		
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./demol.	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials. Also, fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

The production takes place in one site. After the materials arrive to the factory, there are 4 main processes: painting of the frames, cutting of the fiberglass and aluminium profiles to the desired dimension, milling, and assembly of the product. The painting process is the only one that happens outside the production site - the fiberglass profiles are transported to an external entity that performs the painting service. The amount of paint used fell under the cut-off criteria and was considered negligible. After the cutting and milling of the profiles, and in the assembly process, the glazing units are installed into the profiles, along with the metal window fittings, the sash pulleys, the rubber, and the PE weather stripping pile. After that, and before transportation to the installation site, the windows are packaged in LDPE packaging film and PU foam, and for big orders that will travel a long distance the windows are placed inside a wooden box of appropriate dimensions, but it is not a common occurrence.
The only manufacturing waste that is generated is aluminium and fibre glass reinforced PET clipping from the profiles. The aluminium clippings are sent to recycling and the fibre glass reinforced PET clippings are sent to a sorting plant and turned into refuse derived fuel (RDF).

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transportation impacts were calculated by considering all the destinations of the windows orders, whose distance to the factory was weighted by mass of the order, obtaining one average mass-weighted distance. All the orders in the year in question were transported by lorry except one that had two transportation legs: lorry and boat. Upon arrival at the installation site, the energy used for the installation process is considered negligible. The only installation waste is the packaging in which the product arrived: PE packaging film, PU foam, and, possibly, a wooden box.

PRODUCT USE AND MAINTENANCE (B1-B7)

Maintenance includes regularly cleaning the windows with water and detergent, and it is recommended to apply lubricant oil drops to the moving hardware. No systematic replacement of window parts is needed, but it is recommended that the state of the sealing rubber is checked every five years. The reference service life (RSL), according to the manufacturer,

is 80 years, which surpasses the service life of the building, meaning that no replacement of the product is needed during the RSL of the building.

Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

The consumption of energy in the demolition process is assumed to be negligible.

The waste is collected as mixed construction waste and transported to the waste treatment centre, to be sorted. The transportation distance is assumed to be 50 km, and the vehicle is a lorry.

Glass, steel, aluminium, glass fibre reinforced PET, rubber and PE are sorted and either recycled or incinerated as accounted for in module C3.

For glass, the conservative value of 30% of recycled mass was considered, and 70% is sent to landfill.

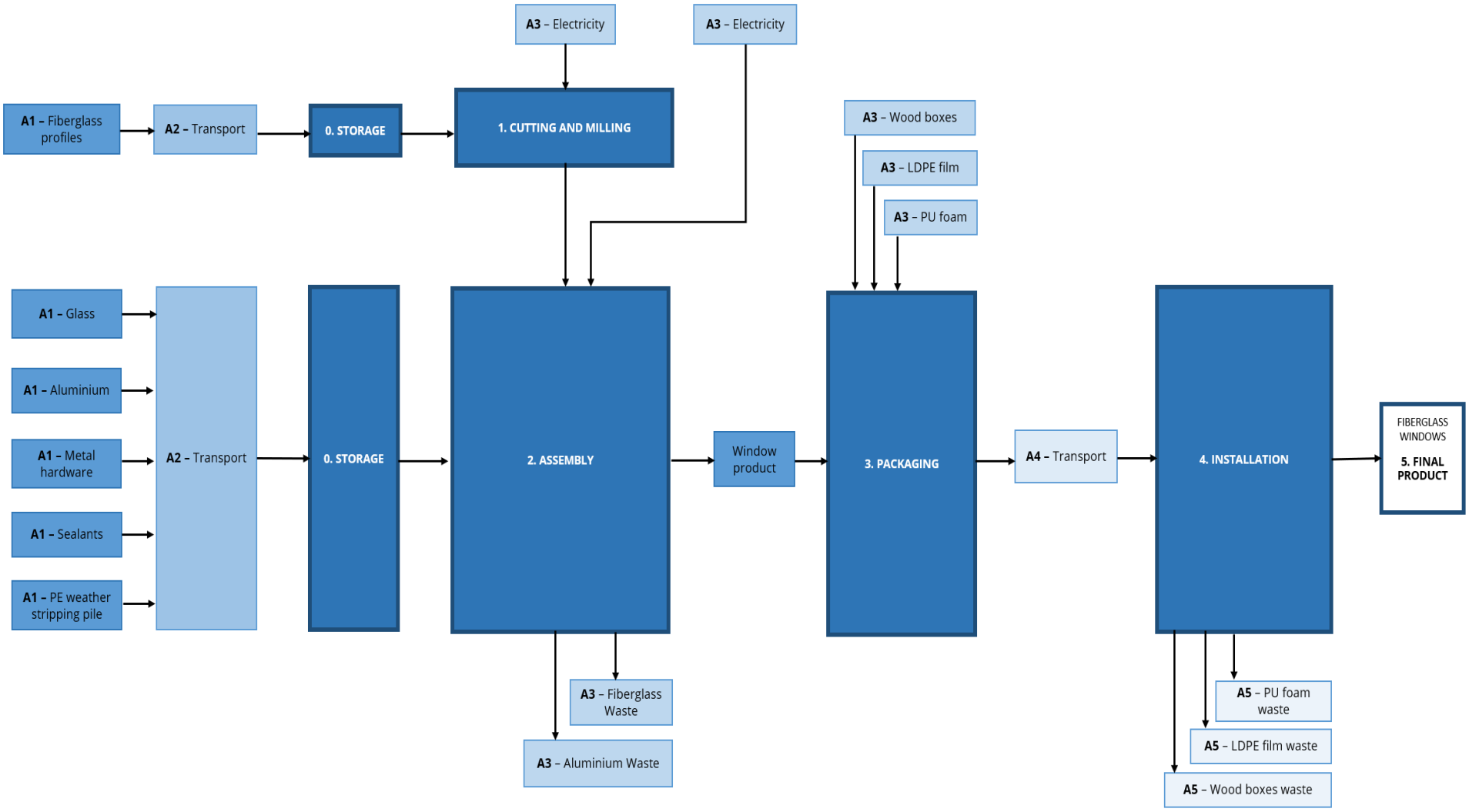
For steel and aluminium, was considered that 95% is recycled and 5% is landfilled.

Rubber and PE weather stripping pile are 100% incinerated with energy recovery.

For the glass fibre reinforced PET contained in the product, 95% is incinerated and 5% is landfilled.

The benefits and loads of incineration and recycling are included in Module D.

MANUFACTURING PROCESS



LIFE-CYCLE ASSESSMENT

CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the reference standard and the applied PCR. The study does not exclude any hazardous materials or substances. The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. All allocations are done as per the reference standards and the applied PCR. In this study, allocation has been done in the following ways:

Data type	Allocation
Raw materials	Allocated by mass or volume
Packaging materials	Allocated by mass or volume
Ancillary materials	Allocated by mass or volume
Manufacturing energy and waste	Allocated by mass or volume

AVERAGES AND VARIABILITY

Type of average	Multiple products
Averaging method	Averaged by shares of total volume
Variation in GWP-fossil for A1-A3	0.7 %

The window is an average of two products: a tilt-and-turn window and a sliding window, both of which are produced at the same site. The same main materials are used in their production, and they have similar dimensions. The averaging was done based on the annual production volume of each, it being 60% of sliding windows and 40% of tilt-and-turn windows.

LCA SOFTWARE AND BIBLIOGRAPHY

This EPD has been created using One Click LCA EPD Generator. The LCA and EPD have been prepared according to the reference standards and ISO 14040/14044. Ecoinvent and One Click LCA databases were used as sources of environmental data.

ENVIRONMENTAL IMPACT DATA

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP – total[1)]	kg CO_2e	8,46E1	1,39E0	1,06E1	9,66E1	5,65E0	8,32E-2	MND	MND	MND	MND	MND	MND	MND	3,19E-2	2,9E-1	1,91E1	1,18E-1	-2,65E1
GWP – fossil	kg CO_2e	8,39E1	1,39E0	1,03E1	9,57E1	5,7E0	4,86E-2	MND	MND	MND	MND	MND	MND	MND	3,19E-2	2,9E-1	1,91E1	1,17E-1	-2,67E1
GWP – biogenic	kg CO_2e	6,38E-1	-2,35E-4	1,16E-1	7,53E-1	2,87E-3	3,46E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	3,64E-1
GWP – LULUC	kg CO_2e	5,31E-2	8,75E-4	1,35E-1	1,89E-1	2,08E-3	1,13E-5	MND	MND	MND	MND	MND	MND	MND	2,69E-6	1,03E-4	2,02E-4	1,84E-5	-1,7E-1
Ozone depletion pot.	kg $CFC_{-11}e$	4,72E-6	2,84E-7	5,53E-7	5,55E-6	1,29E-6	1,63E-9	MND	MND	MND	MND	MND	MND	MND	6,88E-9	6,59E-8	5,02E-8	3,49E-8	-2,32E-6
Acidification potential	mol H^+e	4,54E-1	3,89E-2	8,45E-2	5,78E-1	2,98E-2	8,08E-5	MND	MND	MND	MND	MND	MND	MND	3,33E-4	1,18E-3	5,19E-3	7,32E-4	-2,11E-1
EP-freshwater[2)]	kg Pe	4,34E-3	7,07E-6	5,08E-4	4,86E-3	4,67E-5	3,35E-7	MND	MND	MND	MND	MND	MND	MND	1,29E-7	2,43E-6	9,64E-6	7,37E-7	-9,93E-4
EP-marine	kg Ne	8,74E-2	9,6E-3	1,13E-2	1,08E-1	8,5E-3	2,95E-5	MND	MND	MND	MND	MND	MND	MND	1,47E-4	3,52E-4	2,28E-3	3,3E-4	-2,76E-2
EP-terrestrial	mol Ne	1,04E0	1,07E-1	1,28E-1	1,27E0	9,4E-2	3,02E-4	MND	MND	MND	MND	MND	MND	MND	1,61E-3	3,89E-3	2,35E-2	3,01E-3	-3,27E-1
POCP ("smog")[3)]	kg NMVOCe	2,84E-1	2,78E-2	3,53E-2	3,47E-1	2,78E-2	8,59E-5	MND	MND	MND	MND	MND	MND	MND	4,44E-4	1,19E-3	5,84E-3	8,7E-4	-9,34E-2
ADP-minerals & metals[4)]	kg Sbe	4,83E-3	1,45E-5	4,68E-5	4,89E-3	1,49E-4	2,47E-7	MND	MND	MND	MND	MND	MND	MND	4,87E-8	7,84E-6	6,97E-6	6,62E-7	-3,02E-4
ADP-fossil resources	MJ	6,98E2	1,82E1	1,34E2	8,5E2	8,54E1	2,03E-1	MND	MND	MND	MND	MND	MND	MND	4,39E-1	4,37E0	5,02E0	2,34E0	-3,82E2
Water use[5)]	m^3e depr.	1,34E2	4,2E-2	1,33E1	1,48E2	2,71E-1	4,22E-3	MND	MND	MND	MND	MND	MND	MND	8,18E-4	1,41E-2	3,59E-2	1,31E-2	-5,01E0

1) GWP = Global Warming Potential; 2) EP = Eutrophication potential. Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e; 3) POCP = Photochemical ozone formation; 4) ADP = Abiotic depletion potential; 5) EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

ADDITIONAL (OPTIONAL) ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Particulate matter	Incidence	2,53E-6	5,13E-8	2,25E-7	2,81E-6	3,88E-7	1,02E-9	MND	MND	MND	MND	MND	MND	MND	8,83E-9	2,02E-8	4,65E-8	1,56E-8	-1,92E-6
Ionizing radiation[6)]	kBq U235e	1,88E0	7,85E-2	2,85E-1	2,24E0	3,73E-1	6,3E-4	MND	MND	MND	MND	MND	MND	MND	1,88E-3	1,91E-2	1,39E-2	1,01E-2	-2,14E0
Ecotoxicity (freshwater)	CTUe	1,11E3	1,19E1	1,79E2	1,3E3	6,54E1	2,77E-1	MND	MND	MND	MND	MND	MND	MND	2,57E-1	3,38E0	1,4E1	2,18E1	-4,99E2
Human toxicity, cancer	CTUh	7,76E-7	7,32E-10	3,25E-9	7,8E-7	1,97E-9	2,11E-11	MND	MND	MND	MND	MND	MND	MND	9,22E-12	9,8E-11	8,77E-10	3,01E-11	-1,69E-8
Human tox. non-cancer	CTUh	2,29E-6	1,06E-8	1,21E-7	2,43E-6	7,34E-8	3,62E-10	MND	MND	MND	MND	MND	MND	MND	2,27E-10	3,82E-9	5,74E-8	7,81E-10	-1,72E-7
SQP[7)]	-	9,56E1	3,24E0	1,43E1	1,13E2	6,87E1	1,18E-1	MND	MND	MND	MND	MND	MND	MND	1,13E-2	3,64E0	2,28E0	4,27E0	-2,98E1

6) EN 15804+A2 disclaimer for Ionizing radiation, human health. This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator; 7) SQP = Land use related impacts/soil quality.

USE OF NATURAL RESOURCES

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Renew. PER as energy[8)]	MJ	1,26E2	1,47E-1	6,53E1	1,91E2	1,18E0	9,85E-3	MND	MND	MND	MND	MND	MND	MND	2,37E-3	6,17E-2	2,45E-1	3,69E-2	-8,6E1
Renew. PER as material	MJ	0E0	0E0	1,94E-1	1,94E-1	0E0	-3,3E-1	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	7,52E-2
Total use of renew. PER	MJ	1,26E2	1,47E-1	6,55E1	1,92E2	1,18E0	-3,2E-1	MND	MND	MND	MND	MND	MND	MND	2,37E-3	6,17E-2	2,45E-1	3,69E-2	-8,6E1
Non-re. PER as energy	MJ	9,74E2	1,82E1	1,31E2	1,12E3	8,54E1	2,03E-1	MND	MND	MND	MND	MND	MND	MND	4,39E-1	4,37E0	5,02E0	2,34E0	-3,32E2
Non-re. PER as material	MJ	2,63E2	0E0	2,71E0	2,65E2	0E0	-2,71E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	-2,28E2	-1,1E1	4,78E-1
Total use of non-re. PER	MJ	1,24E3	1,82E1	1,34E2	1,39E3	8,54E1	-2,51E0	MND	MND	MND	MND	MND	MND	MND	4,39E-1	4,37E0	-2,23E2	-8,69E0	-3,31E2
Secondary materials	kg	3,27E0	0E0	8,96E-4	3,28E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	2,19E0
Renew. secondary fuels	MJ	3,79E-11	0E0	0E0	3,79E-11	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	4,45E-10	0E0	0E0	4,45E-10	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m^3	4,27E0	1,97E-3	3,26E-2	4,3E0	1,44E-2	1,13E-4	MND	MND	MND	MND	MND	MND	MND	3,87E-5	7,47E-4	6,9E-3	2,63E-3	-1,22E-1

8) PER = Primary energy resources.

END OF LIFE – WASTE

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Hazardous waste	kg	2,49E0	2,08E-2	1,05E0	3,55E0	8,69E-2	1,35E-3	MND	MND	MND	MND	MND	MND	MND	4,72E-4	4,44E-3	0E0	2,05E-3	-2,58E0
Non-hazardous waste	kg	6,12E1	4,55E-1	2,05E1	8,22E1	5,79E0	3,67E-2	MND	MND	MND	MND	MND	MND	MND	5,04E-3	3,05E-1	0E0	1,62E1	-3,8E1
Radioactive waste	kg	1,87E-2	1,27E-4	2,49E-4	1,9E-2	5,86E-4	7,84E-7	MND	MND	MND	MND	MND	MND	MND	3,07E-6	3E-5	0E0	1,58E-5	-1,53E-3

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	0E0	0E0	0E0
Materials for recycling	kg	4,04E-1	0E0	1,67E0	2,07E0	0E0	9,2E-2	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	8,09E0	0E0	0E0
Materials for energy rec	kg	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,78E1	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	MND	MND	MND	MND	MND	MND	MND	0E0	0E0	1,67E2	0E0	0E0

ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Global Warming Pot.	kg CO_2e	4,77E1	1,38E0	1,02E1	5,93E1	5,65E0	4,81E-2	MND	MND	MND	MND	MND	MND	MND	3,16E-2	2,88E-1	1,91E1	1,03E-1	-2,6E1
Ozone depletion Pot.	kg $CFC_{-11}e$	5,18E-6	2,25E-7	4,66E-7	5,88E-6	1,02E-6	1,37E-9	MND	MND	MND	MND	MND	MND	MND	5,45E-9	5,24E-8	4,26E-8	2,77E-8	-2,1E-6
Acidification	kg SO_2e	2,02E-1	3,08E-2	7,19E-2	3,05E-1	1,69E-2	5,26E-5	MND	MND	MND	MND	MND	MND	MND	4,7E-5	5,82E-4	4,22E-3	2,38E-4	-1,38E-1
Eutrophication	kg PO_4^3e	5,75E-2	3,47E-3	1,71E-2	7,81E-2	2,92E-3	4,75E-5	MND	MND	MND	MND	MND	MND	MND	8,29E-6	1,19E-4	2,23E-3	1,97E-3	-3,33E-2
POCP (“smog”)	kg C_2H_4e	1,21E-2	8,2E-4	2,76E-3	1,57E-2	8,75E-4	3,39E-6	MND	MND	MND	MND	MND	MND	MND	4,84E-6	3,83E-5	9,02E-5	2,39E-5	-7,89E-3
ADP-elements	kg Sbe	4,83E-3	1,45E-5	4,68E-5	4,89E-3	1,49E-4	2,47E-7	MND	MND	MND	MND	MND	MND	MND	4,87E-8	7,84E-6	6,97E-6	6,62E-7	-3,02E-4
ADP-fossil	MJ	6,98E2	1,82E1	1,34E2	8,5E2	8,54E1	2,03E-1	MND	MND	MND	MND	MND	MND	MND	4,39E-1	4,37E0	5,02E0	2,34E0	-3,82E2

VERIFICATION STATEMENT

VERIFICATION PROCESS FOR THIS EPD

This EPD has been verified in accordance with ISO 14025 by an independent, third-party verifier by reviewing results, documents and compliancy with reference standard, ISO 14025 and ISO 14040/14044, following the process and checklists of the program operator for:

- This Environmental Product Declaration
- The Life-Cycle Assessment used in this EPD
- The digital background data for this EPD

Why does verification transparency matter? Read more online
This EPD has been generated by One Click LCA EPD generator, which has been verified and approved by the EPD Hub.

THIRD-PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations by the studied Environmental Product Declaration (EPD), its LCA and project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the EPD, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14025:2010 and reference standard.

I confirm that the company-specific data has been examined as regards plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

I confirm that I have sufficient knowledge and experience of construction products, this specific product category, the construction industry, relevant standards, and the geographical area of the EPD to carry out this verification.

I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.

Silvia Vilčeková, as an authorized verifier acting for EPD Hub Limited
16.06.2023