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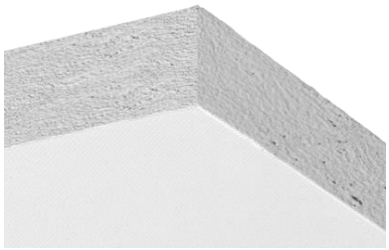
ENVIRONMENTAL PRODUCT DECLARATION

In accordance with EN 15804 and ISO 14025

ECOPHON MASTER E, Carbon Low

EPD®
THE GREEN YARDSTICK



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Date of revision: 9/13/2023
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com.

EPD VERIFIED
The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

ECO PLATFORM EPD VERIFIED

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CONTENT

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SUMMARY ENVIRONMENTAL PRODUCT DECLARATION

Content summary	
Verified by (external third-party verifier)	Martin Erlandsson, IVL Swedish Environmental Research Institute
Programme used	The International EPD System. For more information see www.environdec.com
Registration No	S-P-11522
Owners declaration by	Saint-Gobain Ecophon AB Box 500 265 03 Hyllinge Sweden
Declaration as construction products	The products to be verified herein are acoustic glass wool panels made for sound absorbing ceilings. The present environmental product declaration complies with standard ISO 14025 and describes the environmental impact. Its purpose is to promote compatible and sustainable environmental development of related construction methods. Reference PCR documents: EN 15804 as the core PCR + International EPD System Product Category Rules – PCR for constructions products, Acoustical ceiling and wall solutions (c-PCR-014; appendix to PCR 2019:14). EPD of construction products may not be comparable if they do not comply with EN 15804.
Validity	11/21/2028
Content of the declaration	This is an environmental product declaration containing environmental information of the Ecophon product The values presented in this EPD are represented for the following products: Master E Supplemental product information can be found at www.ecophon.com
Issued date	11/21/2023

Product responsible:

Thomas Roul
Product Engineering & Development Manager
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Independent third-party verifier:

Martin Erlandsson
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PRODUCT DESCRIPTION

Product description and description of use:

This Environmental Product Declaration (EPD) describes the environmental impact of 1 m^2 of acoustic ceiling with the intended use to increase sound absorption in a room to create a better indoor environment.

The EPD covers low carbon products produced at Ecophon production site in Finland. Low carbon products are produced by using glass wool that is manufactured with locally produced biogas.

Ecophon ceilings consists of a high-quality glass wool in different densities and thicknesses. The glass wool is covered with a painted or woven surface layer and cut into panels of different sizes and edge designs.

The structure of glass wool gives the material excellent sound energy absorption properties. Sound absorption is the main function of acoustic glass wool panels. The panels are also light, stable, and easy to handle and cut.

Acoustic glass wool panels are commonly used in schools, offices, and health care facilities where there is a need for noise reduction to improve the indoor environment. The acoustic panels need no maintenance and do not age. They can last as long as the building itself. For aesthetic reasons, normal room surface cleaning is advised.

Description of the main product components and materials for 1 m^2 of product:

Parameter	Value (Weight in %)	Post-consumer recycled content
Product thickness	40 mm	-
Glass wool	88 %	70%
Waterborne paint	3%	-
Glass tissue	1 %	-
Waterborne glue	3 %	-
Plastic wrapping	3 g	-

The total weight of the product is calculated to 3.7 kg/m^2. The product does not contain any biogenic carbon. The packaging contains 0.16 kg C/m^2.

All raw materials contributing more than 5% to any environmental impact are listed in the table above. At the date of issue of this environmental declaration, there is no substance of very high concern (SVHC) in concentration above 0.01% by weight.

If there in future occur production changes that generate an increased impact larger than 10% the EPD will be updated and re-verified.

Energy stored as raw material will leave the system boundary at end-of-life and is zero over the life-cycle.

OTHER ENVIRONMENTAL INDICATORS

Regarding the indoor environment, the Master E product are certified for or fulfil regulations according to the following table:

Certificate and Regulations
French VOC A
Finnish M1
Eurofins Indoor Air Comfort

LCA CALCULATION INFORMATION

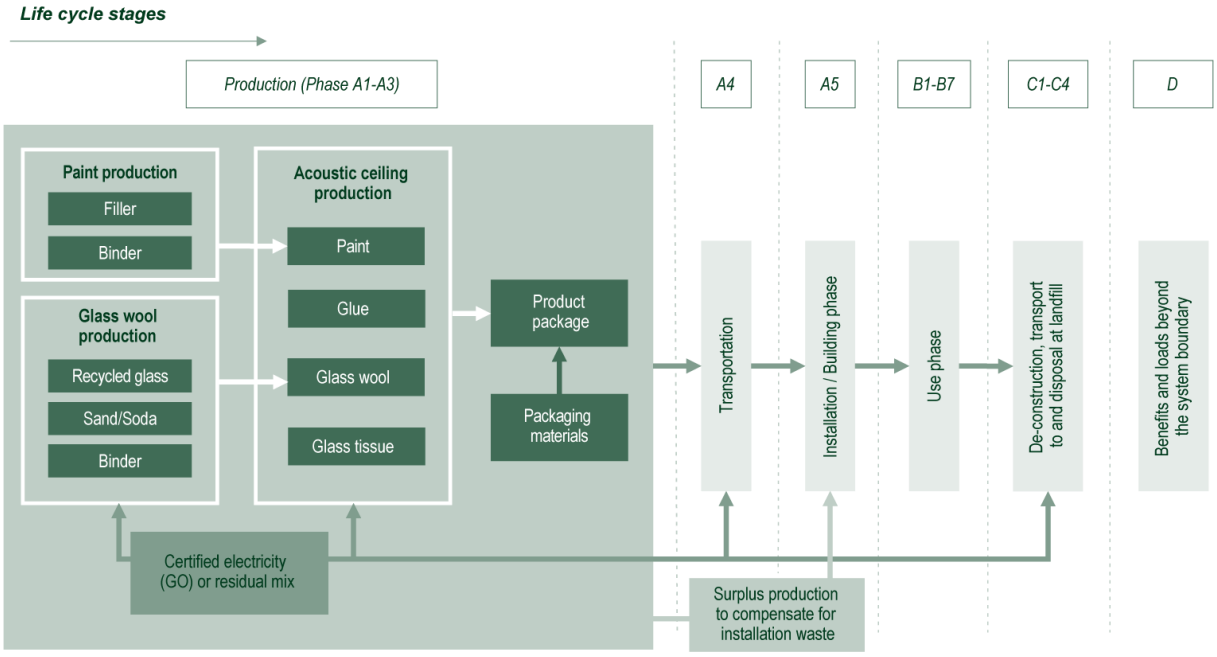
Declared unit	1m² of acoustic celling panel.
Functional unit	1m² acoustic ceiling with sound absorption class A* installed at an ODS of 200mm according to ISO 354.
System boundaries	Cradle to grave: A1-A3, A4-A5, B, C1-C4 and D This EPD covers the environmental impact of acoustic panels without grid or suspension system.
Reference Service Life (RSL)	50 years
Cut-off rules	The use of cut-off criterion on mass inputs and primary energy at the unit process level (1%) and at the information module level (5%). Flows related to human activities such as employee transport are excluded. Biogenic carbon storage is not accounted for in the LCA result related to GWP but included in “Use of renewable primary energy used as raw materials”. The construction of plants, production of machines and transportation systems are excluded since the related flows are supposed to be negligible compared to the production of the building product when compared at these systems lifetime level.
Allocations	Allocation criteria are based on mass.
Geographical coverage and time period	For A1-A3: Global For A4: European covering (2019)

*Master B and Master SQ not tested with ODS 200 mm but believed to have slightly worse absorption class

According to EN 15804, EPD of construction products might not be comparable if they do not comply with this standard. According to ISO 21930, EPD’s might not be comparable if they are from different EPD administrating schemes.

LIFE CYCLE STAGES

Flow diagram of the Life Cycle



Product stage, A1-A3

Description of the stage:

The product stage of the glass wool products is divided into 3 modules: A1 “Raw material and supply”, A2 “Transport to the manufacturer” and A3 “Manufacturer”. The aggregation of the modules A1, A2 and A3 is a possibility considered by the EN 15 804 standard. This rule is applied in this EPD.

A1 Raw material supply

This module takes into account the extraction and processing of all raw materials and energy which occur upstream to the studied manufacturing process.

Specifically, the glass wool raw material supply covers production of the binder components and sourcing (quarry) of raw materials for fiber production, e.g. sand and borax. Besides these raw materials, recycled materials (glass cullet) are also used as input. Other major raw materials (paint, glass tissue and glue) are mainly modelled with specific data.

Manufacturing of glass wool accounts for GOs (Guarantee of Origins) and all other processes use residual mix. Low carbon ceilings are produced with glass wool that utilizes minimal amount of fossil fuels in production. Main fossil fuels are replaced with locally produced biogas. Several trials have been conducted over 6 months to validate minimal variation in biogas consumption.

A2 Transport to the manufacturer

The raw materials are transported to the manufacturing site. In our case, the modelling includes: road, boat or train transportations (average values) of each raw material.

A3 Manufacturing

Mineral wool ceiling panels are produced in a continuous online process starting with applying glass tissue on the mineral wool baseboard. The panels are cut into correct size and the edges of the panels are painted. After drying the panels are packed in cardboard boxes. The manufacturing of ceilings accounts for GOs.

Manufacturing covers all processes linked to production, which comprises various related operations besides on-site activities such as grinding, painting and drying, packaging and internal transportation. Packaging-related flows in the production process and all up-stream packaging are included in the manufacturing module, i.e. wooden pallets, cardboard and PE-film.

Construction process stage, A4-A5

The construction process is divided into 2 modules: A4 “Transport to the building site” and A5 “Installation in the building.

Description of scenarios and additional technical information:

A4 Transport to the building site

This module includes transport from the production gate to the building site. Transport is calculated based on a scenario with the parameters described in the following table.

Parameter	Value
Fuel type, consumption of fuel and vehicle or vehicle type used for transport	Average truck trailer with a 24t payload, diesel consumption 31.7 litres for 100 km
Distance	475 km (based on transports in 2019)
Capacity utilisation (including empty returns)	90% of the capacity in volume 100% of empty returns
Bulk density of transported products (if available)	50 - 120 kg/m^3
Volume capacity utilisation factor (if available)	0.45

The transport distance has been calculated from a European average transport for Ecophon in 2019 from the parameters in the table above.

A5:1 Installation in the building
This module includes waste of products during the implementation, i.e. the additional production processes to compensate the loss and the waste processing which occur in this stage.

Scenarios used for quantity of product wastage and waste processing are:

Parameter	Value
Waste of materials on the building site before waste processing, generated by the product's installation	5%
Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal	Packaging waste is 100 % landfilled. Ceiling panel losses are landfilled

A5:2 Energy usage
As a general figure the time to install 1 m² ceiling is considered to be 20 minutes. During this time the installer is considered to use handheld appliances for about 5% of this time which in this case results in 1 minute. A handheld device such as a cordless screwdriver is considered to have a power of 0.7 kilowatt. Therefore, in one minute it will consume a total energy of 0.7*60 = 4.2 kilojoule = 0.0042 MJ, per m^2 ceiling. In this context it is a negligible contribution and will not be part of the LCA calculation (lower than 0.1% of the total energy consumption).

Use stage (excluding potential savings), B1-B7

Description of the stage:
The use stage is divided into 7 modules, B1 "Use", B2 "Maintenance", B3 "Repair", B4 "Replacement", B5 "Refurbishment", B6 "Operational energy use", B7 "Operational water use"

Description of scenarios and additional technical information:

Once installation is complete, no actions or technical operations are required during the use stages until the end of life stage. Therefore, acoustic ceiling panels have no impact (excluding potential energy savings) on this stage.

End-of-life stage C1-C4

Description of the stage:
The end-of life stage is divided into 4 modules; C1 “De-construction, demolition”, C2 “Transport to waste processing”, C3 “Waste processing for reuse, recovery and/or recycling”, C4 “Disposal”.

Description of scenarios and additional technical information:

C1, De-construction, demolition
The dismantling of acoustic ceiling panels takes part during renovation or demolition of the building. In this case, the environmental impact is assumed to be very small and can be neglected.

C2, Transport to waste processing
The model for transportation (see A4, Transportation to the building site) is applied.

C3, Waste processing for reuse, recovery and/or recycling;
The product is considered to be landfilled without reuse, recovery or recycling.

C4, Disposal;
The product is assumed to be 100% landfilled.

Parameter	Value/description
Collection process specified by type	3.7 kg of acoustic ceiling (collected with mixed construction waste)
Recovery system specified by type	No reuse, recycling or energy recovery
Disposal specified by type	Landfill, 3.7 kg
Assumptions for scenario development (e.g. transportation)	Average truck trailer with a 24t payload, diesel consumption 31.7 litres for 100 km 50 km (distance to landfill)

Reuse/recovery/recycling potential, D

No benefits beyond system boundary, this module is declared as zero.

LCA RESULTS

LCA model, aggregation of data and environmental impact are calculated through the GaBi Professional software. Secondary data is mainly taken from Ecoinvent 3.6 with some GaBi datasets.

Raw materials and energy consumption, as well as transport distances have been taken directly from the manufacturing plants of Saint-Gobain Ecophon in 2019.

Modules declared, geographical scope, share of specific data, and variation between sites (last two percentages given in GWP indicator) are stated in the following table. For stages A1-A3 (largest contribution to total GWP), the raw materials are modelled with very low amount of generic data – about 90% of the GWP comes from specific data.

	Product phase			Construction process phase		Use phase							End of life phase				Resource recovery phase
	Raw material and supply	Transport to the manufacturer	Manufacturing	Transport to the building site	Installation in the building	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport to waste processing	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	x	X	X	X	X	X	X	X	X	X	X	X
Geography	SE, BE, FR, DK, PL, DE, FI, GB, EU, GLO	SE, BE, FR, DK, PL, DE, FI, GB, EU, GLO	SE	GB, EU, GLO	EU, GLO								GB, EU, GLO	GB, EU, GLO	GB, EU, GLO	GB, EU, GLO	-
Specific data	> 85 %			-													-
Variation sites				-													-

Summary of the LCA results are detailed in the tables below.

All results in the EPD are written in logarithmic base of ten. Reading example: 5.2E -03 = $5.2*10^{-3}$ = 0,0052.

ENVIRONMENTAL IMPACT

Environmental impacts									
Parameters	Product stage	Construction process stage		Use stage	End-of-life stage				Reuse, recovery, recycling
	A1–A3	A4	A5	B1–B7	C1	C2	C3	C4	D
Climate change - total *[kg CO2 eq.]*	2.58E+00	1.56E-01	7.72E-01	0.00E+00	0.00E+00	4.09E-03	0.00E+00	2.39E-02	0.00E+00
Climate change - fossil *[kg CO2 eq.]*	3.16E+00	1.56E-01	1.85E-01	0.00E+00	0.00E+00	4.09E-03	0.00E+00	2.39E-02	0.00E+00
Climate change - biogenic *[kg CO2 eq.]*	-5.87E-01	0.00E+00	5.87E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Climate change - land use and land use change *[kg CO2 eq.]*	4.14E-03	1.48E-05	2.09E-04	0.00E+00	0.00E+00	3.87E-07	0.00E+00	3.94E-05	0.00E+00
Ozone depletion *[kg CFC 11 eq]*	1.52E-05	1.96E-14	7.58E-07	0.00E+00	0.00E+00	5.12E-16	0.00E+00	6.81E-17	0.00E+00
Acidification *[Mole of H+ eq.]*	2.32E-02	2.11E-04	1.21E-03	0.00E+00	0.00E+00	5.50E-06	0.00E+00	9.51E-05	0.00E+00
Eutrophication, freshwater *[kg P eq.]*	7.00E-04	5.12E-08	3.93E-05	0.00E+00	0.00E+00	1.34E-09	0.00E+00	2.76E-06	0.00E+00
Eutrophication, marine *[kg N eq.]*	6.94E-03	1.29E-04	4.02E-04	0.00E+00	0.00E+00	3.38E-06	0.00E+00	5.34E-05	0.00E+00
Eutrophication, terrestrial *[Mole of N eq.]*	8.11E-02	1.43E-03	4.32E-03	0.00E+00	0.00E+00	3.73E-05	0.00E+00	3.76E-04	0.00E+00
Photochemical ozone formation, human health *[kg NMVOC eq.]*	2.05E-02	2.74E-04	1.15E-03	0.00E+00	0.00E+00	7.15E-06	0.00E+00	1.42E-04	0.00E+00
Resource use, mineral and metals *[kg Sb eq.]*	2.63E-05	8.51E-09	1.32E-06	0.00E+00	0.00E+00	2.22E-10	0.00E+00	1.27E-09	0.00E+00
Resource use, fossils *[MJ]*	5.00E+01	2.14E+00	2.74E+00	0.00E+00	0.00E+00	5.59E-02	0.00E+00	2.39E-01	0.00E+00

RESOURCE USE

Resource use								
Parameters	Product stage	Construction process stage		Use stage	End-of-life stage				Reuse, recovery, recycling
	A1–A3	A4	A5	B1–B7	C1	C2	C3	C4	D
Use of renewable primary energy excluding renewable primary energy resources used as raw materials [MJ]	2.04E+01	5.46E-02	1.92E+00	0.00E+00	0.00E+00	1.43E-03	0.00E+00	2.35E-02	0.00E+00
Use of renewable primary energy used as raw materials [MJ]	6.46E+00	0.00E+00	-6.46E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) [MJ]	2.69E+01	5.46E-02	-4.54E+00	0.00E+00	0.00E+00	1.43E-03	0.00E+00	2.35E-02	0.00E+00
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw material [M]	4.62E+01	2.15E+00	2.56E+00	0.00E+00	0.00E+00	5.61E-02	0.00E+00	2.40E-01	0.00E+00
Use of non-renewable primary energy used as raw materials [MJ]	4.93E+00	0.00E+00	2.46E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-5.18E+00	0.00E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) [MJ]	5.12E+01	2.15E+00	2.81E+00	0.00E+00	0.00E+00	5.61E-02	0.00E+00	-4.94E+00	0.00E+00
Use of secondary material [kg]	2.59E+00	0.00E+00	1.29E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of renewable secondary fuels [MJ]	1.80E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of non-renewable secondary fuels [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water [m³]	6.21E-02	1.37E-05	3.09E-03	0.00E+00	0.00E+00	3.58E-07	0.00E+00	3.20E-05	0.00E+00

WASTE CATEGORIES

Waste categories									
Parameters	Product stage	Construction process stage		Use stage	End-of-life stage				Reuse, recovery, recycling
	A1–A3	A4	A5	B1–B7	C1	C2	C3	C4	D
Hazardous waste disposed [kg]	1.43E-07	5.30E-12	7.17E-09	0.00E+00	0.00E+00	1.39E-13	0.00E+00	1.85E-11	0.00E+00
Non-hazardous waste disposed [kg]	7.30E-01	5.68E-05	2.05E-01	0.00E+00	0.00E+00	1.49E-06	0.00E+00	3.70E+00	0.00E+00
Radioactive waste disposed [kg]	2.14E-04	2.55E-06	1.09E-05	0.00E+00	0.00E+00	6.67E-08	0.00E+00	1.83E-06	0.00E+00

OUTPUT FLOW

Output flows									
Parameters	Product stage	Construction process stage		Use stage	End-of-life stage				Reuse, recovery, recycling
	A1–A3	A4	A5	B1–B7	C1	C2	C3	C4	D
Components for re-use [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

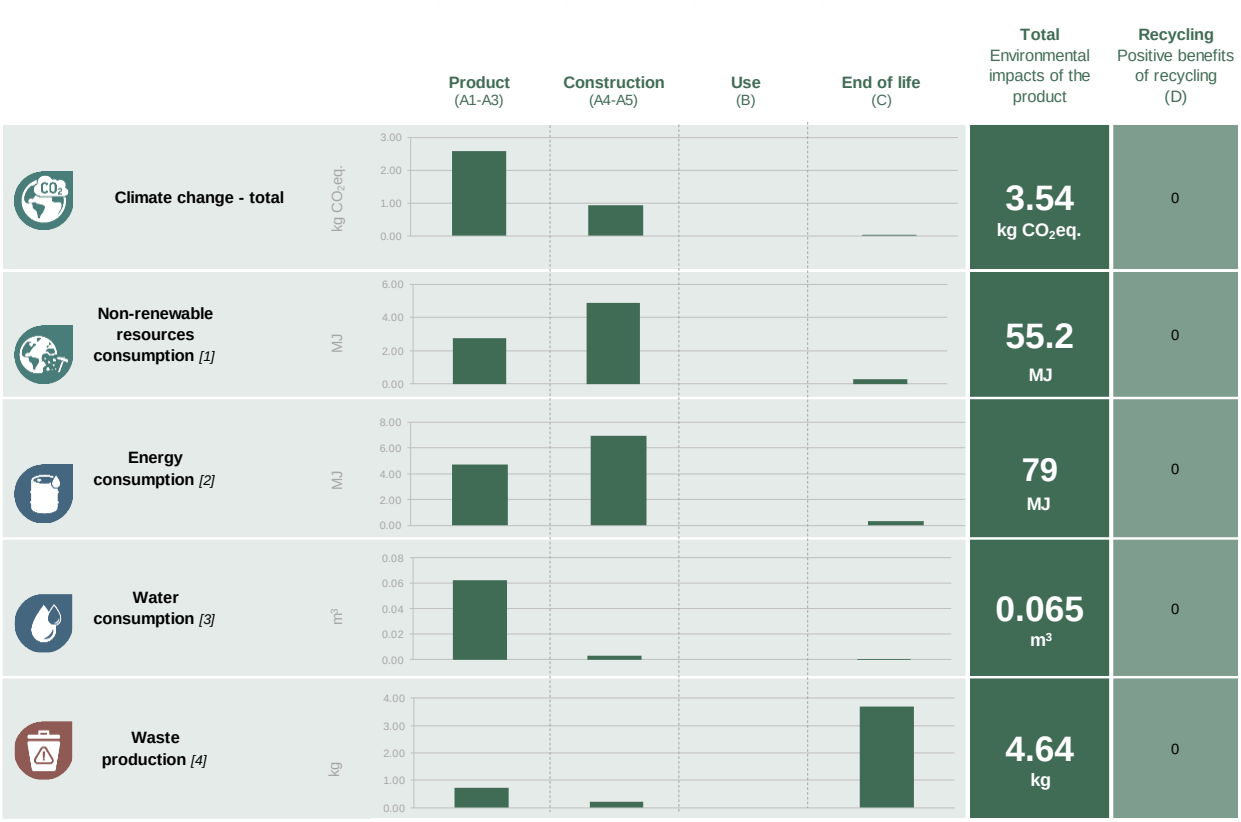
ADDITIONAL VOLUNTARY INDICATORS FROM EN 15804

Environmental impacts									
Parameters		Product stage	Construction process stage		Use stage	End-of-life stage				Reuse, recovery, recycling
		A1–A3	A4	A5	B1–B7	C1	C2	C3	C4	D
	GWP-GHG *[kg CO2 eq.]*	3.17E+00	1.56E-01	1.85E-01	0.00E+00	0.00E+00	4.09E-03	0.00E+00	2.39E-02	0.00E+00

GWP-GHG is calculated with the same characterisation factors as in EN 15804+A2 (EF 3.0), but uptake and release of biogenic carbon dioxide is zero.

SUMMARY

Aggregation of results from A1 to C4 in selected impact categories.



[1] This indicator corresponds to the abiotic depletion potential of fossil resources.
[2] This indicator corresponds to the total use of primary energy.
[3] This indicator corresponds to the use of net fresh water.
[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.

APPENDIX: ENVIRONMENTAL IMPACTS ACCORDING TO EN 15804:2012+A1

Parameters	Product stage	Construction process stage		Use stage	End-of-life stage				Reuse, recovery, recycling
	A1–A3	A4	A5	B1–B7	C1	C2	C3	C4	D
Global Warming Potential (GWP) *[kg CO2 eq.]*	3.39E+00	1.55E-01	3.04E-01	0.00E+00	0.00E+00	4.04E-03	0.00E+00	9.09E-02	0.00E+00
Ozone Depletion Potential (ODP) *[kg R11 eq.]*	1.52E-05	1.96E-14	7.58E-07	0.00E+00	0.00E+00	5.12E-16	0.00E+00	6.81E-17	0.00E+00
Acidification potential (AP) [kg SO_2 eq.]	2.32E-02	2.11E-04	1.21E-03	0.00E+00	0.00E+00	5.50E-06	0.00E+00	9.51E-05	0.00E+00
Eutrophication potential (EP) [kg $(PO_4)^{3-}$ eq.]	9.79E-03	4.45E-05	6.61E-04	0.00E+00	0.00E+00	1.16E-06	0.00E+00	1.14E-04	0.00E+00
Photochemical ozone creation (POPC)[Ethene eq.]	2.08E-03	-6.19E-05	1.40E-04	0.00E+00	0.00E+00	-1.62E-06	0.00E+00	3.11E-05	0.00E+00
Abiotic depletion potential for non-fossil resources (ADP-elements) [kg Sb eq.]	2.69E-05	8.53E-09	1.35E-06	0.00E+00	0.00E+00	2.23E-10	0.00E+00	1.28E-09	0.00E+00
Abiotic depletion potential for fossil resources (ADP-fossil fuels) [MJ/FU]	4.78E+01	2.11E+00	2.63E+00	0.00E+00	0.00E+00	5.51E-02	0.00E+00	2.34E-01	0.00E+00

Aggregation of Global Warming Potential (GWP) results from A1 to C4, according to EN 15804:2012+A1: 3.94 kg CO_2 eq. / m^2.

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REFERENCE LIST

ISO 354:2003: Acoustics – Measurement of sound absorption in a reverberation room

Reach: EU REACH Regulation (EC) No 1907/2006

LCA report: Project report on LCA for low CO2

EN 15804:2012+A2:2019: Sustainability of construction works - Environmental product declarations

c-PCR-014 “Acoustical ceiling and wall solutions” (complementary PCR; complementary to to PCR 2019:14)

PCR 2019:14 Construction products (EN 15804+A2), version 1.2.5

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