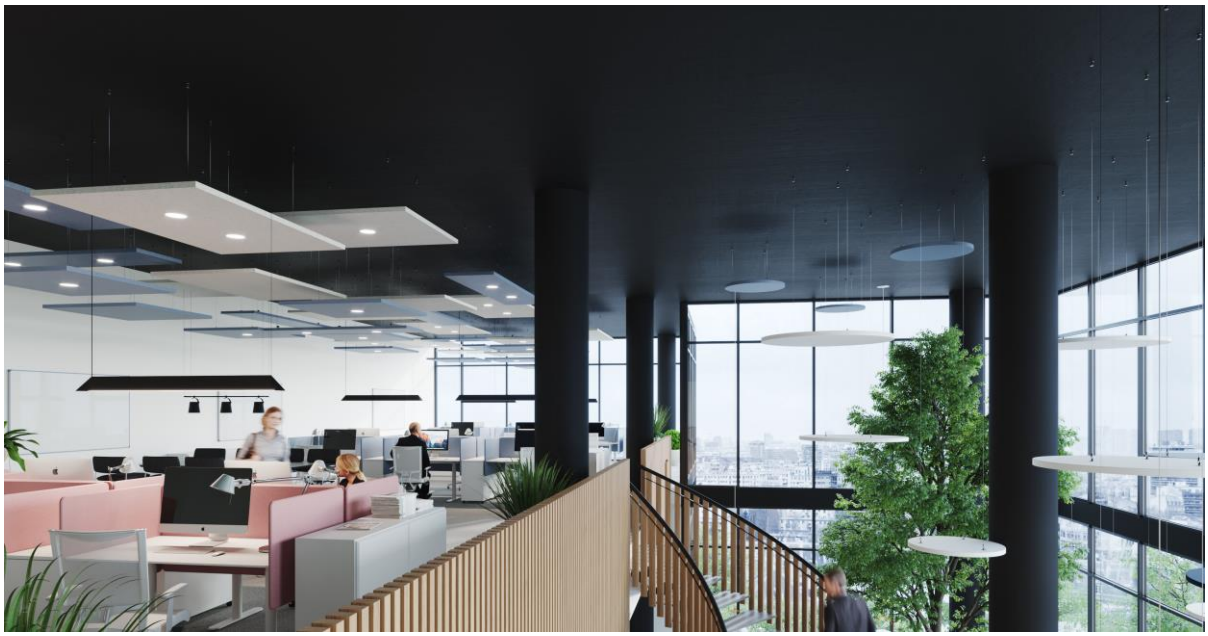
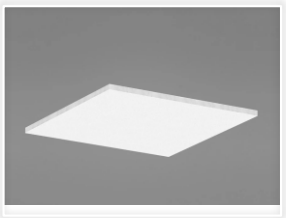
EPD®

THE GREEN YARDSTICK



ENVIRONMENTAL PRODUCT DECLARATION

Ecophon Solo™



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Programme operator: EPD International AB
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Date of publication (issue): 2021-03-05
Date of revision: 2021-03-05
Date of validity: 2026-03-05
In accordance with ISO 14025, ISO 21930 and EN 15804

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.

Ecophon® SAINT-GOBAIN

A SOUND EFFECT ON PEOPLE

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-03225
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 document: EN 15804 as the core PCR + International EPD System Product Category Rules – PCR for constructions products and construction services, Acoustical systems solutions (sub-oriented PCR; appendix to PCR 2012:01) - previously Acoustic ceilings. EPD of construction products may not be comparable if they do not comply with EN 15804.
Validity	2026-03-05
Content of the declaration	This is an environmental product declaration containing environmental information of the product in the Ecophon family Solo. The values presented in this EPD are represented for the following products: Solo Square, Solo Rectangle, Solo Circle, Solo Baffle, Solo Baffle Wave, Solo Baffle Zig Zag, Solo Matrix, Solo Lite, Solo Square/Akutex HS, Solo Rectangle/Akutex HS, Solo Circle/Akutex HS Supplemental product information can be found at www.ecophon.com
UN CPC (Central Product Classification) CODE	37990 37129
Issued date	2021-03-05

Product responsible:

Thomas Roul
Product Engineering & Development Manager
Saint-Gobain Ecophon AB

Independent third party verifier:

Martin Erlandsson
LCA Business Development Manager
IVL

Product description

Product description and description of use:

This Environmental Product Declaration (EPD) describes the environmental impact of 1m² of acoustic ceiling with the intended use to increase sound absorption in a room to create a better indoor environment.

This Environmental Product Declaration (EPD) are valid for products produced in Ecophon production plants in Sweden, Denmark, Poland and Finland with 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 edges are painted and the panels are packed in cardboard boxes.

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, health care facilities and production premises where there is a need for noise reduction to improve the working environment. The decrease in reverberation time, sound pressure level and other acoustic parameters are related to the amount of panels used in the room as well as the placement of the panels. 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 m² of product:

Parameter	Value (Weight in %)	Post-consumer recycled content
Product thickness	40 mm	-
Glass wool	61% - 81%	70%
Waterborne paint	4% - 7%	-
Glass tissue	11% - 31%	-
Waterborne glue	4% - 7%	-
Plastic wrapping	40 g	-

Total weights											
Product	Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Total weight [kg]	6,9	6,8	3,5	7,1	8,1	7,9	5	5,3	6,9	6,8	3,5

All raw materials contributing more than 5% to any environmental impact are listed in the table above. The panels are free from substances of very high concern (SVHC). The product contains no substances from the REACH Candidate list (of 15.06.2018).

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

Other environmental indicators

Regarding the indoor environment, the Solo products are certified for or fulfil regulations according to the following table:

Certificate and Regulations
Finnish M1
Eurofins Indoor Air Comfort

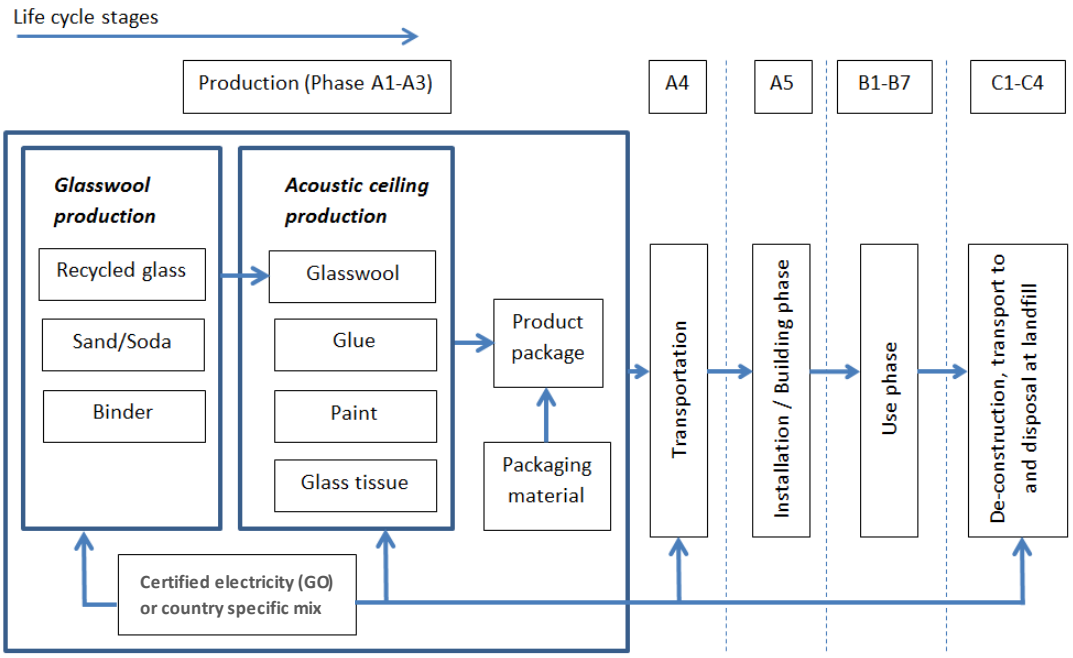
LCA calculation information

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: Mandatory stages = A1-3, A4-5, B1-7, C1-4 and optional stage = 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 has not been included in calculations. 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)

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 are paint, glass tissue and glue which also are included in the calculation. All electricity is taken account for in (GOs) or at least country specific mix.

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

The manufacturing includes two steps; glass wool production and glass wool panel production. The glass wool panels are produced in a continuous online process starting with applying glass tissue on the glass 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.

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. The manufacturing process also yields data on the combustion of refinery products, such as natural gas, diesel and gasoline, related to the production process.

The environmental profile of these energy carriers is modelled for local conditions. 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. Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model. They are reported and allocated to the module where the packaging is applied. Data on packaging waste created during this step is then generated. It is assumed that packaging waste generated in the course of production and up-stream processes is 100% collected and either recycled or incinerated with energy recovery, related to material and quality, in ratios according to the local material handling companies.

The glass wool raw material is supplied from three different external locations to all four Ecophon production sites. A representative electricity mix for glass wool production in each country of origin was used. The finished product can be produced in any of Ecophon's four production sites, the split was calculated by mass allocation from production data for year 2019 for all sites involved.

Construction process stage, A4-A5

Description of the stage:

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 on the basis of 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 38 litres for 100 km
Distance	475 km (based on transports in 2019)
Capacity utilisation (including empty returns)	100% of the capacity in volume 30% of empty returns
Bulk density of transported products (if available)	54 - 98 kg/m^3
Volume capacity utilisation factor (if available)	1

The transport distance has been calculated from a European average transport for Ecophon in 2019 following the parameters in 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 % collected and modelled as recovered matter Ceiling panel losses are landfilled

A5:2 Energy usage

As a general figure the time to install 1m^2 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, glass wool 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 de-construction and/or dismantling of glass wool ceiling panels take part during the renovation of the building or the demolition of the entire building. In our 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	1440 - 2410g of acoustic ceiling (collected with mixed construction waste)
Recovery system specified by type	No reuse, recycling or energy recovery
Disposal specified by type	1080 - 1960g of acoustic ceiling is landfilled
Assumptions for scenario development (e.g. transportation)	Average truck trailer with a 24t payload, diesel consumption 38 litres for 100 km 200 km (distance to landfill)

Reuse/recovery/recycling potential, D

Description of scenarios and additional technical information:
Packaging waste from module A5 is reported in this module as recovered matter.

LCA results

LCA model, aggregation of data and environmental impact are calculated from the GABI SP40 software – mostly Ecoinvent 3.6 datasets and some Gabi datasets.

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

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.

MND (module not declared), is equal to MNA (module not assessed).

Modules declared, geographical scope, and share of specific data (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 – over 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		MND
Geography	SE, NL, FR, DK, PL, DE, FI, GB, EU, GLO	SE, NL, FR, DK, PL, DE, FI, GB, EU, GLO	SE, DK, PL, FI	GB, EU, GLO	EU, GLO								GB, EU, GLO	GB, EU, GLO	GB, EU, GLO	GB, EU, GLO		-
Specific data	> 90 %			-														-

Environmental impact.

Environmental impacts												
Parameters		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Global Warming Potential (GWP) - kg CO_2 equiv/FU	A1–A3	8,37E+00	8,12E+00	9,30E+00	9,07E+00	9,98E+00	1,00E+01	6,29E+00	6,28E+00	8,82E+00	8,54E+00	9,72E+00
	A4–A5	6,03E-01	5,91E-01	6,51E-01	6,38E-01	6,85E-01	6,88E-01	4,22E-01	6,01E-01	6,31E-01	6,17E-01	6,77E-01
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	4,01E-01	4,01E-01	4,01E-01	4,01E-01	4,01E-01	4,01E-01	8,08E-01	3,62E-01	4,82E-01	4,82E-01	4,82E-01
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	9,37E+00	9,12E+00	1,04E+01	1,01E+01	1,11E+01	1,11E+01	7,52E+00	7,24E+00	9,93E+00	9,64E+00	1,09E+01
		The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1.										
Ozone Depletion (ODP) kg CFC 11 equiv/FU	A1–A3	9,31E-07	9,14E-07	1,05E-06	9,94E-07	1,10E-06	1,07E-06	7,50E-07	7,24E-07	9,09E-07	8,93E-07	1,03E-06
	A4–A5	4,77E-08	4,69E-08	5,35E-08	5,09E-08	5,60E-08	5,45E-08	3,82E-08	3,69E-08	4,66E-08	4,58E-08	5,25E-08
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	-1,09E-16	-1,09E-16	-1,09E-16	-1,09E-16	-1,09E-16	-1,09E-16	-1,01E-15	-5,30E-17	-2,25E-16	-2,25E-16	-2,25E-16
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	9,79E-07	9,61E-07	1,10E-06	1,04E-06	1,16E-06	1,12E-06	7,88E-07	7,61E-07	9,56E-07	9,39E-07	1,08E-06
		Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halogens), which break down when they reach the stratosphere and then catalytically destroy ozone molecules.										
Acidification potential (AP) kg SO_2 equiv/FU	A1–A3	4,41E-02	4,28E-02	4,93E-02	4,86E-02	5,25E-02	5,21E-02	3,54E-02	3,34E-02	4,14E-02	4,04E-02	4,68E-02
	A4–A5	2,40E-03	2,34E-03	2,67E-03	2,63E-03	2,83E-03	2,81E-03	1,92E-03	1,86E-03	2,29E-03	2,23E-03	2,56E-03
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	4,81E-04	4,81E-04	4,81E-04	4,81E-04	4,81E-04	4,81E-04	3,31E-04	4,69E-04	5,02E-04	5,02E-04	5,02E-04
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	4,69E-02	4,57E-02	5,24E-02	5,17E-02	5,58E-02	5,54E-02	3,77E-02	3,57E-02	4,42E-02	4,31E-02	4,99E-02
		Acid depositions have negative impacts on natural ecosystems and the man-made environment incl, buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport.										
Eutrophication potential (EP) kg $(PO_4)^3$- equiv/FU	A1–A3	1,21E-02	1,17E-02	1,36E-02	1,37E-02	1,44E-02	1,45E-02	9,35E-03	9,25E-03	1,20E-02	1,16E-02	1,33E-02
	A4–A5	8,45E-04	8,27E-04	9,16E-04	9,22E-04	9,64E-04	9,66E-04	6,02E-04	8,30E-04	8,41E-04	8,23E-04	9,12E-04
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	4,70E-04	4,70E-04	4,70E-04	4,70E-04	4,70E-04	4,70E-04	1,06E-03	4,17E-04	5,78E-04	5,78E-04	5,78E-04
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,34E-02	1,30E-02	1,50E-02	1,51E-02	1,59E-02	1,60E-02	1,10E-02	1,05E-02	1,34E-02	1,30E-02	1,48E-02
		Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.										
Photochemical ozone creation (POPC) kg Ethene equiv/FU	A1–A3	4,89E-03	4,75E-03	5,50E-03	5,50E-03	5,81E-03	5,80E-03	3,84E-03	3,56E-03	4,82E-03	4,69E-03	5,44E-03
	A4–A5	3,06E-04	2,99E-04	3,37E-04	3,37E-04	3,52E-04	3,52E-04	2,29E-04	2,64E-04	3,04E-04	2,98E-04	3,35E-04
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	1,19E-04	1,19E-04	1,19E-04	1,19E-04	1,19E-04	1,19E-04	2,55E-04	1,06E-04	1,45E-04	1,45E-04	1,45E-04
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	5,31E-03	5,17E-03	5,95E-03	5,96E-03	6,28E-03	6,27E-03	4,32E-03	3,93E-03	5,27E-03	5,14E-03	5,92E-03
		Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.										
Abiotic depletion potential for non-fossil resources (ADP-elements) - kg Sb equiv/FU	A1–A3	1,26E-05	1,20E-05	1,42E-05	1,56E-05	1,55E-05	1,58E-05	1,03E-05	8,97E-06	1,38E-05	1,32E-05	1,54E-05
	A4–A5	6,52E-07	6,24E-07	7,35E-07	8,02E-07	8,00E-07	8,14E-07	5,39E-07	4,71E-07	7,15E-07	6,83E-07	7,94E-07
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	3,84E-09	3,84E-09	3,84E-09	3,84E-09	3,84E-09	3,84E-09	-5,80E-09	4,23E-09	3,02E-09	3,02E-09	3,02E-09
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,33E-05	1,26E-05	1,49E-05	1,64E-05	1,63E-05	1,66E-05	1,08E-05	9,44E-06	1,45E-05	1,39E-05	1,62E-05
Abiotic depletion potential for fossil resources (ADP-fossil fuels) - MJ/FU	A1–A3	1,23E+02	1,20E+02	1,37E+02	1,31E+02	1,44E+02	1,41E+02	1,02E+02	9,59E+01	1,21E+02	1,18E+02	1,35E+02
	A4–A5	6,81E+00	6,69E+00	7,56E+00	7,23E+00	7,89E+00	7,74E+00	5,54E+00	5,46E+00	6,72E+00	6,61E+00	7,48E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	1,41E+00	1,41E+00	1,41E+00	1,41E+00	1,41E+00	1,41E+00	9,57E-01	1,38E+00	1,47E+00	1,47E+00	1,47E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,31E+02	1,28E+02	1,46E+02	1,40E+02	1,53E+02	1,50E+02	1,09E+02	1,03E+02	1,29E+02	1,26E+02	1,44E+02
		Consumption of non-renewable resources, thereby lowering their availability for future generations.										

Resource use

Environmental impacts												
Parameters		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - MJ / FU	A1–A3	8,74E+01	8,67E+01	9,81E+01	8,70E+01	1,01E+02	9,62E+01	6,91E+01	7,02E+01	8,82E+01	8,76E+01	9,88E+01
	A4–A5	5,60E+00	5,57E+00	6,14E+00	5,58E+00	6,29E+00	6,04E+00	3,96E+00	3,97E+00	5,65E+00	5,61E+00	6,18E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	1,58E-02	1,58E-02	1,58E-02	1,58E-02	1,58E-02	1,58E-02	-2,30E-01	2,91E-02	-1,19E-02	-1,19E-02	-1,19E-02
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	9,30E+01	9,23E+01	1,04E+02	9,26E+01	1,07E+02	1,02E+02	7,28E+01	7,42E+01	9,39E+01	9,32E+01	1,05E+02
Use of renewable primary energy used as raw materials - MJ / FU	A1–A3	1,04E+00	1,04E+00	1,18E+00	1,03E+00	1,21E+00	1,13E+00	8,75E-01	8,44E-01	1,04E+00	1,04E+00	1,18E+00
	A4–A5	5,22E-02	5,19E-02	5,89E-02	5,17E-02	6,03E-02	5,67E-02	4,38E-02	4,22E-02	5,22E-02	5,19E-02	5,89E-02
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	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	0,00E+00	0,00E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,09E+00	1,09E+00	1,24E+00	1,08E+00	1,27E+00	1,19E+00	9,19E-01	8,86E-01	1,09E+00	1,09E+00	1,24E+00
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ / FU	A1–A3	8,84E+01	8,77E+01	9,93E+01	8,81E+01	1,02E+02	9,73E+01	6,99E+01	7,10E+01	8,93E+01	8,86E+01	1,00E+02
	A4–A5	5,65E+00	5,62E+00	6,20E+00	5,63E+00	6,35E+00	6,10E+00	4,01E+00	4,01E+00	5,70E+00	5,66E+00	6,24E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	1,58E-02	1,58E-02	1,58E-02	1,58E-02	1,58E-02	1,58E-02	-2,30E-01	2,91E-02	-1,19E-02	-1,19E-02	-1,19E-02
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	9,41E+01	9,34E+01	1,05E+02	9,37E+01	1,08E+02	1,03E+02	7,37E+01	7,50E+01	9,50E+01	9,43E+01	1,06E+02
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials - MJ /FU	A1–A3	1,23E+02	1,21E+02	1,39E+02	1,33E+02	1,45E+02	1,40E+02	1,04E+02	9,78E+01	1,15E+02	1,13E+02	1,31E+02
	A4–A5	6,81E+00	6,70E+00	7,62E+00	7,32E+00	7,91E+00	7,67E+00	5,64E+00	5,48E+00	6,40E+00	6,32E+00	7,23E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	1,34E+00	1,34E+00	1,34E+00	1,34E+00	1,34E+00	1,34E+00	7,14E-01	1,32E+00	1,37E+00	1,37E+00	1,37E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,31E+02	1,29E+02	1,48E+02	1,41E+02	1,54E+02	1,49E+02	1,11E+02	1,05E+02	1,23E+02	1,20E+02	1,39E+02
Use of non-renewable primary energy used as raw materials - MJ / FU	A1–A3	5,19E+00	5,16E+00	5,85E+00	5,14E+00	6,00E+00	5,64E+00	4,35E+00	4,20E+00	5,19E+00	5,16E+00	5,85E+00
	A4–A5	2,59E-01	2,58E-01	2,93E-01	2,57E-01	3,00E-01	2,82E-01	2,18E-01	2,10E-01	2,59E-01	2,58E-01	2,93E-01
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	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	0,00E+00	0,00E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	5,45E+00	5,42E+00	6,14E+00	5,40E+00	6,30E+00	5,92E+00	4,57E+00	4,41E+00	5,45E+00	5,42E+00	6,14E+00
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - MJ / FU	A1–A3	1,28E+02	1,26E+02	1,45E+02	1,38E+02	1,51E+02	1,46E+02	1,09E+02	1,02E+02	1,20E+02	1,18E+02	1,37E+02
	A4–A5	7,07E+00	6,96E+00	7,91E+00	7,58E+00	8,21E+00	7,95E+00	5,86E+00	5,69E+00	6,66E+00	6,58E+00	7,52E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	1,34E+00	1,34E+00	1,34E+00	1,34E+00	1,34E+00	1,34E+00	7,14E-01	1,32E+00	1,37E+00	1,37E+00	1,37E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,36E+02	1,34E+02	1,54E+02	1,47E+02	1,60E+02	1,55E+02	1,15E+02	1,09E+02	1,28E+02	1,26E+02	1,46E+02
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Use of secondary material Kg / FU	A1–A3	4,00E+00	3,98E+00	4,52E+00	3,97E+00	4,63E+00	4,35E+00	3,13E+00	3,24E+00	4,00E+00	3,98E+00	4,52E+00
	A4–A5	2,00E-01	1,99E-01	2,26E-01	1,98E-01	2,31E-01	2,17E-01	1,57E-01	1,62E-01	2,00E-01	1,99E-01	2,26E-01
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	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	0,00E+00	0,00E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	4,20E+00	4,18E+00	4,75E+00	4,17E+00	4,86E+00	4,57E+00	3,29E+00	3,40E+00	4,20E+00	4,18E+00	4,75E+00
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Use of renewable secondary fuels MJ / FU	A1–A3	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	0,00E+00	0,00E+00
	A4–A5	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	0,00E+00	0,00E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	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	0,00E+00	0,00E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	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	0,00E+00	0,00E+00
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Use of non-renewable secondary fuels - MJ / FU	A1–A3	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	0,00E+00	0,00E+00
	A4–A5	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	0,00E+00	0,00E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	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	0,00E+00	0,00E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	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	0,00E+00	0,00E+00
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Use of net fresh water m³ / FU	A1–A3	1,64E-01	1,60E-01	1,85E-01	1,80E-01	1,95E-01	1,90E-01	1,31E-01	1,26E-01	1,63E-01	1,59E-01	1,84E-01
	A4–A5	8,46E-03	8,28E-03	9,53E-03	9,26E-03	1,00E-02	9,76E-03	6,71E-03	6,42E-03	8,40E-03	8,23E-03	9,48E-03
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	1,33E-04	1,33E-04	1,33E-04	1,33E-04	1,33E-04	1,33E-04	-1,35E-04	1,42E-04	1,12E-04	1,12E-04	1,12E-04
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,73E-01	1,68E-01	1,95E-01	1,89E-01	2,05E-01	2,00E-01	1,38E-01	1,33E-01	1,71E-01	1,67E-01	1,93E-01

Waste categories

Environmental impacts												
Parameters		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Hazardous waste disposed kg / FU	A1–A3	9,14E-08	9,07E-08	1,03E-07	9,03E-08	1,06E-07	1,00E-07	7,15E-08	7,31E-08	9,28E-08	9,21E-08	1,04E-07
	A4–A5	5,96E-09	5,92E-09	6,52E-09	5,90E-09	6,67E-09	6,41E-09	4,15E-09	4,22E-09	6,03E-09	5,99E-09	6,59E-09
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	8,69E-11	8,69E-11	8,69E-11	8,69E-11	8,69E-11	8,69E-11	1,00E-11	8,77E-11	8,49E-11	8,49E-11	8,49E-11
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	9,74E-08	9,67E-08	1,10E-07	9,63E-08	1,13E-07	1,06E-07	7,57E-08	7,74E-08	9,89E-08	9,82E-08	1,11E-07
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Non-hazardous waste disposed - kg / FU	A1–A3	8,69E-01	7,85E-01	9,45E-01	1,11E+00	1,16E+00	1,35E+00	1,06E-01	4,71E-01	1,04E+00	9,42E-01	1,10E+00
	A4–A5	3,29E-01	3,23E-01	3,70E-01	3,38E-01	3,88E-01	3,78E-01	2,45E-01	3,87E-01	3,43E-01	3,36E-01	3,83E-01
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	4,68E+00	4,68E+00	4,68E+00	4,68E+00	4,68E+00	4,68E+00	2,31E+00	4,62E+00	4,77E+00	4,77E+00	4,77E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	5,88E+00	5,79E+00	6,00E+00	6,13E+00	6,23E+00	6,41E+00	2,66E+00	5,48E+00	6,16E+00	6,05E+00	6,26E+00
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Radioactive waste disposed kg / FU	A1–A3	1,68E-04	1,66E-04	1,70E-04	1,30E-04	1,83E-04	1,94E-04	1,72E-04	1,26E-04	2,83E-04	2,74E-04	2,78E-04
	A4–A5	-7,99E-06	-8,09E-06	-7,84E-06	-9,96E-06	-7,17E-06	-6,64E-06	-1,90E-07	-2,44E-05	-2,72E-06	-3,15E-06	-2,90E-06
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	-3,06E-05	-3,06E-05	-3,06E-05	-3,06E-05	-3,06E-05	-3,06E-05	-9,65E-05	-2,56E-05	-4,08E-05	-4,08E-05	-4,08E-05
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA

Output flow

Environmental impacts												
Parameters		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Components for re-use kg/FU	A1–A3	-	-	-	-	-	-	-	-	-	-	-
	A4–A5	-	-	-	-	-	-	-	-	-	-	-
	B1–B7	-	-	-	-	-	-	-	-	-	-	-
	C1–C4	-	-	-	-	-	-	-	-	-	-	-
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	-	-	-	-	-	-	-	-	-	-	-
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Materials for recycling kg/FU	A1–A3	1,11E-01	1,10E-01	1,24E-01	1,09E-01	1,28E-01	1,22E-01	8,58E-02	8,79E-02	1,11E-01	1,10E-01	1,24E-01
	A4–A5	1,14E-02	1,14E-02	1,17E-02	1,13E-02	1,19E-02	1,18E-02	4,70E-02	1,86E-02	1,14E-02	1,14E-02	1,17E-02
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	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	0,00E+00	0,00E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	1,22E-01	1,21E-01	1,36E-01	1,20E-01	1,40E-01	1,34E-01	1,33E-01	1,07E-01	1,22E-01	1,21E-01	1,36E-01
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Materials for energy reovery - kg/FU	A1–A3	-	-	-	-	-	-	-	-	-	-	-
	A4–A5	-	-	-	-	-	-	-	-	-	-	-
	B1–B7	-	-	-	-	-	-	-	-	-	-	-
	C1–C4	-	-	-	-	-	-	-	-	-	-	-
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	-	-	-	-	-	-	-	-	-	-	-
		Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Exported energy MJ/FU	A1–A3	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	0,00E+00	0,00E+00
	A4–A5	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	0,00E+00	0,00E+00
	B1–B7	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	0,00E+00	0,00E+00
	C1–C4	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	0,00E+00	0,00E+00
	D	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA	NDA
	Total A-C	-	-	-	-	-	-	-	-	-	-	-

Summary

	Solo Square	Solo Rectangle	Solo Circle	Solo Baffle	Solo Baffle Wave	Solo Baffle Zig Zag	Solo Matrix	Solo Lite	Solo Square/Akutex HS	Solo Rectangle/Akutex HS	Solo Circle/Akutex HS
Global warming  kg CO_2equiv/FU	9,37	9,12	10,35	10,11	11,07	11,13	7,52	7,24	9,93	9,64	10,87
Non-renewable resources consumption *[1]*  MJ/FU	131	128	146	139,62	153,35	150,29	108,82	102,78	129,13	125,95	143,97
Energy consumption *[2]*  MJ/FU	230	228	259	240,57	268,83	258,28	189,00	184,04	222,98	220,11	251,85
Water consumption *[3]*  m^3/FU	0,17	0,17	0,19	0,19	0,21	0,20	0,14	0,13	0,17	0,17	0,19
Waste production *[4]*  kg/FU	5,88	5,79	6,00	6,13	6,23	6,41	2,66	5,48	6,16	6,05	6,26

[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.

Reference list

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

Finnish M1: Emission classification of building materials (M1 Classification): general instructions 12 November 2014

Eurofins Indoor Air Comfort: Eurofins Indoor Air Comfort GOLD and Indoor Air Comfort Version 7.0 May 2020

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

LCA report: Project_report_on_Ecophon_LCA_2021-03-03

EN 15804:2012+A1:2013: Sustainability of construction works - Environmental product declarations -

Acoustical systems solutions (sub-oriented PCR; appendix to PCR 2012:01) - previously Acoustic ceilings.

PCR 2012:01 Construction products and construction services (version 2.32 dated 2020-07-01)

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