structo WALL SYSTEMS

ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH
EN 15804+A2 & ISO 14025

GLASS WALLS

A SPATIAL WAY OF THINKING — QUALITY DESIGN FROM ESTONIA —
structo

Structo Group OÜ

THE BUILDING INFORMATION FOUNDATION RTS
EPD

GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Structo Group OÜ
Address	Sära tee 11-6, Peetri, 75312, Estonia
Contact details	Heiko Saava +372 50 44 791 heiko@structo.ee
Website	www.structo.ee

PRODUCT IDENTIFICATION

Product name	Glass Walls: GLASSLINE ALULINE DOUBLELINE MODULE-30 MODULE-42 MODULE-S32
Place(s) of production	Estonia

Jessica Karhu
RTS EPD Committee secretary

Laura Apilo
Managing Director

The Building Information Foundation RTS sr

EPDs within the same product category but from different programmes may not be comparable.

EPD INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. 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.

EPD program operator	The Building Information Foundation RTS sr/ Building Information Ltd Malminkatu 16 A,
EPD standards	This EPD is in accordance with EN 15804+A2 and ISO 14025 standards.
Product category rules	The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 26.8.2020) is used.
EPD author	Mari Kirss and Anni Oviir Rangi Maja OÜ Tondi 22-4, Tallinn Estonia www.lcasupport.com
EPD verification	Independent verification of this EPD and data, according to ISO 14025: ☐ Internal certification ☑ External verification
Verification date	5 August 2021
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD number	RTS_142_21
Publishing date	07.09.2021
EPD valid until	16.08.2026

PRODUCT INFORMATION

PRODUCT DESCRIPTION

GLASSLINE and ALULINE are single full glass walls.

DOUBLELINE is a double full glass wall.

MODULE-30 and MODULE-42 are single modular glass walls with respectively MDF or wooden frame.

MODULE-S32 is a single modular glass wall with aluminum frame.

PRODUCT APPLICATION

Glass walls are interior partition wall elements that are mainly used in office buildings. They can be combined with different portals and doors to create exciting and functional results.

PHYSICAL PROPERTIES OF THE PRODUCT

Product properties can be found on the manufacturer website at www.structo.ee

TECHNICAL SPECIFICATIONS

For this assessment one square meter of product shall be used.

For ALULINE and DOUBLELINE, the studied product is a weighted average of both products.

TECHNICAL SPECIFICATIONS

For this assessment one square meter of product shall be used.

Product	Width, mm	Height, mm	Wall thickness, mm	Weight, kg
GLASSLINE	1349	2230	20	26
ALULINE	2080	2340	20	26
DOUBLELINE	460	2360	74	57
MODULE-30	939	2106	120	34
MODULE-42	942	1648	120	36
MODULE-S32	1036	2455	48	22

ADDITIONAL TECHNICAL INFORMATION

Further information can be found at www.structo.ee

SUBSTANCES, REACH - VERY HIGH CONCERN

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

PRODUCT RAW MATERIAL COMPOSITION

	Quantity, mass %					Usability			Origin of the raw materials
	GLASSLINE, ALULINE	DOUBLELINE	MODULE-30	MODULE-42	MODULE-S32	Renewable	Non-renewable	Recycled	
Glass	94	81	66	58	76		X		non-EU
Aluminum	5	18	-	-	22	X			EU
MDF	-	-	33	-	-	X			non-EU
Pine	-	-	-	41	-		X		non-EU
Other materials	1	1	1	1	2		X		EU & non-EU
TOTAL	100	100	100	100	100				

Raw material category	Amount, mass- %					Material origin
	GLASSLINE, ALULINE	DOUBLELINE	MODULE-30	MODULE-42	MODULE-S32	
Metals	5	18	<1	<1	23	non-EU
Minerals	94	81	66	58	76	non-EU
Fossil materials	<1	1	1	1	1	EU & non-EU
Bio-based materials	-	-	32	40	-	EU
TOTAL	100	100	100	100	100	

PRODUCT LIFE-CYCLE

MANUFACTURING AND PACKAGING (A1-A3)

GLASSLINE, ALULINE and DOUBLELINE are assembled on the construction site. The production begins with unpacking raw the materials. After that, the profiles are processed and get the selected finish. Before packing and stacking the profiles to transportation pallets, final quality checks will be conducted and the products will be ready for transportation to construction site. Glass panels are usually sent directly to the construction site.

MODULE -30, MODULE-42 and MODULE-S32 production begins with unpacking the raw materials. After that, the profiles are processed, will get the selected finish and are sent to the assembly line. When the glass panels have arrived from suppliers, the profiles are assembled into wall modules. Before packing and stacking the doors to transportation pallets, final quality checks will be concluded and the finished product will be sent to the construction site.

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MANUFACTURING PROCESS:

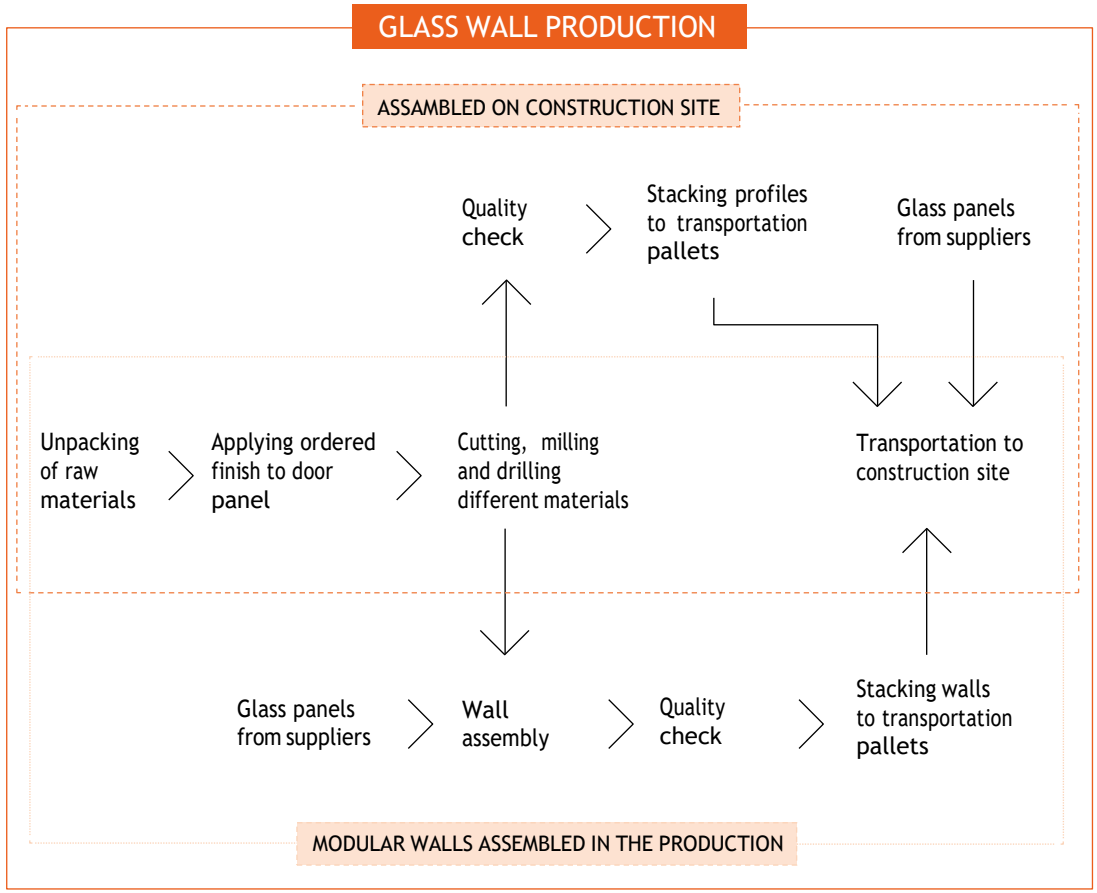
TRANSPORT (A4)

Transportation impacts occurred from final product's delivery to construction site cover direct exhaust emissions of fuel, environmental impacts of fuel production, as well as related infrastructure emissions.

PRODUCT END OF LIFE (C1-C4, D)

At the end-of-life, in the demolition phase end-of-life product is collected as mixed waste (C1) and is assumed to be sent (C2) to recycling (C3). Less than 1% is sent to the landfill (C4). Due to the recycling potential of aluminum, some of the end-of-life product is converted into recycled raw materials (D).

LIFE-CYCLE ASSESSMENT



LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	2020

DECLARED AND FUNCTIONAL UNIT

Declared unit	1 m^2
Mass per declared unit	22 - 57 kg

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content in product, kg C	0.00 – 5.08
Biogenic carbon content in packaging, kg C	0.53 – 2.58

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SYSTEM BOUNDARY

This EPD covers the cradle to gate with options scope with following modules; A1 (Raw material supply), A2 (Transport) and A3 (Manufacturing), A4 (Transport), as well as C1 (Deconstruction), C2 (Transport at end-of-life), C3 (Waste processing) and C4 (Disposal). In addition, module D - benefits and loads beyond the system boundary is included.

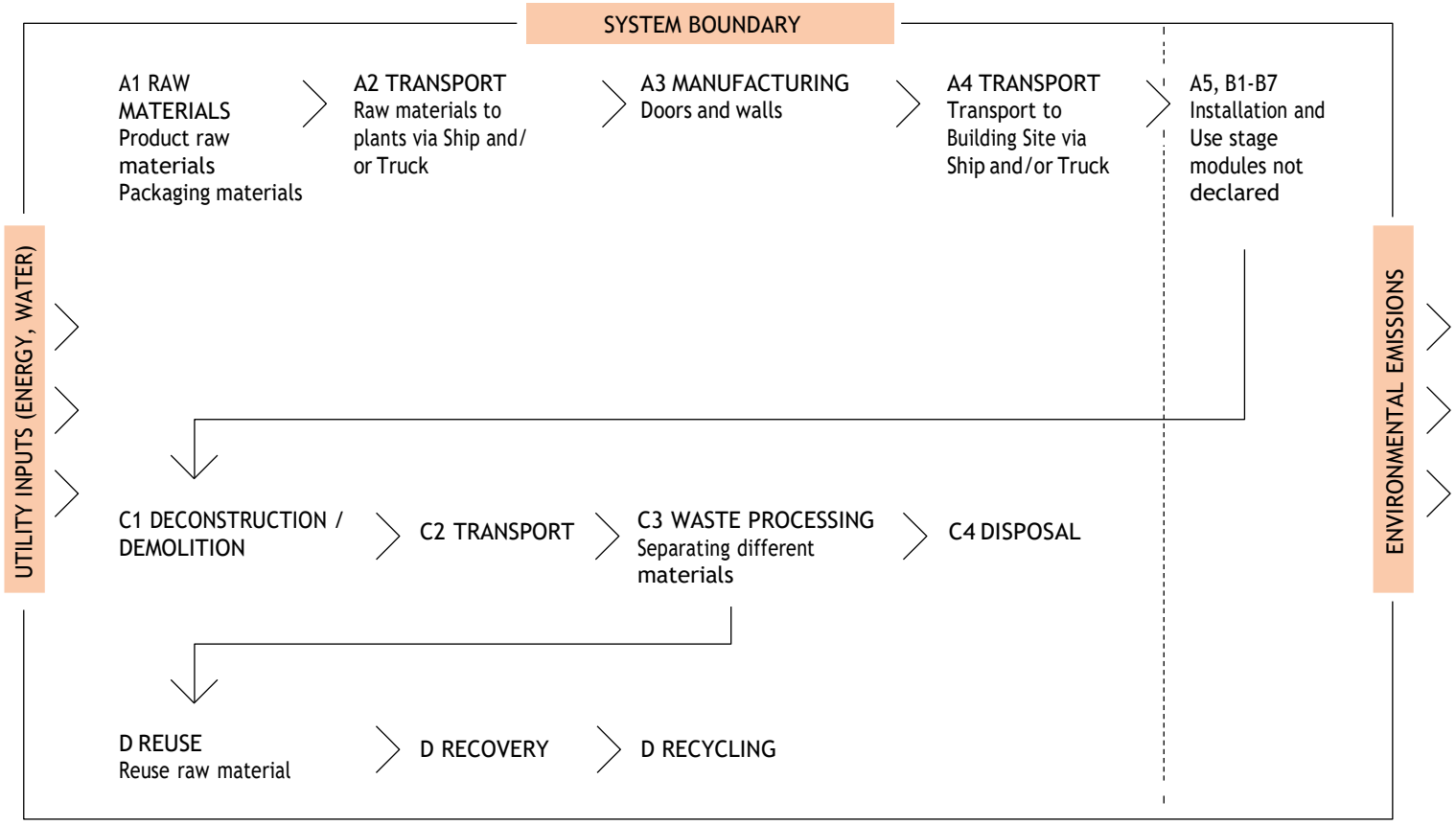
Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x

Geography, by two-letter ISO country code or regions. The International EPD System only.

Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstr./ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND

LIFE CYCLE STAGES DIAGRAM:



CUT-OFF CRITERIA

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 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

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation.

In this study, as per EN 15804, allocation is conducted in the following order;

1. Allocation should be avoided.
2. Allocation should be based on physical properties (e.g. mass, volume) when the difference in revenue is small.
3. Allocation should be based on economic values.

Allocation used in Ecoinvent 3.6 environmental data sources follows the methodology 'allocation, cut-off by classification'. This methodology is in line with the requirements of the EN 15804 -standard.

ESTIMATES AND ASSUMPTIONS

This LCA study is conducted in accordance with all methodological considerations, such as performance, system boundaries, data quality, allocation procedures, and decision rules to evaluate inputs and outputs. All estimations and assumptions are given below:

Module A4: The transportation distance is defined according to RTS PCR. It was assumed that typical installation place is situated in Stockholm, Sweden. Average distance of transportation from production plant to building site is equal to 460 km. Transportation method is assumed to be ferry and lorry. The transportation doesn't cause losses as products are packaged properly. Also, volume capacity utilisation factor is assumed to be 1 for the nested packaged products.

Module C1: Energy consumption of demolition process is on the average 0 kWh/m2. It is assumed no machinery is needed for the process.

Module C2: It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed that it has the same weight with the declared product. All of the end-of-life product is assumed to be sent to the closest facilities such as recycling and landfill. Transportation distance to the closest disposal area is estimated as 15 km and the transportation method is assumed as lorry which is the most common.

Module A2, A4 & C2: Vehicle capacity utilization volume factor is assumed to be 1 which means full load. In reality, it may vary but as role of transportation emission in total results is small and so the variety in load assumed to be negligible. Empty returns are not taken into account as it is assumed that return trip is used by transportation company to serve needs of other clients.

Module C3: It is assumed that over 99% of total waste is recycled or incinerated for heat production. This assumption was based on information from industry associations. App. 95% of metals, 70% of glass is recycled. 98% of other waste is incinerated for heat generation. The process losses of the waste treatment plant are assumed to be negligible.

Module C4: The remaining less than 1% of is assumed to be sent to landfill.

Module D: The recycled end-of-life product is assumed to be converted into a raw material after recycling.

ENVIRONMENTAL IMPACT DATA

Note: ENVIRONMENTAL IMPACTS - EN 15804+A1, CML / ISO 21930 are presented in annex.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

1) GWP = Global Warming Potential; EP = Eutrophication potential; POCP = Photochemical ozone formation; ADP = Abiotic depletion potential.

2) 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 experienced with the indicator.

3) Required characterisation method and data are in kg P-eq. Multiply by 3,07 to get PO4e.

GLASSLINE/ALULINE - CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	4,58E1	1,2E0	0E0	6,7E−2	1,76E0	3,19E−5	−2,4E1
GWP - fossil	kg CO2e	4,67E1	1,21E0	0E0	6,7E−2	1,59E0	3,16E−5	−2,39E1
GWP - biogenic	kg CO2e	−8,94E−1	1,16E−4	0E0	3,57E−5	1,66E−1	2,56E−7	−1,1E−1
GWP - LULUC	kg CO2e	4,54E−2	6,16E−4	0E0	2,37E−5	1,44E−3	1,52E−8	−3,23E−2
Ozone depletion pot.	kg CFC11e	5,08E−6	2,57E−7	0E0	1,52E−8	1,83E−7	9,81E−12	−2,08E−6
Acidification potential	mol H+e	4,07E−1	2,8E−2	0E0	2,73E−4	8,45E−3	2,7E−7	−2,29E−1
EP-freshwater[3)]	kg Pe	1,22E−3	6,68E−6	0E0	5,6E−7	5,61E−5	5,53E−10	−7,57E−4
EP-marine	kg Ne	6,74E−2	7,06E−3	0E0	8,13E−5	1,85E−3	9,14E−8	−3,52E−2
EP-terrestrial	mol Ne	7,99E−1	7,84E−2	0E0	8,98E−4	2,12E−2	1,01E−6	−4,24E−1
POCP (“smog”)	kg NMVOCe	2,09E−1	2,06E−2	0E0	2,75E−4	5,94E−3	2,91E−7	−1,09E−1
ADP-minerals & metals	kg Sbe	5,7E−3	1,23E−5	0E0	1,81E−6	5,41E−3	3,4E−10	6,85E−4
ADP-fossil resources	MJ	5,51E2	1,66E1	0E0	1,01E0	1,91E1	7,43E−4	−2,65E2
Water use[2)]	m3e depr.	1,01E1	4,31E−2	0E0	3,25E−3	1,29E0	3,33E−5	−5E0

DOUBLELINE - CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	7,02E1	2,66E0	0E0	1,57E−1	1,18E1	2,45E−4	−9,82E1
GWP - fossil	kg CO2e	8,07E1	2,68E0	0E0	1,57E−1	1,07E1	2,42E−4	−9,78E1
GWP - biogenic	kg CO2e	−1,06E1	2,57E−4	0E0	8,36E−5	1,05E0	1,96E−6	−2,08E−1
GWP - LULUC	kg CO2e	6,5E−2	1,37E−3	0E0	5,55E−5	1,06E−2	1,16E−7	−2,19E−1
Ozone depletion pot.	kg CFC11e	9,38E−6	5,71E−7	0E0	3,56E−8	9,47E−7	7,52E−11	−6,34E−6
Acidification potential	mol H+e	7,28E−1	6,22E−2	0E0	6,4E−4	5,38E−2	2,07E−6	−7,65E−1
EP-freshwater[3)]	kg Pe	2,12E−3	1,48E−5	0E0	1,31E−6	4,16E−4	4,24E−9	−3,67E−3
EP-marine	kg Ne	1,2E−1	1,57E−2	0E0	1,9E−4	1,03E−2	7E−7	−1,18E−1
EP-terrestrial	mol Ne	1,44E0	1,74E−1	0E0	2,1E−3	1,19E−1	7,72E−6	−1,39E0
POCP (“smog”)	kg NMVOCe	3,75E−1	4,58E−2	0E0	6,43E−4	3,27E−2	2,23E−6	−3,86E−1
ADP-minerals & metals	kg Sbe	2,21E−2	2,73E−5	0E0	4,24E−6	4,25E−2	2,6E−9	9E−3
ADP-fossil resources	MJ	9,83E2	3,68E1	0E0	2,36E0	1,15E2	5,7E−3	−1,08E3
Water use[2)]	m3e depr.	2,08E1	9,58E−2	0E0	7,6E−3	9,62E0	2,55E−4	−1,71E1

MODULE-30 - CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	4,66E1	1,6E0	0E0	9,01E-2	1,53E1	2,56E-3	-1,48E1
GWP - fossil	kg CO2e	5,55E1	1,61E0	0E0	9,01E-2	6,4E0	2,54E-3	-1,46E1
GWP - biogenic	kg CO2e	-8,96E0	1,54E-4	0E0	4,8E-5	8,89E0	2,05E-5	-1,05E-1
GWP - LULUC	kg CO2e	4,06E-2	8,19E-4	0E0	3,19E-5	2,34E-4	1,22E-6	-5,5E-3
Ozone depletion pot.	kg CFC11e	7,09E-6	3,42E-7	0E0	2,05E-8	1,22E-7	7,88E-10	-1,62E-6
Acidification potential	mol H+e	4,41E-1	3,72E-2	0E0	3,68E-4	5,81E-3	2,17E-5	-1,68E-1
EP-freshwater[3)]	kg Pe	1,95E-3	8,89E-6	0E0	7,54E-7	1,15E-5	4,44E-8	-3,73E-4
EP-marine	kg Ne	7,43E-2	9,4E-3	0E0	1,09E-4	2,32E-3	7,34E-6	-2,57E-2
EP-terrestrial	mol Ne	9,44E-1	1,04E-1	0E0	1,21E-3	2,44E-2	8,09E-5	-3,16E-1
POCP ("smog")	kg NMVOCe	2,7E-1	2,74E-2	0E0	3,7E-4	6,45E-3	2,34E-5	-7,65E-2
ADP-minerals & metals	kg Sbe	1,66E-3	1,64E-5	0E0	2,44E-6	1,19E-5	2,73E-8	-5,86E-4
ADP-fossil resources	MJ	7,61E2	2,2E1	0E0	1,36E0	9,31E0	5,97E-2	-1,64E2
Water use[2)]	m3e depr.	2,25E1	5,74E-2	0E0	4,37E-3	5,34E-1	2,67E-3	-3,61E0

MODULE-42 - CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	1,42E1	1,69E0	0E0	9,62E−2	2,02E1	3,4E−3	−1,39E1
GWP - fossil	kg CO2e	4,1E1	1,7E0	0E0	9,62E−2	8,39E0	3,37E−3	−1,38E1
GWP - biogenic	kg CO2e	−2,68E1	1,62E−4	0E0	5,13E−5	1,18E1	2,73E−5	−9,8E−2
GWP - LULUC	kg CO2e	5E−2	8,65E−4	0E0	3,41E−5	2,69E−4	1,62E−6	−5,15E−3
Ozone depletion pot.	kg CFC11e	5,06E−6	3,61E−7	0E0	2,18E−8	1,31E−7	1,05E−9	−1,52E−6
Acidification potential	mol H+e	3,38E−1	3,93E−2	0E0	3,93E−4	6,92E−3	2,88E−5	−1,57E−1
EP-freshwater[3)]	kg Pe	1,38E−3	9,39E−6	0E0	8,05E−7	1,37E−5	5,9E−8	−3,51E−4
EP-marine	kg Ne	5,68E−2	9,93E−3	0E0	1,17E−4	2,81E−3	9,75E−6	−2,41E−2
EP-terrestrial	mol Ne	6,74E−1	1,1E−1	0E0	1,29E−3	2,95E−2	1,07E−4	−2,96E−1
POCP (“smog”)	kg NMVOCe	2,1E−1	2,9E−2	0E0	3,95E−4	7,69E−3	3,1E−5	−7,18E−2
ADP-minerals & metals	kg Sbe	1,35E−3	1,73E−5	0E0	2,6E−6	1,4E−5	3,62E−8	−5,48E−4
ADP-fossil resources	MJ	5,24E2	2,33E1	0E0	1,45E0	1,01E1	7,93E−2	−1,54E2
Water use[2)]	m3e depr.	9,66E0	6,06E−2	0E0	4,67E−3	6,77E−1	3,55E−3	−3,38E0

MODULE-S32 - CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	7,57E1	1,13E0	0E0	5,43E-2	5,17E0	1,17E-4	-3,96E1
GWP - fossil	kg CO2e	7,71E1	1,14E0	0E0	5,43E-2	4,68E0	1,16E-4	-3,95E1
GWP - biogenic	kg CO2e	-1,55E0	1,09E-4	0E0	2,89E-5	4,86E-1	9,37E-7	-6,48E-2
GWP - LULUC	kg CO2e	1,37E-1	5,79E-4	0E0	1,92E-5	4,65E-3	5,56E-8	-9,51E-2
Ozone depletion pot.	kg CFC11e	6,6E-6	2,42E-7	0E0	1,23E-8	3,98E-7	3,6E-11	-2,39E-6
Acidification potential	mol H+e	5,61E-1	2,63E-2	0E0	2,22E-4	2,32E-2	9,89E-7	-2,95E-1
EP-freshwater[3)]	kg Pe	2,61E-3	6,29E-6	0E0	4,54E-7	1,82E-4	2,03E-9	-1,53E-3
EP-marine	kg Ne	9,39E-2	6,64E-3	0E0	6,59E-5	4,37E-3	3,35E-7	-4,58E-2
EP-terrestrial	mol Ne	1,08E0	7,38E-2	0E0	7,27E-4	5,07E-2	3,69E-6	-5,32E-1
POCP ("smog")	kg NMVOCe	3,07E-1	1,94E-2	0E0	2,23E-4	1,39E-2	1,07E-6	-1,51E-1
ADP-minerals & metals	kg Sbe	1,81E-2	1,16E-5	0E0	1,47E-6	1,87E-2	1,25E-9	4,1E-3
ADP-fossil resources	MJ	9,03E2	1,56E1	0E0	8,18E-1	4,92E1	2,72E-3	-4,33E2
Water use[2)]	m3e depr.	1,89E1	4,06E-2	0E0	2,63E-3	4,21E0	1,22E-4	-6,63E0

USE OF NATURAL RESOURCES

4) PER abbreviation stands for primary energy resources.

GLASSLINE/ALULINE - USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renew. PER as energy	MJ	4,32E1	1,44E−1	0E0	1,42E−2	1,52E0	1,23E−5	−2,34E1
Renew. PER as material	MJ	2,26E1	0E0	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	6,58E1	1,44E−1	0E0	1,42E−2	1,52E0	1,23E−5	−2,34E1
Non-re. PER as energy	MJ	5,51E2	1,66E1	0E0	1,01E0	1,91E1	7,43E−4	−2,65E2
Non-re. PER as material	MJ	1,43E−1	0E0	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	5,51E2	1,66E1	0E0	1,01E0	1,91E1	7,43E−4	−2,65E2
Secondary materials	kg	1,27E0	0E0	0E0	0E0	0E0	0E0	−1,13E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	3,13E−1	2,25E−3	0E0	1,73E−4	5,67E−2	8,4E−7	−1,39E−1

DOUBLELINE - USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renew. PER as energy	MJ	8,93E1	3,2E−1	0E0	3,33E−2	1,15E1	9,4E−5	−1,17E2
Renew. PER as material	MJ	1,08E2	0E0	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	1,97E2	3,2E−1	0E0	3,33E−2	1,15E1	9,4E−5	−1,17E2
Non-re. PER as energy	MJ	9,83E2	3,68E1	0E0	2,36E0	1,15E2	5,7E−3	−1,08E3
Non-re. PER as material	MJ	9,56E−1	0E0	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	9,83E2	3,68E1	0E0	2,36E0	1,15E2	5,7E−3	−1,08E3
Secondary materials	kg	1,37E0	0E0	0E0	0E0	0E0	0E0	−8,55E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	6,64E−1	4,99E−3	0E0	4,04E−4	4,14E−1	6,44E−6	−4,08E−1

MODULE-30 - USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renew. PER as energy	MJ	2,97E2	1,92E−1	0E0	1,92E−2	1,9E−1	9,85E−4	−1,08E1
Renew. PER as material	MJ	3,53E1	0E0	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	3,32E2	1,92E−1	0E0	1,92E−2	1,9E−1	9,85E−4	−1,08E1
Non-re. PER as energy	MJ	7,56E2	2,2E1	0E0	1,36E0	9,31E0	5,97E−2	−1,64E2
Non-re. PER as material	MJ	5,26E0	0E0	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	7,61E2	2,2E1	0E0	1,36E0	9,31E0	5,97E−2	−1,64E2
Secondary materials	kg	1,64E−1	0E0	0E0	0E0	0E0	0E0	3,47E−3
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	3,51E−1	2,99E−3	0E0	2,32E−4	2,39E−2	6,74E−5	−1,12E−1

MODULE-42 - USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renew. PER as energy	MJ	1,37E2	2,03E−1	0E0	2,05E−2	2,23E−1	1,31E−3	−1,01E1
Renew. PER as material	MJ	3,27E2	0E0	0E0	0E0	-2.82E2	0E0	0E0
Total use of renew. PER	MJ	4,64E2	2,03E−1	0E0	2,05E−2	-2.82E2	1,31E−3	−1,01E1
Non-re. PER as energy	MJ	5,17E2	2,33E1	0E0	1,45E0	1,01E1	7,93E−2	−1,54E2
Non-re. PER as material	MJ	6,69E0	0E0	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	5,24E2	2,33E1	0E0	1,45E0	1,01E1	7,93E−2	−1,54E2
Secondary materials	kg	1,74E−1	0E0	0E0	0E0	0E0	0E0	2,74E−2
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	2,81E−1	3,16E−3	0E0	2,48E−4	2,98E−2	8,96E−5	−1,05E−1

MODULE-S32 - USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renew. PER as energy	MJ	8,68E1	1,36E−1	0E0	1,15E−2	5,04E0	4,5E−5	−4,87E1
Renew. PER as material	MJ	3,01E1	0E0	0E0	0E0	0E0	0E0	0E0
Total use of renew. PER	MJ	1,17E2	1,36E−1	0E0	1,15E−2	5,04E0	4,5E−5	−4,87E1
Non-re. PER as energy	MJ	9,02E2	1,56E1	0E0	8,18E−1	4,92E1	2,72E−3	−4,33E2
Non-re. PER as material	MJ	1,43E0	0E0	0E0	0E0	0E0	0E0	0E0
Total use of non-re. PER	MJ	9,03E2	1,56E1	0E0	8,18E−1	4,92E1	2,72E−3	−4,33E2
Secondary materials	kg	4,58E0	0E0	0E0	0E0	0E0	0E0	−3,72E0
Renew. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Non-ren. secondary fuels	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Use of net fresh water	m3	5,41E−1	2,11E−3	0E0	1,4E−4	1,81E−1	3,08E−6	−1,52E−1

END OF LIFE – WASTE

GLASSLINE/ALULINE - END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	Kg	2,98E0	1,72E-2	0E0	1,03E-3	0E0	1,3E-6	-2,03E0
Non-hazardous waste	Kg	5,83E1	8,2E-1	0E0	7,04E-2	0E0	3E-3	-3,19E1
Radioactive waste	Kg	2,07E-3	1,16E-4	0E0	6,92E-6	0E0	4,47E-9	-9,42E-4

DOUBLELINE - END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	Kg	4,14E0	3,83E-2	0E0	2,4E-3	0E0	9,98E-6	-1,39E1
Non-hazardous waste	Kg	1,04E2	1,82E0	0E0	1,65E-1	0E0	2,3E-2	-1,55E2
Radioactive waste	Kg	3,8E-3	2,57E-4	0E0	1,62E-5	0E0	3,43E-8	-3,26E-3

MODULE-30 - END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	Kg	2,66E0	2,3E-2	0E0	1,38E-3	0E0	1,05E-4	-3,48E-1
Non-hazardous waste	Kg	7,62E1	1,09E0	0E0	9,47E-2	0E0	2,41E-1	-1,55E1
Radioactive waste	Kg	2,82E-3	1,54E-4	0E0	9,31E-6	0E0	3,59E-7	-6,7E-4

MODULE-42 - END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	Kg	1,95E0	2,42E−2	0E0	1,47E−3	0E0	1,39E−4	−3,32E−1
Non-hazardous waste	Kg	5,05E1	1,15E0	0E0	1,01E−1	0E0	3,2E−1	−1,46E1
Radioactive waste	Kg	2,03E−3	1,62E−4	0E0	9,94E−6	0E0	4,77E−7	−6,26E−4

MODULE-S32 - END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	Kg	9,5E0	1,62E−2	0E0	8,31E−4	0E0	4,77E−6	−6,02E0
Non-hazardous waste	Kg	1,21E2	7,72E−1	0E0	5,7E−2	0E0	1,1E−2	−6,46E1
Radioactive waste	Kg	2,67E−3	1,09E−4	0E0	5,61E−6	0E0	1,64E−8	−1,27E−3

END OF LIFE – OUTPUT FLOWS

GLASSLINE/ALULINE - END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	Kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	2E-2	0E0	0E0	0E0	1,9E1	0E0	0E0
Materials for energy rec	Kg	1,66E0	0E0	0E0	0E0	7,75E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0

DOUBLELINE - END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	Kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	3,79E0	0E0	0E0	0E0	4,62E1	0E0	0E0
Materials for energy rec	Kg	3,4E-1	0E0	0E0	0E0	1,64E1	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0

MODULE-30 - END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	Kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	0E0	0E0	0E0	0E0	1,68E1	0E0	0E0
Materials for energy rec	Kg	3,16E0	0E0	0E0	0E0	1,9E1	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0

MODULE-42 - END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	Kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	0E0	0E0	0E0	0E0	1,58E1	0E0	0E0
Materials for energy rec	Kg	3,58E0	0E0	0E0	0E0	2,24E1	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0

MODULE-S32 - END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	Kg	0E0	0E0	0E0	0E0	0E0	0E0	0E0
Materials for recycling	Kg	7,7E−1	0E0	0E0	0E0	1,62E1	0E0	0E0
Materials for energy rec	Kg	1,8E0	0E0	0E0	0E0	5,48E0	0E0	0E0
Exported energy	MJ	0E0	0E0	0E0	0E0	0E0	0E0	0E0

KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

5) Biog. C in product = Biogenic carbon content in product

GLASSLINE/ALULINE - KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	1,79E0	4,72E−2	0E0	2,62E−3	6,88E−2	1,25E−6	−9,39E−1
ADP-minerals & metals	kg Sbe	2,23E−4	4,81E−7	0E0	7,08E−8	2,12E−4	1,33E−11	2,68E−5
ADP-fossil	MJ	2,15E1	6,48E−1	0E0	3,95E−2	7,48E−1	2,91E−5	−1,04E1
Water use	m3e depr.	3,96E−1	1,69E−3	0E0	1,27E−4	5,03E−2	1,3E−6	−1,95E−1
Secondary materials	kg	4,95E−2	0E0	0E0	0E0	0E0	0E0	−4,43E−2
Biog. C in product	kg C	0E0	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	0.53	N/A	N/A	N/A	N/A	N/A	N/A

DOUBLELINE - KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	1,23E0	4,72E−2	0E0	2,76E−3	2,08E−1	4,3E−6	−1,73E0
ADP-minerals & metals	kg Sbe	3,89E−4	4,81E−7	0E0	7,45E−8	7,48E−4	4,58E−11	1,58E−4
ADP-fossil	MJ	1,73E1	6,48E−1	0E0	4,15E−2	2,02E0	1E−4	−1,89E1
Water use	m3e depr.	3,65E−1	1,69E−3	0E0	1,34E−4	1,69E−1	4,49E−6	−3E−1
Secondary materials	kg	2,41E−2	0E0	0E0	0E0	0E0	0E0	−1,5E−1
Biog. C in product	kg C	0E0	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	2.58	N/A	N/A	N/A	N/A	N/A	N/A

MODULE-30 - KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	1,37E0	4,72E-2	0E0	2,65E-3	4,49E-1	7,53E-5	-4,34E-1
ADP-minerals & metals	kg Sbe	4,87E-5	4,81E-7	0E0	7,16E-8	3,49E-7	8,02E-10	-1,72E-5
ADP-fossil	MJ	2,24E1	6,48E-1	0E0	3,99E-2	2,73E-1	1,75E-3	-4,81E0
Water use	m3e depr.	6,62E-1	1,69E-3	0E0	1,28E-4	1,57E-2	7,85E-5	-1,06E-1
Secondary materials	kg	4,81E-3	0E0	0E0	0E0	0E0	0E0	1,02E-4
Biog. C in product	kg C	5.08	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	0.84	N/A	N/A	N/A	N/A	N/A	N/A

MODULE-42 - KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	3,95E-1	4,72E-2	0E0	2,68E-3	5,61E-1	9,46E-5	-3,86E-1
ADP-minerals & metals	kg Sbe	3,77E-5	4,81E-7	0E0	7,23E-8	3,9E-7	1,01E-9	-1,52E-5
ADP-fossil	MJ	1,46E1	6,48E-1	0E0	4,03E-2	2,81E-1	2,2E-3	-4,28E0
Water use	m3e depr.	2,69E-1	1,69E-3	0E0	1,3E-4	1,88E-2	9,87E-5	-9,41E-2
Secondary materials	kg	4,84E-3	0E0	0E0	0E0	0E0	0E0	7,62E-4
Biog. C in product	kg C	0E0	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	1.06	N/A	N/A	N/A	N/A	N/A	N/A

MODULE-S32 - KEY INFORMATION TABLE (RTS) – KEY INFORMATION PER KG OF PRODUCT

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP - total	kg CO2e	3,49E0	5,24E−2	0E0	2,5E−3	2,38E−1	5,39E−6	−1,83E0
ADP-minerals & metals	kg Sbe	8,35E−4	5,33E−7	0E0	6,76E−8	8,61E−4	5,74E−11	1,89E−4
ADP-fossil	MJ	4,16E1	7,18E−1	0E0	3,77E−2	2,27E0	1,26E−4	−1,99E1
Water use	m3e depr.	8,69E−1	1,87E−3	0E0	1,21E−4	1,94E−1	5,62E−6	−3,05E−1
Secondary materials	kg	2,11E−1	0E0	0E0	0E0	0E0	0E0	−1,71E−1
Biog. C in product	kg C	0E0	N/A	N/A	N/A	N/A	N/A	N/A
Biog. C in packaging	kg C	0.71	N/A	N/A	N/A	N/A	N/A	N/A

SCENARIO DOCUMENTATION

MANUFACTURING ENERGY SCENARIO DOCUMENTATION

Scenario parameter	Value
Electricity data source and quality	Market for electricity, high voltage (Reference product: electricity, high voltage) Estonia, Ecoinvent 3,6, year: 2020
Electricity CO2e / kWh	0.84 kg CO2/kWh
Heating data source and quality (firewood)	Heat production, mixed logs, at wood heater 6kw, state-of-the-art 2014 (Reference product: heat, central or small-scale, other than natural gas) Global, Ecoinvent 3,6, year: 2020
Heating (firewood) CO2e / kWh	0.0184 kg CO2/MJ
Heating data source and quality (gas)	Heat production, natural gas, at industrial furnace >100kw (Reference product: heat, district or industrial, natural gas) Europe, Ecoinvent 3,6, year: 2020
Heating (gas) CO2e / kWh	0.0687 kg CO2/kWh

TRANSPORT SCENARIO DOCUMENTATION (A4)

Scenario parameter	
A4 specific transport CO2e emissions, kg CO2e / tkm, lorry	0.090
A4 specific transport CO2e emissions, kg CO2e / tkm, ferry	0.011
A4 average transport distance, lorry, km	175
A4 average transport distance, ferry, km	285
A4 Capacity utilization (including empty return) %	75
A4 Bulk density of transported products, kg/m2	22 - 57
A4 Volume capacity utilization factor	1

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END OF LIFE SCENARIO DOCUMENTATION

Scenario parameter	GLASSLINE/ ALULINE	DOUBLELINE	MODULE-30	MODULE-42	MODULE-S32
Collection process - kg collected separately	26.78	62.64	36.02	38.46	21.70
Collection process - kg collected with mixed waste	0.00	0.00	0.00	0.00	0.00
Recovery process - kg for re-use	0.00	0.00	0.00	0.00	0.00
Recovery process - kg for recycling	19.02	46.19	16.81	15.76	16.20
Recovery process - kg for energy recovery	7.75	16.43	18.97	22.38	5.48
Disposal (total) - kg for final deposition	0.003	0.023	0.241	0.320	0.011

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ABOUT THE MANUFACTURER

All our products are manufactured according to the customer's individual requirements. As a result, our products fit perfectly in the designated interior space and comply with all requirements of the building. Structo's products are practical, of high quality and stylish.

Not only do we manufacture products that look good, we also make them practical, long lasting and easy to handle. It is our greatest aim to provide all present and future customers with the satisfaction that can be guaranteed by our extensive experience and professional expertise.

Structo's products are characterised by innovative ideas and immaculate workmanship. Our constant product development makes sure you will get the best solutions for even your most complicated requirements.

EPD AUTHOR AND CONTRIBUTORS

Manufacturer	Structo Group OÜ
EPD author	Mari Kirss and Anni Oviir, Rangi Maja OÜ
EPD verifier	Silvia Vilčeková, Silcert, s.r.o.
EPD program	The Building Information Foundation RTS sr
Background data	This EPD is based on Ecoinvent 3.6 and One Click LCA databases.
LCA software	One Click LCA

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ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

GLASSLINE/ALULINE - ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	4,58E1	1,2E0	0E0	6,64E-2	1,57E0	3,1E-5	-2,33E1
Ozone depletion Pot.	kg CFC11e	4,2E-6	2,04E-7	0E0	1,21E-8	1,51E-7	7,82E-12	-1,75E-6
Acidification	kg SO2e	1,61E-1	2,18E-2	0E0	1,34E-4	7,85E-3	2,15E-6	-8,45E-2
Eutrophication	kg PO4 3e	4,79E-2	2,53E-3	0E0	2,76E-5	2,63E-3	4,38E-8	-2,86E-2
POCP ("smog")	kg C2H4e	7,88E-3	5,91E-4	0E0	8,84E-6	3,04E-4	8,09E-9	-4,38E-3
ADP-elements	kg Sbe	5,7E-3	1,23E-5	0E0	1,81E-6	5,41E-3	3,4E-10	6,85E-4
ADP-fossil	MJ	5,51E2	1,66E1	0E0	1,01E0	1,91E1	7,43E-4	-2,65E2

DOUBLELINE - ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	7,94E1	2,66E0	0E0	1,55E-1	1,06E1	2,38E-4	-9,45E1
Ozone depletion Pot.	kg CFC11e	7,72E-6	4,53E-7	0E0	2,83E-8	8E-7	5,99E-11	-5,67E-6
Acidification	kg SO2e	2,71E-1	4,84E-2	0E0	3,14E-4	5,5E-2	1,65E-5	-4,03E-1
Eutrophication	kg PO4 3e	8,1E-2	5,61E-3	0E0	6,45E-5	1,9E-2	3,35E-7	-1,44E-1
POCP ("smog")	kg C2H4e	1,29E-2	1,31E-3	0E0	2,07E-5	1,94E-3	6,2E-8	-2,42E-2
ADP-elements	kg Sbe	2,21E-2	2,73E-5	0E0	4,24E-6	4,25E-2	2,6E-9	9E-3
ADP-fossil	MJ	9,83E2	3,68E1	0E0	2,36E0	1,15E2	5,7E-3	-1,08E3

MODULE-30 - ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	5,48E1	1,6E0	0E0	8,93E−2	6,39E0	2,49E−3	−1,45E1
Ozone depletion Pot.	kg CFC11e	6,01E−6	2,71E−7	0E0	1,63E−8	1,06E−7	6,28E−10	−1,31E−6
Acidification	kg SO2e	1,96E−1	2,9E−2	0E0	1,81E−4	3,65E−3	1,72E−4	−4,25E−2
Eutrophication	kg PO4 3e	6,29E−2	3,36E−3	0E0	3,71E−5	3,68E−3	3,52E−6	−1,32E−2
POCP (“smog”)	kg C2H4e	1,21E−2	7,86E−4	0E0	1,19E−5	1,45E−4	6,5E−7	−1,75E−3
ADP-elements	kg Sbe	1,66E−3	1,64E−5	0E0	2,44E−6	1,19E−5	2,73E−8	−5,86E−4
ADP-fossil	MJ	7,61E2	2,2E1	0E0	1,36E0	9,31E0	5,97E−2	−1,64E2

MODULE-42 - ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	4,07E1	1,69E0	0E0	9,53E−2	8,37E0	3,31E−3	−1,36E1
Ozone depletion Pot.	kg CFC11e	4,32E−6	2,86E−7	0E0	1,74E−8	1,17E−7	8,34E−10	−1,23E−6
Acidification	kg SO2e	1,31E−1	3,06E−2	0E0	1,93E−4	4,43E−3	2,29E−4	−4E−2
Eutrophication	kg PO4 3e	4,09E−2	3,55E−3	0E0	3,96E−5	4,78E−3	4,67E−6	−1,25E−2
POCP (“smog”)	kg C2H4e	7,89E−3	8,31E−4	0E0	1,27E−5	1,65E−4	8,63E−7	−1,68E−3
ADP-elements	kg Sbe	1,35E−3	1,73E−5	0E0	2,6E−6	1,4E−5	3,62E−8	−5,48E−4
ADP-fossil	MJ	5,24E2	2,33E1	0E0	1,45E0	1,01E1	7,93E−2	−1,54E2

MODULE-S32 - ANNEX 1 : ENVIRONMENTAL IMPACTS – EN 15804+A1, CML / ISO 21930

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global Warming Pot.	kg CO2e	7,47E1	1,13E0	0E0	5,38E-2	4,62E0	1,14E-4	-3,8E1
Ozone depletion Pot.	kg CFC11e	5,91E-6	1,92E-7	0E0	9,81E-9	3,37E-7	2,87E-11	-2,17E-6
Acidification	kg SO2e	3,41E-1	2,05E-2	0E0	1,09E-4	2,39E-2	7,87E-6	-1,67E-1
Eutrophication	kg PO4 3e	1,06E-1	2,38E-3	0E0	2,24E-5	8,31E-3	1,6E-7	-6,02E-2
POCP ("smog")	kg C2H4e	1,87E-2	5,56E-4	0E0	7,16E-6	8,37E-4	2,97E-8	-1,03E-2
ADP-elements	kg Sbe	1,81E-2	1,16E-5	0E0	1,47E-6	1,87E-2	1,25E-9	4,1E-3
ADP-fossil	MJ	9,03E2	1,56E1	0E0	8,18E-1	4,92E1	2,72E-3	-4,33E2

structo WALL SYSTEMS

	+372 666 5017		info@structo.ee		www.structo.ee