

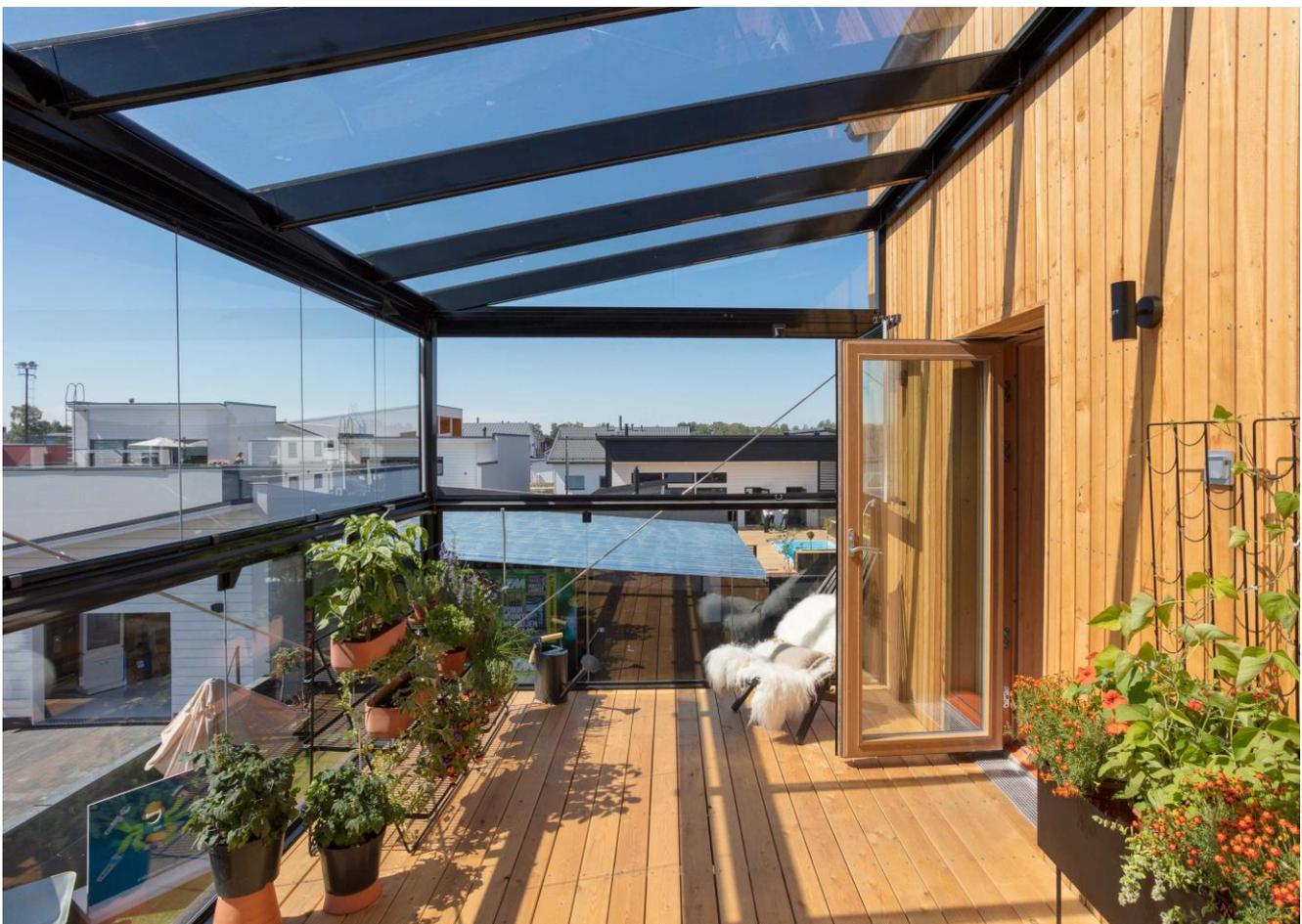
Environmental Product Declaration

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



Balcony, façade and terrace products

Component EPD



Registration number in RTS EPD:

RTS EPD RTS_257_23

Handwritten signature of Jukka Seppänen in blue ink.

Jukka Seppänen
RTS EPD Committee Secretary

Handwritten signature of Laura Apilo in blue ink.

Laura Apilo
Managing Director



GENERAL INFORMATION

MANUFACTURER INFORMATION

Manufacturer	Lumon Oy, a member of the Lumon Group
Address	Kaitilankatu 11, FI-45130 Kouvola, Finland
Website	https://lumon.com/fi/

PRODUCT IDENTIFICATION

Product name	Balcony, Façade and terrace products
Declared unit	1 kg per component
Specific product name	<p>The studied product components are listed below:</p> <ul style="list-style-type: none">• Laminated Glass component• Tempered Glass component• Aluminium component• Other materials component <p>Components are applicable for Lumon's products:</p> <ul style="list-style-type: none">• Lumon Glazing Retractable• Lumon Glazing Sliding• Lumon Railing• Lumon Post Railing• Lumon Roof VT3• Lumon Roof VT4
Place(s) of production	Kouvola, Finland

EPD INFORMATION

Construction products EPDs 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	Building Information Foundation, RTS, Malminkatu 16 A, 00100 Helsinki, Finland
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. RTS PCR 2020
EPD author	Natalia Pennanen, Anni Viitala, Granlund Oy, Malminkaari 21, 00701 Helsinki, Finland
EPD verification	Independent verification of this EPD and data, according to ISO 14025: External verification
Verification date	7.9.2023
EPD verifier	Heini Koutonen, Nordic Offset Oy

	Keilaniementie 1, 02150 Espoo, Finland
RTS EPD number	RTS_257_23
Publishing date	3.10.2023 (revision 30.06.2025)
Components valid for product EPD until	3.10.2026
Reference product EPD results valid until	3.10.2028

EPD VERIFICATION REPORT

Verified according to the requirements of EN 15804:2019 and RTS PCR 2020	
Independent verification of the declaration, according to ISO14025:2010	
<input type="checkbox"/>	Internal
<input checked="" type="checkbox"/>	External
<p>Third party verifier:</p> <p><i>Heini Koutonen</i></p> <p>Heini Koutonen Senior Consultant, Nordic Offset Oy 7.9.2023</p>	

PRODUCT INFORMATION

PRODUCT DESCRIPTION

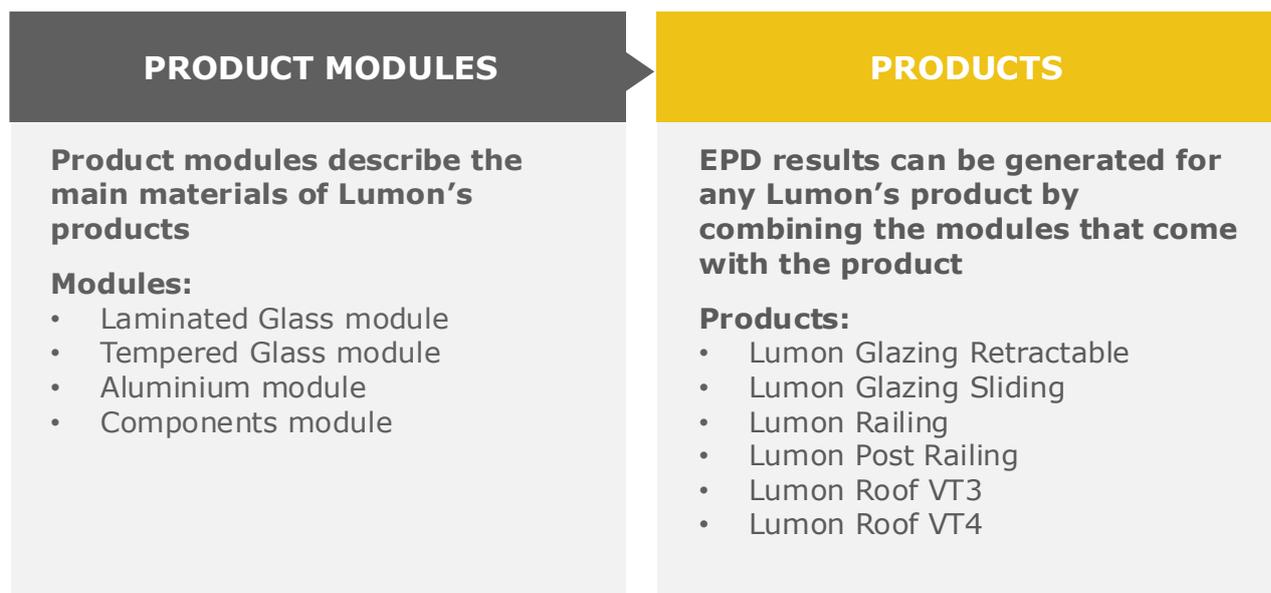
The product portfolio of Lumon covers multiple product families and individual products, with numerous product variations available depending on the target and customer's needs. The EPD has been developed based on the principle of modularity, allowing for the creation of EPD results for any Lumon's product using the main materials or components included in the products.

This EPD creating method provides high coverage and adaptability to different product variants for Lumon Oy's customers.

The studied product components are:

- Laminated Glass component
- Tempered Glass component
- Aluminium component
- Other materials component

The products that are covered by the components are presented below



EPD Creating method; Modular approach.

General description: Balcony, Façade and terrace products

Commercial labels:

- Lumon Glazing Retractable
- Lumon Glazing Sliding
- Lumon Railing
- Lumon Post Railing
- Lumon Roof VT3
- Lumon Roof VT4

PRODUCT APPLICATION

Glass products are used for balcony and terrace enclosures. The products are suitable for all types of buildings.

LUMON GLAZING RETRACTABLE

The frameless glazing system is inward and outward opening and upper bearing, that is developed for use worldwide on balconies and terraces. The system consists of an upper and a lower aluminum profile which are mounted to the balcony ceiling and on handrail or floor. Toughened glass panes, with glass beads top and bottom, are mounted between the upper and lower profiles. The glass panes slide and fold open with the help of roller bearings and hinge components that are fixed to each glazing bead. Vertical and lateral silicone and rubber sealing profiles are used to cover gaps and openings between the glazing system and the surrounding structures to ensure sufficient water, wind and sound proofing.

The Lumon Glazing Retractable has two strength classes; normal and strong. The normal strength is used in conventional conditions and low glazings, as the strong version of the glazing with stronger components are for challenging conditions and high glazings. The selection between normal and strong is automatic and made by the functional calculation.

Glass: 6, 8, 10 or 12 mm tempered glass.

A locking groove is milled to the top and bottom of the glass to ensure a fail-proof connection between the glass and the glass bead in addition to the adhesively bonded connection.

EAD and ETA

European Assessment Document: EAD 020002-00-0404 January 2016 European. Technical Assessment: ETA 21/0677 of 09/08/2021

LUMON GLAZING SLIDING

A balcony and terrace glazing system with sliding glasses that scales according to the space, demands of the conditions, and customer needs. The frameless glazing system has glasses that slide interleadingly and is lower bearing, that is developed for use worldwide on balconies and terraces. The system consists of an upper and a lower aluminum profile which are mounted to the balcony ceiling and on handrail or floor. Toughened glass panes, with glass beads on the bottom, are mounted between the upper and lower profiles. The glass panes slide open with the help of roller bearing components that are fixed to each glazing bead. Vertical and lateral silicone and rubber sealing profiles are used to cover gaps and openings between the glazing system and the surrounding structures to ensure sufficient water, wind and sound proofing.

EAD and ETA

European Assessment Document: EAD 020002-00-0404 January 2016. European Technical Assessment: ETA 21/1100 of 11/01/2022

LUMON RAILING

The fastening method of the railing is based on horizontal stabilization. A horizontally stabilized railing is fastened from the ends of the handrail to the balcony walls. This structure is the load bearing one. The lower glass frame is attached with a lighter fastening since the load bearing capacity needed is minimal. The handrail can be strengthened with support posts. The amount of support posts needed depends on environmental conditions on site and local regulations. The railing element is either installed on the front edge of the slab, on top of the slab or on the side of the slab. The lower glass frame also works as a fastener, no additional brackets are needed. The cladding is always on the outside of the supporting posts.

LUMON POST RAILING

The fastening method of the post railing is based on the mast attachment method. The distance between railing posts depends on loading caused by local conditions, properties of the railing posts and attachment methods. The typical distance between railing posts is 800...1500 mm. The railing element is either installed on the front edge of the slab with hatbrackets or on top of the slab with pedestals. The slab thickness must be between 160-300mm. The amount of posts needed is depends on environmental conditions on site and local regulations. The cladding can be either on the out- or inside of the posts. Even double claddings are possible.

LUMON ROOF VT3

Key features of Lumon roof VT3:

- Made of high-quality aluminium for durability and resistance to weather conditions.
- Consists of frameworks, roof, side-eaves, and glazings.
- Front posts are 90×90 mm, rear posts are 50×90 mm, and the middle post is 90×90 mm for dividing the glazing.
- Maximum size of roof glass is 900×4495 mm, and for deeper roofs, two glass panes with an extension seal are used for waterproofing.
- Gable glasses are always 2-part 6 mm toughened glass for extra strength and safety.
- Includes a rain gutter as standard, with drainpipes and snow guards as optional add-ons.

LUMON ROOF VT4

Key features of Lumon roof VT4:

- The roof framework is made of durable aluminium and includes a reinforced front beam and posts (70×70 mm or 90×90 mm).
- Glazing is available throughout the roof, with a middle post dividing it into sections. Continuous glazing is also possible using a 70×70 mm post.
- Fixed end glazing is not possible if the side overhang exceeds 70 mm, but a fixed wall can be installed instead.

- The roof glass is clear or coloured toughened glass, with a maximum size of 900×4495 mm. For deeper roofs, two glass panes are used with an extension seal for waterproofing.
- Gable glasses are always 2-part 6 mm toughened glass.
- Rain gutters are included in standard delivery, with drainpipes and snow guards as optional extras.

PRODUCT RAW MATERIAL COMPOSITION AND TECHNICAL INFORMATION

Main substances of the products are presented in table below presenting raw materials of components per 1 kg of each component.

MAIN MATERIALS OF LAMINATED GLASS COMPONENT

Laminated glass component	Mass per 1 kg (%)
Laminated glass	100 %
Total mass of materials	1 kg

MAIN MATERIALS OF TEMPERED GLASS COMPONENT

Tempered glass component	Mass per 1 kg (%)
Float glass	100 %
Total mass of materials	1 kg

MAIN MATERIALS OF ALUMINIUM COMPONENT

Aluminium component	Mass per 1 kg (%)
Aluminium	100 %
Total mass of materials	1 kg

MAIN MATERIALS OF OTHER MATERIALS COMPONENT

Other materials component	Mass per 1 kg (%)
Plastic	44 %
Steel	34 %
Silicone	3 %
Other	<1 %
Total mass of materials	1 kg

PACKAGING MATERIAL COMPOSITION AND TECHNICAL INFORMATION

MAIN PACKAGING MATERIALS PER PRODUCT

Main packaging materials of products per 1 kg of product are presented in table below.

Packaging material	% of weight
Cardboard	5,4 %
Wood	83,7 %
Plastic	5,3 %
Polystyrene	0,05 %
Paper	5,5 %

SUBSTANCES, REACH - VERY HIGH CONCERN

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

LIFE-CYCLE ASSESSMENT

LIFE-CYCLE ASSESSMENT INFORMATION

Period for data	1 year, 2022
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DECLARED UNIT

Declared unit	1 kg per component (1 unit per reference product)
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Mass per declared unit	The studied product components are listed below:
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- Laminated Glass component 1 kg
- Tempered glass component 1 kg
- Aluminium component 1 kg
- Components component 1 kg

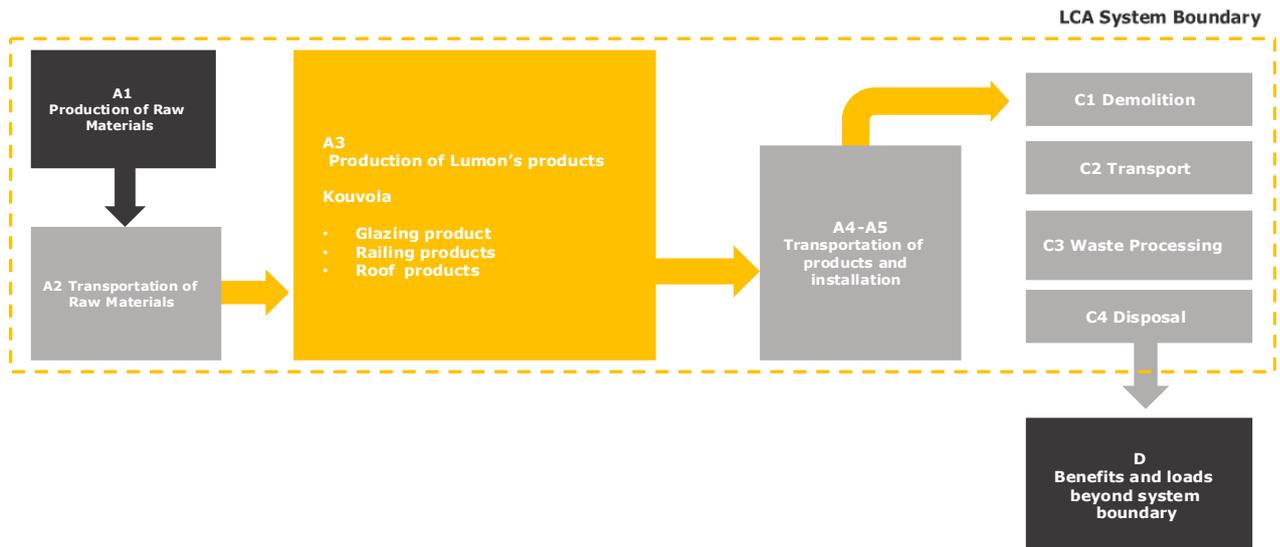
Components are applicable for Lumon's products:

- Lumon Glazing Retractable
- Lumon Glazing Sliding
- Lumon Railing
- Lumon Post Railing
- Lumon Roof VT3
- Lumon Roof VT4

Declaration covers	This declaration covers the life cycle stages from cradle to gate with options (A4 and A5), components C1–C4, and component D
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SYSTEM BOUNDARY

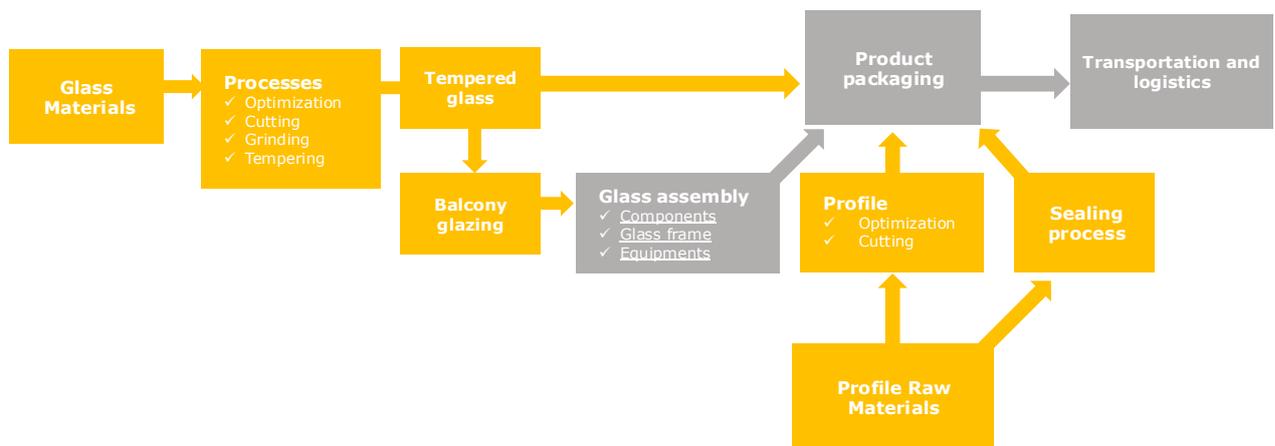
Studied system covers the following steps of life cycle according to EN 15804: **A1** Raw material supply, **A2** Transport, **A3** Manufacturing, **A4** Transportation of the product to construction site, **A5** Installation to building, **C1** Deconstruction, **C2** Transportation of end-of-life **C3** Waste processing and **C4** Disposal. In addition, the benefits and loads beyond the system boundary of stage **D** consist of product reuse, recovery and recycling. System boundary describing the system boundary and the input and output flows is shown below:



LCA System Boundary of studied products

End of waste point of the studied product is the step when material is used as fuel in an incineration plant or recycled material is handled in the collection and sorting plant. **End of waste point of the waste flows** in A3 component is the step when materials are collected and handled in the sorting plant. **End of waste point of the packaging materials** collected for recycling in A5 component is the point when materials are collected and handled in the sorting plant. **The end of waste point of the recycled steel and aluminium** raw material that is used in the product was assumed to be after scrap collection, sorting and preparation. Processing of scrap in production was considered to be part of next life cycle and included to the system boundaries of the studied product.

Production stage (A3) on the Lumon's production site cover following manufacturing processes; raw material supply (Glass, aluminium, other metals, rubber and plastics), glass processing, assembly components and framing, profile processing: cutting and optimization, packaging the final product. After that, products will be transported to the client. The production processes of studied products are presented in following Figure.



The production processes of studied products

Studied system covers the following steps of life cycle according to EN 1580

Product Stage			Construction Process Stage		Use Stage							End-of-Life Stage				Benefits and loads beyond the system boundary			
Raw material supply	Transport	Manufacturing	Transport to building	Installation to building	Use/applications	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demoli	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D	
Included			X	X	X	x							X	X	X	X	X	X	X
Relevancy			R	R	R	R	NR	NR	NR	NR	NR	NR	R	R	R	R	R	R	R

	Mandatory
	Mandatory as per the RTS PCR section 6.2.1 rules and terms
	Optional components based on scenarios

The study does not omit any life cycle stages, processes or data needs that are mandatory according to EN 15804 and RTS PCR. The study excludes following life cycle stages which are optional according to EN 15804 and RTS PCR.

- B1 Use
- B2 Maintenance
- B3 Repairs
- B4 Replacement
- B5 Refurbishment
- B6 Operational energy use
- B7 Operational water use

CUT-OFF CRITERIA

This study follows the cut-off criteria stated in RTS PCR and EN 15804 -standard. This study does not exclude any components or processes which represent more than 1 % of the emissions of studied life cycle stage. The study does not exclude any hazardous materials or substances.

Excluded processes and the criteria for exclusion are given in following table. Machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

Process excluded from study	Cut-off criteria	Quantified contribution from process
B1-B7, use stage	Not mandatory according to the RTS instructions	-

ALLOCATION, ESTIMATES AND ASSUMPTIONS

Allocation rules used are made according to the ISO14044:2006. Allocation is avoided when possible and when necessary, allocation is made based on physical shares and also avoiding double calculations. Allocation is required if the production process produces more than one product and the flows of materials, energy and waste cannot be separately measured for the studied product. Allocation used in generic data sources follow the requirements of the EN 15804 -standard. It should be noticed that the allocation method 'allocation, cut-off by classification' has been used for Ecoinvent 3.8 data, which complies with EN 15804. Avoiding allocation could not be avoided for following inputs as the information was only measured on factory process level.

- Electricity consumption, heat production, transport fuels: only measured on factory level.
- Energy-, mixed-, bio-, wood-, aluminium-, mixed metal-, cardboard-, plastic-, glass-, hazardous-, construction waste: only measured on factory level.
- Water use: only measured on factory level.
- Ancillary materials; fluids, sandblasting sand and nitrogen: only measured on factory level.
- Packaging materials: only measured on factory level.

The inputs were allocated to studied product based on production volume (mass in kilograms).

According to EN 15804, flows leaving the system at the end-of-waste boundary of the product stage (A1-A3) are allocated as co-products. According to EN 15804, process that has a very low contribution to the overall revenue may be neglected in co-product allocation. Materials sent for recycling or energy recovery from manufacturing were not allocated, as it was estimated that their contribution to the overall revenue is very marginal. No other allocations were made in this assessment.

KEY ASSUMPTIONS

The scenarios included are currently in use and are representative for one of the most likely scenario alternatives.

A1 Raw Materials: It is assumed that aluminium contains 25 % recycled aluminium raw material. Recycled content of steel raw material was assumed to be 35% for stainless steel and 20 % for other steel products. (SYKE 2023)

A5 Installation to building: It can be assumed that there are no significant environmental impacts (energy or water use) caused by installation phase.

C1-4 End-of-life scenario was assumed based on the common practises of construction products (SYKE 2023). The material flows at the end of life were assumed to be following:

- C1: Deconstruction/demolition: It was assumed that materials are collected separately for recycling in the end-of-life stage. It can be assumed that there are no significant environmental impacts caused by demolition phase and hence it is not declared.
- C2: Transportation distance 75 km road driving by lorry (SYKE 2023).
- C3-4: It was assumed that products are collected, and the materials are separated.
 - Metals waste to material recycling
 - Glass to material recycling (30 %) and to final disposal (70 %)
 - Plastics and rubber components to energy recovery
 - Silicone and hazardous waste to final disposal.

It was assumed that 5 % of recyclable or recoverable materials end up as material loss.

Component D: covers the net benefits and loads arising from the reuse of products or the recycling or recovery of energy from end-of-waste state materials.

- Recovery: when a product is incinerated at its end-of-life and the produced heat is recovered, the benefits can include avoiding the production of energy.
 - Net calorific value as received of the construction waste was assumed to be 1,59 kWh/kg and efficiency of heat and power co-generation was 90 %.
- Recycling: Benefits from the recycling of metal materials were included to the assessment. Only share of virgin raw materials in the product composition were included to the component D.
 - Glass: Benefits from avoided primary glass in foam glass production due to the recycling of glass at end of life was included.
 - Metal: Benefits from avoided primary metal production due to the recycling of materials end of life was included.

VALIDATION OF DATA

The quality requirements for the life cycle assessment were set according to the EN ISO 14044 standard (4.2.3.6) and EN 15804 standard (6.3.7).

This LCA study follows the standard EN 15804:2012+A2:2019 and RTS PCR and no decisions are made based on the values.

PROCEDURED FOR COLLECTION PROCESS SPECIFIC DATA

Production specific data was collected directly from manufacturer's production plant. The data represents the production of the studied product at the plant from the materials transported to the facility and represents 1 year average. The data represents year 2021, which was the latest year with full year data. All gathered data was used without excluding categories in advance following the system boundaries set in earlier chapters.

CRITERIA FOR CHOOSING THE GENERIC DATA

Generic data that was used for upstream and downstream processes represents complementary data from Ecoinvent 3.8 database.

The datasets were chosen to represent the studied system as closely as possible. When available supplier specific information was used for instance in form of EN 15804 EPDs or emissions profile of local energy supplier. When supplier specific information was not available the information sources were chosen based on their technical and geographical representativeness. Only when country specific or European data has not been available has global level data been used (concerns mainly data from ecoinvent 3.8)

As up-to-date data as possible was chosen and no more than five-year-old for producer specific data and ten years for generic data was used.

ENVIRONMENTAL IMPACT DATA

INSTRUCTION FOR GENERATING EPD RESULTS OF COMPONENT PRODUCTS

The product portfolio of Lumon covers multiple product families and individual products, with numerous product variations available depending on the target and customer's needs. The EPD has been developed based on the principle of modularity, allowing for the creation of EPD results for any Lumon's product using the main materials or components included in the products.

The studied product components are listed below:

- Laminated Glass component
- Tempered glass component
- Aluminium component
- Other materials component

The mass data of materials used in the installed products are available from Lumon. Additionally, EPD provides information on reference products that can be utilized when specific product choices have not been made.

ENVIRONMENTAL IMPACT DATA, COMPONENTS

LAMINATED GLASS COMPONENT, 1 KG PER COMPONENT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	1,26E+00	1,55E-2	3,97E-1	0,00E+00	7,04E-3	1,45E-3	3,69E-3	-1,36E-1
GWP – fossil	kg CO ₂ e	1,65E+00	1,55E-2	6,36E-3	0,00E+00	7,04E-3	1,44E-3	3,69E-3	-1,35E-1
GWP – biogenic	kg CO ₂ e	-3,91E-1	0,00E+00	3,91E-1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-6,21E-4
GWP – LULUC	kg CO ₂ e	5,84E-3	5,57E-6	5,68E-6	0,00E+00	2,6E-6	1,83E-6	3,48E-6	-2,26E-4
Ozone depletion pot.	kg CFC-11e	1,94E-7	3,7E-9	5,58E-10	0,00E+00	1,62E-9	2,84E-10	1,49E-9	-3,5E-9
Acidification potential	mol H ⁺ e	8,09E-3	6,47E-5	2,56E-5	0,00E+00	2,98E-5	1,02E-5	3,47E-5	-7E-4
EP-freshwater ³⁾	kg Pe	1,29E-5	1,06E-7	2,07E-7	0,00E+00	5,76E-8	6,13E-8	3,86E-8	-5,69E-6
EP-marine	kg Ne	1,87E-3	1,96E-5	7,42E-6	0,00E+00	8,86E-6	3,04E-6	1,2E-5	-1,03E-4
EP-terrestrial	mol Ne	2,3E-2	2,16E-4	7,92E-5	0,00E+00	9,77E-5	3,36E-5	1,32E-4	-1,61E-3
POCP (“smog”)	kg NMVOCe	5,75E-3	6,94E-5	2,21E-5	0,00E+00	3,13E-5	9,57E-6	3,84E-5	-2,95E-4
ADP-minerals & metals	kg Sbe	6,47E-6	3,64E-8	2,24E-8	0,00E+00	1,65E-8	7,65E-9	8,47E-9	-1,74E-6
ADP-fossil resources	MJ	2,55E+01	2,37E-1	6,85E-2	0,00E+00	1,06E-1	2,87E-2	1,01E-1	-1,15E0
Water use ²⁾	m ³ e depr.	1,01E+00	1,09E-3	2,97E-3	0,00E+00	4,73E-4	3,68E-4	3,21E-4	-5,95E-2

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	4,07E+00	3,07E-03	6,59E-03	0,00E+00	1,19E-03	2,25E-03	8,78E-04	-1.47E-01
Renew. PER as material	MJ	2,02E+00	0,00E+00	-2,02E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0.00E+00
Total use of renew. PER	MJ	6,09E+00	3,07E-03	-2,01E+00	0,00E+00	1,19E-03	2,25E-03	8,78E-04	-1.47E-01
Non-re. PER as energy	MJ	2,43E+01	2,37E-01	4,47E-02	0,00E+00	1,06E-01	2,87E-02	1,01E-01	-1.15E+00
Non-re. PER as material	MJ	4,23E-01	0,00E+00	-4,23E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0.00E+00
Total use of non-ren. PER	MJ	2,48E+01	2,37E-01	-3,78E-01	0,00E+00	1,06E-01	2,87E-02	1,01E-01	-1.15E+00
Secondary materials	kg	3,98E-2	6,68E-5	6,72E-5	0,00E+00	2,94E-5	9,75E-6	2,12E-5	-1.47E-01
Renew. secondary fuels	MJ	7,29E-3	5,89E-7	5,09E-7	0,00E+00	2,96E-7	2,05E-7	5,55E-7	-3,89E-5
Non-ren. 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
Use of net fresh water	m ³	2,25E-2	3,15E-5	5,52E-5	0,00E+00	1,37E-5	2,28E-5	1,11E-4	-1,51E-3

1)PER = primary energy resources; Non-ren = Non renewable

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	6,48E-1	2,54E-4	2,89E-4	0,00E+00	1,4E-4	0,00E+00	0,00E+00	-7,88E-3
Non-hazardous waste	kg	5,51E-1	4,42E-3	3,47E-2	0,00E+00	2,3E-3	0,00E+00	7E-1	-2,01E-1
Radioactive waste	kg	3,82E-4	1,63E-6	4,26E-7	0,00E+00	7,07E-7	0,00E+00	0,00E+00	-3,51E-6

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	1,37E-2	0,00E+00						
Materials for recycling	kg	2,82E-1	0,00E+00	2,28E-1	0,00E+00	0,00E+00	3E-1	0,00E+00	0,00E+00
Materials for energy recycling	kg	1,721E-2	0,00E+00	1E-4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00							

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	0,066 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

TEMPERED GLASS COMPONENT, 1 KG PER COMPONENT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	1,54E+00	1,55E-2	3,97E-1	0,00E+00	7,04E-3	1,45E-3	3,69E-3	-1,13E-1
GWP – fossil	kg CO ₂ e	1,91E+00	1,55E-2	6,36E-3	0,00E+00	7,04E-3	1,44E-3	3,69E-3	-1,12E-1
GWP – biogenic	kg CO ₂ e	-3,91E-1	0,00E+00	3,91E-1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-5,18E-4
GWP – LULUC	kg CO ₂ e	7,2E-3	5,57E-6	5,68E-6	0,00E+00	2,6E-6	1,83E-6	3,48E-6	-1,88E-4
Ozone depletion pot.	kg CFC ₁₁ e	1,58E-7	3,7E-9	5,58E-10	0,00E+00	1,62E-9	2,84E-10	1,49E-9	-2,92E-9
Acidification potential	mol H ⁺ e	1,25E-2	6,47E-5	2,56E-5	0,00E+00	2,98E-5	1,02E-5	3,47E-5	-5,84E-4
EP-freshwater ³⁾	kg Pe	2,75E-5	1,06E-7	2,07E-7	0,00E+00	5,76E-8	6,13E-8	3,86E-8	-4,74E-6
EP-marine	kg Ne	2,26E-3	1,96E-5	7,42E-6	0,00E+00	8,86E-6	3,04E-6	1,2E-5	-8,61E-5
EP-terrestrial	mol Ne	2,78E-2	2,16E-4	7,92E-5	0,00E+00	9,77E-5	3,36E-5	1,32E-4	-1,34E-3
POCP (“smog”)	kg NMVOCe	6,81E-3	6,94E-5	2,21E-5	0,00E+00	3,13E-5	9,57E-6	3,84E-5	-2,46E-4
ADP-minerals & metals	kg Sbe	2,68E-5	3,64E-8	2,24E-8	0,00E+00	1,65E-8	7,65E-9	8,47E-9	-1,45E-6
ADP-fossil resources	MJ	2,88E+01	2,37E-1	6,85E-2	0,00E+00	1,06E-1	2,87E-2	1,01E-1	-9,59E-1
Water use ²⁾	m ³ e depr.	7,81E-1	1,09E-3	2,97E-3	0,00E+00	4,73E-4	3,68E-4	3,21E-4	-4,96E-2

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	5,44E+00	3,07E-03	6,59E-03	0,00E+00	1,19E-03	2,25E-03	8,78E-04	-1,22E-01
Renew. PER as material	MJ	2,02E+00	0,00E+00	-2,02E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	7,46E+00	3,07E-03	-2,01E+00	0,00E+00	1,19E-03	2,25E-03	8,78E-04	-1,22E-01
Non-re. PER as energy	MJ	2,71E+01	2,37E-01	4,47E-02	0,00E+00	1,06E-01	2,87E-02	1,01E-01	-9,60E-01
Non-re. PER as material	MJ	4,23E-01	0,00E+00	-4,23E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	2,75E+01	2,37E-01	-3,78E-01	0,00E+00	1,06E-01	2,87E-02	1,01E-01	-9,60E-01
Secondary materials	kg	9,1E-2	6,68E-5	6,72E-5	0,00E+00	2,94E-5	9,75E-6	2,12E-5	2,03E-1
Renew. secondary fuels	MJ	4,07E-3	5,89E-7	5,09E-7	0,00E+00	2,96E-7	2,05E-7	5,55E-7	-3,25E-5
Non-ren. secondary fuels	MJ	3,02E-13	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	m ³	2,12E-2	3,15E-5	5,52E-5	0,00E+00	1,37E-5	2,28E-5	1,11E-4	-1,26E-3

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	3,82E-1	2,54E-4	2,89E-4	0,00E+00	1,4E-4	0,00E+00	0,00E+00	-6,56E-3
Non-hazardous waste	kg	1,03E+00	4,42E-3	3,47E-2	0,00E+00	2,3E-3	0,00E+00	7E-1	-1,68E-1
Radioactive waste	kg	3,27E-4	1,63E-6	4,26E-7	0,00E+00	7,07E-7	0,00E+00	0,00E+00	-2,92E-6

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	6,48E-3	0,00E+00						
Materials for recycling	kg	1,99E-1	0,00E+00	2,28E-1	0,00E+00	0,00E+00	3E-1	0,00E+00	0,00E+00
Materials for energy rec	kg	1,721E-2	0,00E+00	1E-4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	2,04E-3	0,00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	0,066 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

ALUMINIUM COMPONENT, 1 KG PER COMPONENT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	7,31E+00	2,7E-2	3,97E-1	0,00E+00	7,04E-3	2,09E-2	5,29E-4	-4,58E0
GWP – fossil	kg CO ₂ e	7,64E+00	2,7E-2	6,36E-3	0,00E+00	7,04E-3	2,08E-2	5,26E-4	-4,44E0
GWP – biogenic	kg CO ₂ e	-3,91E-1	0,00E+00	3,91E-1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	-2,4E-2
GWP – LULUC	kg CO ₂ e	6,43E-2	1,09E-5	5,68E-6	0,00E+00	2,6E-6	2,73E-5	5,33E-7	-1,12E-1
Ozone depletion pot.	kg CFC ₁₁ e	6,76E-7	6,01E-9	5,58E-10	0,00E+00	1,62E-9	2,57E-9	1,6E-10	-4,67E-7
Acidification potential	mol H ⁺ e	3,88E-2	1,12E-4	2,56E-5	0,00E+00	2,98E-5	2,64E-4	4,44E-6	-2,94E-2
EP-freshwater ³⁾	kg Pe	4,49E-3	2,23E-7	2,07E-7	0,00E+00	5,76E-8	1,12E-6	8,17E-9	-2,36E-4
EP-marine	kg Ne	4,85E-3	3,28E-5	7,42E-6	0,00E+00	8,86E-6	5,58E-5	1,52E-6	-3,14E-3
EP-terrestrial	mol Ne	4,99E-2	3,62E-4	7,92E-5	0,00E+00	9,77E-5	6,45E-4	1,67E-5	-3,46E-2
POCP (“smog”)	kg NMVOCe	2,2E-2	1,11E-4	2,21E-5	0,00E+00	3,13E-5	1,77E-4	4,82E-6	-1,32E-2
ADP-minerals & metals	kg Sbe	2,45E-5	9,07E-8	2,24E-8	0,00E+00	1,65E-8	2,8E-6	1,77E-9	-7,68E-6
ADP-fossil resources	MJ	9,52E+01	3,93E-1	6,85E-2	0,00E+00	1,06E-1	2,82E-1	1,22E-2	-6,81E1
Water use ²⁾	m ³ e depr.	1,37E+06	1,73E-3	2,97E-3	0,00E+00	4,73E-4	5,47E-3	7,09E-5	-9,24E0

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	4,77E+01	4,66E-03	6,59E-03	0,00E+00	1,19E-03	5,00E-02	2,11E-04	-2,89E+01
Renew. PER as material	MJ	2,02E+00	0,00E+00	-2,02E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	4,97E+01	4,66E-03	-2,01E+00	0,00E+00	1,19E-03	5,00E-02	2,11E-04	-2,89E+01
Non-re. PER as energy	MJ	1,31E+02	3,93E-01	4,47E-02	0,00E+00	1,06E-01	2,82E-01	1,22E-02	-6,82E+01
Non-re. PER as material	MJ	4,23E-01	0,00E+00	-4,23E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of non-re. PER	MJ	1,31E+02	3,93E-01	-3,78E-01	0,00E+00	1,06E-01	2,82E-01	1,22E-02	-6,82E+01
Secondary materials	kg	1,15E-1	1,27E-4	6,72E-5	0,00E+00	2,94E-5	3,14E-4	4,38E-6	5,97E-1
Renew. secondary fuels	MJ	9,81E-3	1,6E-6	5,09E-7	0,00E+00	2,96E-7	1,63E-5	1,68E-7	-1,88E-4
Non-ren. secondary fuels	MJ	2,21E-2	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	m ³	1,37E+00	4,71E-5	5,52E-5	0,00E+00	1,37E-5	1,65E-4	1,31E-5	-2,05E-1

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	4,72E-1	5,5E-4	2,89E-4	0,00E+00	1,4E-4	0,00E+00	0,00E+00	-1,15E0
Non-hazardous waste	kg	3,79E+00	8,85E-3	3,47E-2	0,00E+00	2,3E-3	0,00E+00	5E-2	-1,07E1
Radioactive waste	kg	1,19E-3	2,61E-6	4,26E-7	0,00E+00	7,07E-7	0,00E+00	0,00E+00	-4,39E-4

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00							
Materials for recycling	kg	1,87E-1	0,00E+00	2,28E-1	0,00E+00	0,00E+00	9,5E-1	0,00E+00	0,00E+00
Materials for energy rec	kg	1,721E-2	0,00E+00	1E-4	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy	MJ	5,82E-3	0,00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	0,066 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

OTHER MATERIALS COMPONENT, 1 KG PER COMPONENT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	4,46E+00	1,55E-2	3,97E-1	0,00E+00	7,04E-3	7,8E-1	1,75E-2	-4,09E-1
GWP – fossil	kg CO ₂ e	4,85E+00	1,55E-2	6,36E-3	0,00E+00	7,04E-3	7,8E-1	1,75E-2	-4,09E-1
GWP – biogenic	kg CO ₂ e	-3,91E-1	0,00E+00	3,91E-1	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,59E-4
GWP – LULUC	kg CO ₂ e	4,46E-3	5,57E-6	5,68E-6	0,00E+00	2,6E-6	1,53E-5	2,46E-6	-7,72E-5
Ozone depletion pot.	kg CFC ₁₁ e	4,04E-7	3,7E-9	5,58E-10	0,00E+00	1,62E-9	2,95E-9	6,81E-10	-2,39E-8
Acidification potential	mol H ⁺ e	2,06E-2	6,47E-5	2,56E-5	0,00E+00	2,98E-5	2,4E-4	2,55E-5	-4,85E-3
EP-freshwater ³⁾	kg Pe	6,74E-5	1,06E-7	2,07E-7	0,00E+00	5,76E-8	5,37E-7	4,77E-8	-1,27E-5
EP-marine	kg Ne	4,62E-3	1,96E-5	7,42E-6	0,00E+00	8,86E-6	8,76E-5	9,53E-6	-2,92E-4
EP-terrestrial	mol Ne	4,42E-2	2,16E-4	7,92E-5	0,00E+00	9,77E-5	9,24E-4	1,02E-4	-3,49E-3
POCP (“smog”)	kg NMVOCe	8,93E-3	6,94E-5	2,21E-5	0,00E+00	3,13E-5	2,71E-4	2,79E-5	-1,66E-3
ADP-minerals & metals	kg Sbe	1,04E-5	3,64E-8	2,24E-8	0,00E+00	1,65E-8	1,05E-6	1,05E-8	-4,57E-5
ADP-fossil resources	MJ	2,66E+01	2,37E-1	6,85E-2	0,00E+00	1,06E-1	2,67E-1	5,29E-2	-4,33E0
Water use ²⁾	m ³ e depr.	1,48E+00	1,09E-3	2,97E-3	0,00E+00	4,73E-4	2,34E-2	2,34E-3	-5,79E-2

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	9,19E+00	3,04E-03	6,89E-03	0,00E+00	1,33E-03	2,11E-02	1,06E-03	-2,02E-01
Renew. PER as material	MJ	2,02E+00	0,00E+00	-2,02E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Total use of renew. PER	MJ	1,12E+01	3,04E-03	-2,01E+00	0,00E+00	1,33E-03	2,11E-02	1,06E-03	-2,02E-01
Non-re. PER as energy	MJ	4,64E+01	2,41E-01	6,88E-02	0,00E+00	1,06E-01	2,67E-01	5,29E-02	-4,33E+00
Non-re. PER as material	MJ	1,55E+01	0,00E+00	-4,23E-01	0,00E+00	0,00E+00	-1,25E+01	-2,56E+00	0,00E+00
Total use of non-re. PER	MJ	6,19E+01	2,41E-01	-3,54E-01	0,00E+00	1,06E-01	-1,22E+01	-2,51E+00	-4,33E+00
Secondary materials	kg	3,26E-1	6,68E-5	6,72E-5	0,00E+00	2,94E-5	2,51E-4	2,68E-5	8,24E-2
Renew. secondary fuels	MJ	1,11E-3	5,89E-7	5,09E-7	0,00E+00	2,96E-7	7,02E-6	8,12E-7	-3,53E-5
Non-ren. 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
Use of net fresh water	m ³	8,34E-2	3,15E-5	5,52E-5	0,00E+00	1,37E-5	1,66E-4	8,17E-5	-1,86E-3

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	9,61E-2	2,54E-4	2,89E-4	0,00E+00	1,4E-4	0,00E+00	0,00E+00	-1,03E-1
Non-hazardous waste	kg	1,70E+00	4,42E-3	3,47E-2	0,00E+00	2,3E-3	0,00E+00	2,1E-1	-8,38E-1
Radioactive waste	kg	4,83E-4	1,63E-6	4,26E-7	0,00E+00	7,07E-7	0,00E+00	0,00E+00	-1,24E-6

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	0,00E+00							
Materials for recycling	kg	4,65E-3	0,00E+00	2,28E-1	0,00E+00	0,00E+00	3,43E-1	0,00E+00	0,00E+00
Materials for energy rec	kg	1,721E-2	0,00E+00	1E-4	0,00E+00	0,00E+00	4,4E-1	0,00E+00	0,00E+00
Exported energy	MJ	0,00E+00							

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	0,066 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

ENVIRONMENTAL IMPACT DATA, REFERENCE PRODUCTS

LUMON GLAZING RETRACTABLE (DEPTH 1700 MM – WIDTH 3500 MM – HEIGHT 1760 MM, 8 PANES, GLASS THICKNESS 6MM)

RESULTS OF 1 UNIT PER REFERENCE PRODUCT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	4.00E+02	2.67E+00	6.04E+01	0.00E+00	1.07E+00	3.56E+00	5.27E-01	-1.38E+02
GWP – fossil	kg CO ₂ e	4.55E+02	2.67E+00	9.68E-01	0.00E+00	1.07E+00	3.55E+00	5.27E-01	-1.34E+02
GWP – biogenic	kg CO ₂ e	-5.95E+01	0.00E+00	5.95E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-7.07E-01
GWP – LULUC	kg CO ₂ e	2.62E+00	9.91E-04	8.65E-04	0.00E+00	3.96E-04	1.01E-03	4.47E-04	-3.03E+00
Ozone depletion pot.	kg CFC ₁₁ e	3.88E-05	6.25E-07	8.49E-08	0.00E+00	2.47E-07	1.14E-07	1.88E-07	-1.30E-05
Acidification potential	mol H ⁺ e	2.64E+00	1.11E-02	3.90E-03	0.00E+00	4.54E-03	9.20E-03	4.44E-03	-8.78E-01
EP-freshwater ³⁾	kg Pe	1.24E-01	1.93E-05	3.15E-05	0.00E+00	8.77E-06	3.95E-05	5.09E-06	-6.96E-03
EP-marine	kg Ne	4.22E-01	3.34E-03	1.13E-03	0.00E+00	1.35E-03	2.18E-03	1.54E-03	-9.58E-02
EP-terrestrial	mol Ne	4.88E+00	3.68E-02	1.21E-02	0.00E+00	1.49E-02	2.47E-02	1.69E-02	-1.10E+00
POCP (“smog”)	kg NMVOCe	1.45E+00	1.17E-02	3.36E-03	0.00E+00	4.76E-03	6.90E-03	4.91E-03	-3.90E-01
ADP-minerals & metals	kg Sbe	3.96E-03	7.00E-06	3.41E-06	0.00E+00	2.51E-06	7.99E-05	1.12E-06	-5.48E-04
ADP-fossil resources	MJ	6.16E+03	4.03E+01	1.04E+01	0.00E+00	1.61E+01	1.20E+01	1.28E+01	-1.96E+03
Water use ²⁾	m ³ e depr.	3.68E+07	1.83E-01	4.52E-01	0.00E+00	7.20E-02	2.76E-01	4.94E-02	-2.54E+02

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	1.98E+03	5.10E-01	1.00E+00	0.00E+00	1.81E-01	1.69E+00	1.16E-01	-7.91E+02
Renew. PER as material	MJ	3.07E+02	0.00E+00	-3.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ	2.28E+03	5.10E-01	-3.06E+02	0.00E+00	1.81E-01	1.69E+00	1.16E-01	-7.91E+02
Non-re. PER as energy	MJ	6.98E+03	4.03E+01	6.80E+00	0.00E+00	1.61E+01	1.20E+01	1.28E+01	-1.96E+03
Non-re. PER as material	MJ	1.19E+02	0.00E+00	-6.44E+01	0.00E+00	0.00E+00	-4.52E+01	-9.25E+00	0.00E+00
Total use of non-re. PER	MJ	7.09E+03	4.03E+01	-5.75E+01	0.00E+00	1.61E+01	-3.30E+01	3.56E+00	-1.96E+03
Secondary materials	kg	1.53E+01	1.18E-02	1.02E-02	0.00E+00	4.47E-03	1.05E-02	2.80E-03	4.10E+01
Renew. secondary fuels	MJ	7.63E-01	1.17E-04	7.75E-05	0.00E+00	4.51E-05	4.88E-04	7.50E-05	-9.13E-03
Non-ren. secondary fuels	MJ	5.93E-01	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	m ³	3.97E+01	5.21E-03	8.40E-03	0.00E+00	2.09E-03	7.81E-03	1.42E-02	-5.66E+00

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	5.95E+01	4.66E-02	4.40E-02	0.00E+00	2.13E-02	0.00E+00	0.00E+00	-3.20E+01
Non-hazardous waste	kg	2.33E+02	7.92E-01	5.28E+00	0.00E+00	3.50E-01	0.00E+00	8.73E+01	-3.11E+02
Radioactive waste	kg	7.35E-02	2.74E-04	6.48E-05	0.00E+00	1.08E-04	0.00E+00	0.00E+00	-1.21E-02

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	7.89E-01	0.00E+00						
Materials for recycling	kg	2.93E+01	0.00E+00	3.47E+01	0.00E+00	0.00E+00	6.33E+01	0.00E+00	0.00E+00
Materials for energy rec	kg	2.62E+00	0.00E+00	1.52E-02	0.00E+00	0.00E+00	1.59E+00	0.00E+00	0.00E+00
Exported energy	MJ	4.05E-01	0.00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	10 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

LUMON GLAZING SLIDING (DEPTH 4000 MM - WIDTH 2120 MM – HEIGHT 2500 MM, 8 PANES, GLASS THICKNESS 8 MM)

RESULTS OF 1 UNIT PER REFERENCE PRODUCT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	6.74E+02	5.35E+00	1.29E+02	0.00E+00	2.28E+00	3.68E+00	1.15E+00	-1.65E+02
GWP – fossil	kg CO ₂ e	7.92E+02	5.35E+00	2.06E+00	0.00E+00	2.28E+00	3.68E+00	1.15E+00	-1.60E+02
GWP – biogenic	kg CO ₂ e	-1.27E+02	0.00E+00	1.27E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-8.33E-01
GWP – LULUC	kg CO ₂ e	3.95E+00	1.96E-03	1.84E-03	0.00E+00	8.43E-04	1.36E-03	1.04E-03	-3.24E+00
Ozone depletion pot.	kg CFC-11e	6.68E-05	1.27E-06	1.81E-07	0.00E+00	5.25E-07	1.66E-07	4.43E-07	-1.42E-05
Acidification potential	mol H ⁺ e	4.83E+00	2.23E-02	8.30E-03	0.00E+00	9.67E-03	1.13E-02	1.04E-02	-1.02E+00
EP-freshwater ³⁾	kg Pe	1.36E-01	3.77E-05	6.71E-05	0.00E+00	1.87E-05	5.16E-05	1.17E-05	-8.14E-03
EP-marine	kg Ne	8.15E-01	6.73E-03	2.41E-03	0.00E+00	2.87E-03	2.78E-03	3.59E-03	-1.15E-01
EP-terrestrial	mol Ne	9.70E+00	7.42E-02	2.57E-02	0.00E+00	3.17E-02	3.13E-02	3.94E-02	-1.39E+00
POCP (“smog”)	kg NMVOCe	2.65E+00	2.37E-02	7.17E-03	0.00E+00	1.02E-02	8.76E-03	1.15E-02	-4.53E-01
ADP-minerals & metals	kg Sbe	8.57E-03	1.33E-05	7.27E-06	0.00E+00	5.35E-06	8.54E-05	2.56E-06	-7.99E-04
ADP-fossil resources	MJ	1.12E+04	8.13E+01	2.22E+01	0.00E+00	3.44E+01	1.73E+01	3.01E+01	-2.23E+03
Water use ²⁾	m ³ e depr.	3.90E+07	3.72E-01	9.63E-01	0.00E+00	1.53E-01	3.43E-01	1.04E-01	-2.77E+02

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	2.98E+03	1.04E+00	2.14E+00	0.00E+00	3.86E-01	2.15E+00	2.66E-01	-8.58E+02
Renew. PER as material	MJ	6.55E+02	0.00E+00	-6.55E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ	3.63E+03	1.04E+00	-6.52E+02	0.00E+00	3.86E-01	2.15E+00	2.66E-01	-8.58E+02
Non-re. PER as energy	MJ	1.18E+04	8.13E+01	1.45E+01	0.00E+00	3.44E+01	1.73E+01	3.01E+01	-2.23E+03
Non-re. PER as material	MJ	1.89E+02	0.00E+00	-1.37E+02	0.00E+00	0.00E+00	-4.27E+01	-8.75E+00	0.00E+00
Total use of non-re. PER	MJ	1.20E+04	8.13E+01	-1.23E+02	0.00E+00	3.44E+01	-2.53E+01	2.13E+01	-2.23E+03
Secondary materials	kg	3.10E+01	2.34E-02	2.18E-02	0.00E+00	9.54E-03	1.26E-02	6.42E-03	7.66E+01
Renew. secondary fuels	MJ	1.47E+00	2.20E-04	1.65E-04	0.00E+00	9.60E-05	5.47E-04	1.70E-04	-1.50E-02
Non-ren. secondary fuels	MJ	6.28E-01	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	m ³	4.54E+01	1.07E-02	1.79E-02	0.00E+00	4.44E-03	1.19E-02	3.31E-02	-6.20E+00

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	1.25E+02	9.08E-02	9.37E-02	0.00E+00	4.54E-02	0.00E+00	0.00E+00	-3.50E+01
Non-hazardous waste	kg	4.15E+02	1.56E+00	1.13E+01	0.00E+00	7.46E-01	0.00E+00	2.07E+02	-3.56E+02
Radioactive waste	kg	1.31E-01	5.57E-04	1.38E-04	0.00E+00	2.29E-04	0.00E+00	0.00E+00	-1.33E-02

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	1.90E+00	0.00E+00						
Materials for recycling	kg	6.35E+01	0.00E+00	7.39E+01	0.00E+00	0.00E+00	1.16E+02	0.00E+00	0.00E+00
Materials for energy rec	kg	5.58E+00	0.00E+00	3.24E-02	0.00E+00	0.00E+00	1.50E+00	0.00E+00	0.00E+00
Exported energy	MJ	7.62E-01	0.00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	21,4 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

LUMON RAILING (WIDTH 2790 MM - HEIGHT 1100 MM)

RESULTS OF 1 UNIT PER REFERENCE PRODUCT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	2.52E+02	1.40E+00	2.84E+01	0.00E+00	5.03E-01	2.20E+00	2.11E-01	-1.24E+02
GWP – fossil	kg CO ₂ e	2.78E+02	1.40E+00	4.54E-01	0.00E+00	5.03E-01	2.20E+00	2.11E-01	-1.21E+02
GWP – biogenic	kg CO ₂ e	-2.79E+01	0.00E+00	2.79E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.42E-01
GWP – LULUC	kg CO ₂ e	1.91E+00	5.35E-04	4.06E-04	0.00E+00	1.86E-04	8.11E-04	1.71E-04	-2.88E+00
Ozone depletion pot.	kg CFC-11e	2.66E-05	3.24E-07	3.99E-08	0.00E+00	1.16E-07	8.44E-08	7.07E-08	-1.22E-05
Acidification potential	mol H ⁺ e	1.39E+00	5.83E-03	1.83E-03	0.00E+00	2.13E-03	7.71E-03	1.68E-03	-7.94E-01
EP-freshwater ³⁾	kg Pe	1.16E-01	1.06E-05	1.48E-05	0.00E+00	4.11E-06	3.25E-05	2.00E-06	-6.33E-03
EP-marine	kg Ne	2.16E-01	1.74E-03	5.30E-04	0.00E+00	6.33E-04	1.74E-03	5.84E-04	-8.56E-02
EP-terrestrial	mol Ne	2.38E+00	1.92E-02	5.66E-03	0.00E+00	6.98E-03	1.99E-02	6.41E-03	-9.65E-01
POCP (“smog”)	kg NMVOCe	8.34E-01	6.02E-03	1.58E-03	0.00E+00	2.24E-03	5.51E-03	1.86E-03	-3.55E-01
ADP-minerals & metals	kg Sbe	9.33E-04	3.99E-06	1.60E-06	0.00E+00	1.18E-06	7.43E-05	4.37E-07	-3.67E-04
ADP-fossil resources	MJ	3.61E+03	2.09E+01	4.89E+00	0.00E+00	7.57E+00	9.03E+00	4.84E+00	-1.81E+03
Water use ²⁾	m ³ e depr.	3.51E+07	9.43E-02	2.12E-01	0.00E+00	3.38E-02	2.04E-01	2.07E-02	-2.40E+02

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	1.42E+03	2.60E-01	4.71E-01	0.00E+00	8.53E-02	1.42E+00	4.60E-02	-7.48E+02
Renew. PER as material	MJ	1.44E+02	0.00E+00	-1.44E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ	1.56E+03	2.60E-01	-1.44E+02	0.00E+00	8.53E-02	1.42E+00	4.60E-02	-7.48E+02
Non-re. PER as energy	MJ	4.52E+03	2.09E+01	3.24E+00	0.00E+00	7.57E+00	9.03E+00	4.84E+00	-1.81E+03
Non-re. PER as material	MJ	6.11E+01	0.00E+00	-3.02E+01	0.00E+00	0.00E+00	-2.56E+01	-5.25E+00	0.00E+00
Total use of non-re. PER	MJ	4.57E+03	2.09E+01	-2.70E+01	0.00E+00	7.57E+00	-1.65E+01	-4.14E-01	-1.81E+03
Secondary materials	kg	5.36E+00	6.32E-03	4.80E-03	0.00E+00	2.10E-03	8.99E-03	1.09E-03	2.62E+01
Renew. secondary fuels	MJ	5.73E-01	6.80E-05	3.64E-05	0.00E+00	2.11E-05	4.41E-04	3.03E-05	-6.59E-03
Non-ren. secondary fuels	MJ	5.67E-01	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	m ³	3.63E+01	2.65E-03	3.94E-03	0.00E+00	9.79E-04	5.57E-03	5.36E-03	-5.33E+00

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	4.06E+01	2.57E-02	2.06E-02	0.00E+00	1.00E-02	0.00E+00	0.00E+00	-3.00E+01
Non-hazardous waste	kg	1.25E+02	4.29E-01	2.48E+00	0.00E+00	1.64E-01	0.00E+00	3.23E+01	-2.85E+02
Radioactive waste	kg	4.82E-02	1.42E-04	3.04E-05	0.00E+00	5.05E-05	0.00E+00	0.00E+00	-1.14E-02

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	5.99E-01	0.00E+00						
Materials for recycling	kg	1.71E+01	0.00E+00	1.63E+01	0.00E+00	0.00E+00	3.82E+01	0.00E+00	0.00E+00
Materials for energy rec	kg	1.23E+00	0.00E+00	7.14E-03	0.00E+00	0.00E+00	9.02E-01	0.00E+00	0.00E+00
Exported energy	MJ	1.49E-01	0.00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	4,7 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

LUMON POST RAILING (WIDTH 2200 MM – HEIGHT 1100 MM)

RESULTS OF 1 UNIT PER REFERENCE PRODUCT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	2.81E+02	1.87E+00	4.08E+01	0.00E+00	7.24E-01	1.78E+00	3.23E-01	-1.22E+02
GWP – fossil	kg CO ₂ e	3.20E+02	1.87E+00	6.54E-01	0.00E+00	7.24E-01	1.77E+00	3.23E-01	-1.19E+02
GWP – biogenic	kg CO ₂ e	-4.02E+01	0.00E+00	4.02E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-6.30E-01
GWP – LULUC	kg CO ₂ e	2.02E+00	7.02E-04	5.84E-04	0.00E+00	2.67E-04	8.26E-04	2.85E-04	-2.74E+00
Ozone depletion pot.	kg CFC-11e	3.20E-05	4.37E-07	5.74E-08	0.00E+00	1.67E-07	8.87E-08	1.20E-07	-1.16E-05
Acidification potential	mol H ⁺ e	1.60E+00	7.80E-03	2.63E-03	0.00E+00	3.06E-03	7.55E-03	2.82E-03	-7.75E-01
EP-freshwater ³⁾	kg Pe	1.10E-01	1.37E-05	2.13E-05	0.00E+00	5.92E-06	3.27E-05	3.24E-06	-6.19E-03
EP-marine	kg Ne	2.69E-01	2.34E-03	7.63E-04	0.00E+00	9.11E-04	1.72E-03	9.76E-04	-8.46E-02
EP-terrestrial	mol Ne	3.05E+00	2.58E-02	8.15E-03	0.00E+00	1.00E-02	1.96E-02	1.07E-02	-9.69E-01
POCP (“smog”)	kg NMVOCe	9.91E-01	8.15E-03	2.27E-03	0.00E+00	3.22E-03	5.44E-03	3.12E-03	-3.46E-01
ADP-minerals & metals	kg Sbe	1.11E-03	5.06E-06	2.30E-06	0.00E+00	1.70E-06	7.01E-05	7.12E-07	-3.88E-04
ADP-fossil resources	MJ	4.32E+03	2.82E+01	7.05E+00	0.00E+00	1.09E+01	9.45E+00	8.16E+00	-1.75E+03
Water use ²⁾	m ³ e depr.	3.33E+07	1.28E-01	3.05E-01	0.00E+00	4.86E-02	1.96E-01	2.99E-02	-2.29E+02

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	1.49E+03	3.54E-01	6.78E-01	0.00E+00	1.23E-01	1.42E+00	7.44E-02	-7.13E+02
Renew. PER as material	MJ	2.08E+02	0.00E+00	-2.08E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ	1.69E+03	3.54E-01	-2.07E+02	0.00E+00	1.23E-01	1.42E+00	7.44E-02	-7.13E+02
Non-re. PER as energy	MJ	5.12E+03	2.82E+01	4.63E+00	0.00E+00	1.09E+01	9.45E+00	8.16E+00	-1.75E+03
Non-re. PER as material	MJ	6.59E+01	0.00E+00	-4.35E+01	0.00E+00	0.00E+00	-1.86E+01	-3.80E+00	0.00E+00
Total use of non-re. PER	MJ	5.18E+03	2.82E+01	-3.88E+01	0.00E+00	1.09E+01	-9.05E+00	4.36E+00	-1.75E+03
Secondary materials	kg	6.34E+00	8.33E-03	6.91E-03	0.00E+00	3.02E-03	8.75E-03	1.78E-03	3.34E+01
Renew. secondary fuels	MJ	8.02E-01	8.51E-05	5.24E-05	0.00E+00	3.04E-05	4.22E-04	4.81E-05	-7.61E-03
Non-ren. secondary fuels	MJ	5.36E-01	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	m ³	3.51E+01	3.62E-03	5.68E-03	0.00E+00	1.41E-03	6.01E-03	9.00E-03	-5.10E+00

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	6.16E+01	3.33E-02	2.97E-02	0.00E+00	1.44E-02	0.00E+00	0.00E+00	-2.87E+01
Non-hazardous waste	kg	1.37E+02	5.62E-01	3.57E+00	0.00E+00	2.37E-01	0.00E+00	5.55E+01	-2.76E+02
Radioactive waste	kg	5.91E-02	1.91E-04	4.38E-05	0.00E+00	7.27E-05	0.00E+00	0.00E+00	-1.09E-02

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	1.06E+00	0.00E+00						
Materials for recycling	kg	2.63E+01	0.00E+00	2.34E+01	0.00E+00	0.00E+00	4.67E+01	0.00E+00	0.00E+00
Materials for energy rec	kg	1.77E+00	0.00E+00	1.03E-02	0.00E+00	0.00E+00	6.53E-01	0.00E+00	0.00E+00
Exported energy	MJ	1.41E-01	0.00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	6,8 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

LUMON ROOF VT3 (DEPTH 5000 MM – WIDTH 4000 MM /HEIGHT 2100 MM/2950 MM)

RESULTS OF 1 UNIT PER REFERENCE PRODUCT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	5.27E+03	2.41E+01	4.40E+02	0.00E+00	7.81E+00	3.82E+01	2.63E+00	-2.82E+03
GWP – fossil	kg CO ₂ e	5.66E+03	2.41E+01	7.05E+00	0.00E+00	7.81E+00	3.82E+01	2.63E+00	-2.74E+03
GWP – biogenic	kg CO ₂ e	-4.34E+02	0.00E+00	4.34E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.47E+01
GWP – LULUC	kg CO ₂ e	4.22E+01	9.38E-03	6.30E-03	0.00E+00	2.88E-03	1.78E-02	2.05E-03	-6.75E+01
Ozone depletion pot.	kg CFC-11e	4.95E-04	5.49E-06	6.19E-07	0.00E+00	1.80E-06	1.78E-06	8.26E-07	-2.83E-04
Acidification potential	mol H ⁺ e	2.99E+01	1.00E-01	2.84E-02	0.00E+00	3.30E-02	1.71E-01	2.00E-02	-1.81E+01
EP-freshwater ³⁾	kg Pe	2.72E+00	1.88E-04	2.30E-04	0.00E+00	6.39E-05	7.20E-04	2.48E-05	-1.45E-01
EP-marine	kg Ne	4.14E+00	2.97E-02	8.23E-03	0.00E+00	9.83E-03	3.78E-02	6.92E-03	-1.94E+00
EP-terrestrial	mol Ne	4.46E+01	3.27E-01	8.78E-02	0.00E+00	1.08E-01	4.34E-01	7.61E-02	-2.16E+01
POCP (“smog”)	kg NMVOCe	1.68E+01	1.02E-01	2.45E-02	0.00E+00	3.47E-02	1.20E-01	2.20E-02	-8.11E+00
ADP-minerals & metals	kg Sbe	2.78E-02	7.30E-05	2.48E-05	0.00E+00	1.83E-05	1.72E-03	5.43E-06	-6.77E-03
ADP-fossil resources	MJ	7.18E+04	3.57E+02	7.60E+01	0.00E+00	1.18E+02	1.92E+02	5.70E+01	-4.16E+04
Water use ²⁾	m ³ e depr.	8.24E+08	1.59E+00	3.29E+00	0.00E+00	5.25E-01	4.21E+00	2.70E-01	-5.58E+03

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	3.16E+04	4.36E+00	7.32E+00	0.00E+00	1.32E+00	3.18E+01	5.78E-01	-1.75E+04
Renew. PER as material	MJ	2.24E+03	0.00E+00	-2.24E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ	3.38E+04	4.36E+00	-2.23E+03	0.00E+00	1.32E+00	3.18E+01	5.78E-01	-1.75E+04
Non-re. PER as energy	MJ	9.32E+04	3.57E+02	5.03E+01	0.00E+00	1.18E+02	1.92E+02	5.70E+01	-4.16E+04
Non-re. PER as material	MJ	9.52E+02	0.00E+00	-4.69E+02	0.00E+00	0.00E+00	-4.00E+02	-8.19E+01	0.00E+00
Total use of non-re. PER	MJ	9.39E+04	3.57E+02	-4.18E+02	0.00E+00	1.18E+02	-2.07E+02	-2.50E+01	-4.16E+04
Secondary materials	kg	1.23E+02	1.10E-01	7.45E-02	0.00E+00	3.26E-02	2.02E-01	1.36E-02	4.58E+02
Renew. secondary fuels	MJ	7.87E+00	1.26E-03	5.64E-04	0.00E+00	3.28E-04	1.01E-02	3.91E-04	-1.30E-01
Non-ren. secondary fuels	MJ	1.33E+01	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	m ³	8.37E+02	4.43E-02	6.12E-02	0.00E+00	1.52E-02	1.15E-01	6.33E-02	-1.24E+02

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	4.69E+02	4.60E-01	3.20E-01	0.00E+00	1.55E-01	0.00E+00	0.00E+00	-6.98E+02
Non-hazardous waste	kg	2.82E+03	7.57E+00	3.85E+01	0.00E+00	2.55E+00	0.00E+00	3.70E+02	-6.54E+03
Radioactive waste	kg	8.87E-01	2.40E-03	4.72E-04	0.00E+00	7.84E-04	0.00E+00	0.00E+00	-2.66E-01

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	3.08E+00	0.00E+00						
Materials for recycling	kg	2.07E+02	0.00E+00	2.53E+02	0.00E+00	0.00E+00	7.25E+02	0.00E+00	0.00E+00
Materials for energy rec	kg	1.91E+01	0.00E+00	1.11E-01	0.00E+00	0.00E+00	1.41E+01	0.00E+00	0.00E+00
Exported energy	MJ	4.47E+00	0.00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	73,2 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

LUMON ROOF VT4 (DEPTH 4150 MM – WIDTH 2000 MM – HEIGHT 2200 MM / 2800 MM)

RESULTS OF 1 UNIT PER REFERENCE PRODUCT

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP – total	kg CO ₂ e	1.43E+03	7.40E+00	1.44E+02	0.00E+00	2.56E+00	1.40E+01	1.04E+00	-7.37E+02
GWP – fossil	kg CO ₂ e	1.56E+03	7.40E+00	2.31E+00	0.00E+00	2.56E+00	1.39E+01	1.04E+00	-7.15E+02
GWP – biogenic	kg CO ₂ e	-1.42E+02	0.00E+00	1.42E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.81E+00
GWP – LULUC	kg CO ₂ e	1.11E+01	2.85E-03	2.07E-03	0.00E+00	9.45E-04	4.76E-03	7.98E-04	-1.73E+01
Ozone depletion pot.	kg CFC-11e	1.47E-04	1.70E-06	2.03E-07	0.00E+00	5.89E-07	4.91E-07	3.26E-07	-7.28E-05
Acidification potential	mol H ⁺ e	7.83E+00	3.08E-02	9.31E-03	0.00E+00	1.08E-02	4.58E-02	7.84E-03	-4.72E+00
EP-freshwater ³⁾	kg Pe	6.94E-01	5.65E-05	7.53E-05	0.00E+00	2.09E-05	1.91E-04	9.48E-06	-3.76E-02
EP-marine	kg Ne	1.18E+00	9.16E-03	2.70E-03	0.00E+00	3.22E-03	1.04E-02	2.72E-03	-5.07E-01
EP-terrestrial	mol Ne	1.28E+01	1.01E-01	2.88E-02	0.00E+00	3.55E-02	1.18E-01	2.99E-02	-5.68E+00
POCP (“smog”)	kg NMVOCe	4.63E+00	3.16E-02	8.04E-03	0.00E+00	1.14E-02	3.27E-02	8.66E-03	-2.11E+00
ADP-minerals & metals	kg Sbe	5.18E-03	2.16E-05	8.14E-06	0.00E+00	6.00E-06	4.46E-04	2.08E-06	-2.14E-03
ADP-fossil resources	MJ	2.00E+04	1.10E+02	2.49E+01	0.00E+00	3.85E+01	5.26E+01	2.24E+01	-1.08E+04
Water use ²⁾	m ³ e depr.	2.11E+08	4.95E-01	1.08E+00	0.00E+00	1.72E-01	1.23E+00	1.05E-01	-1.43E+03

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.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Renew. PER as energy	MJ	8.26E+03	1.36E+00	2.40E+00	0.00E+00	4.35E-01	8.41E+00	2.19E-01	-4.48E+03
Renew. PER as material	MJ	7.34E+02	0.00E+00	-7.34E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renew. PER	MJ	8.99E+03	1.36E+00	-7.31E+02	0.00E+00	4.35E-01	8.41E+00	2.19E-01	-4.48E+03
Non-re. PER as energy	MJ	2.55E+04	1.10E+02	1.66E+01	0.00E+00	3.85E+01	5.26E+01	2.24E+01	-1.08E+04
Non-re. PER as material	MJ	3.56E+02	0.00E+00	-1.54E+02	0.00E+00	0.00E+00	-1.68E+02	-3.43E+01	0.00E+00
Total use of non-re. PER	MJ	2.58E+04	1.10E+02	-1.37E+02	0.00E+00	3.85E+01	-1.14E+02	-1.19E+01	-1.08E+04
Secondary materials	kg	2.99E+01	3.35E-02	2.44E-02	0.00E+00	1.07E-02	5.36E-02	5.20E-03	1.41E+02
Renew. secondary fuels	MJ	2.96E+00	3.70E-04	1.85E-04	0.00E+00	1.08E-04	2.64E-03	1.46E-04	-3.70E-02
Non-ren. secondary fuels	MJ	3.40E+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	m ³	2.16E+02	1.39E-02	2.01E-02	0.00E+00	4.98E-03	3.21E-02	2.49E-02	-3.19E+01

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	2.01E+02	1.38E-01	1.05E-01	0.00E+00	5.09E-02	0.00E+00	0.00E+00	-1.80E+02
Non-hazardous waste	kg	7.14E+02	2.29E+00	1.26E+01	0.00E+00	8.36E-01	0.00E+00	1.48E+02	-1.70E+03
Radioactive waste	kg	2.65E-01	7.43E-04	1.55E-04	0.00E+00	2.57E-04	0.00E+00	0.00E+00	-6.82E-02

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Components for re-use	kg	2.69E+00	0.00E+00						
Materials for recycling	kg	8.42E+01	0.00E+00	8.29E+01	0.00E+00	0.00E+00	2.10E+02	0.00E+00	0.00E+00
Materials for energy rec	kg	6.26E+00	0.00E+00	3.64E-02	0.00E+00	0.00E+00	5.90E+00	0.00E+00	0.00E+00
Exported energy	MJ	8.95E-01	0.00E+00						

BIOGENIC CARBON CONTENT

Product's biogenic carbon content at the factory gate

Biogenic carbon content	Unit (expressed per functional unit or per declared unit)
Biogenic carbon content in product	0 kg
Biogenic carbon content in accompanying packaging	24,0 kg

NOTE 1 kg biogenic carbon is equivalent to 44/12 kg of CO₂.

SCENARIO DOCUMENTATION

Manufacturing energy scenario documentation

Energy type	Object	GWP value	Data quality	Representativeness
Electricity	Electricity data quality and CO ₂ emission kg CO ₂ eq. / kWh	0.26 kg CO ₂ e / kWh	Market for electricity, medium voltage (Reference product: electricity, medium voltage) EN15804+A1, EN15804+A2, Finland, 2021. Ecoinvent 3.8.	The processes included in the data set are well representative for the geography (Finland)
District heat	District heating data quality and CO ₂ emissions kg CO ₂ eq. / kWh	0.196 kg CO ₂ e / kWh	Heat production, natural gas, at industrial furnace Heat production, light fuel oil, at industrial furnace 1MW Heat production, softwood chips from forest. Heat production, untreated waste wood, at furnace 1000-5000 kW EN15804+A1, EN15804+A2, Europe.2021. Ecoinvent 3.8.	The processes included in the data set are representative for the geography (Finland / Europe)

Transportation scenario

Parameter	Value
Fuel type and consumption of vehicle used for transport	Truck: diesel, maximum load capacity 34 t. Specific transport emissions 0,064 kg CO ₂ equiv. / tn x km
Distance (km)	Average transport distance 139 km
Capacity utilization (%)	100 % for truck
Density of transported products (kg/m ³)	Density varies depending on the mass and size of the product type
Volume capacity utilization factor	1

Installation of the product in the building

The masses of the packaging materials of products are shown on page 6.

Parameter	Unit
Ancillary materials for installation (specified by material)	Disposable gloves, (not included in the analysis because of their insignificant usage amount)
Water use	0 m ³
Other resource use	0 kWh (energy use is insignificant)
Quantitative description of energy type (regional mix) and consumption during the installation process	
Waste materials generated by product installation	Packaging materials per 1 kg of product Polystyrene 0,00048 kg Plastic 0,06 kg Cardboard 0,06 kg Wood 0,89 kg Paper 0,00026 kg

End-of-life scenario

End-of-life description for Tempered glass component

Tempered glass component			
		Material	Mass
Process flow			
Collection process specified by type	kg collected separately		1 kg
	kg collected with mixed construction waste		
Recovery system specified by type	kg for reuse		
	kg for recycling	Glass products	0,3 kg
	kg for energy recovery		
Disposal specified by type	kg material for final deposition	Glass product	0,7 kg
Assumptions for scenario development	units as appropriate	Waste materials are transported 75 km by truck to recycling facility with a truck capacity utilization of 45%	

End-of-life description for Laminated glass component

Laminated glass component			
		Material	Mass
Process flow			
Collection process specified by type	kg collected separately		1 kg
	kg collected with mixed construction waste		
Recovery system specified by type	kg for reuse		
	kg for recycling	Laminated glass	0,3 kg
	kg for energy recovery		-
Disposal specified by type	kg material for final deposition	Laminated glass	0,7 kg
Assumptions for scenario development	units as appropriate	Waste materials are transported 75 km by truck to recycling facility with a truck capacity utilization of 45%	

End-of-life description for Aluminium component

Aluminium component			
		Material	Mass
Process flow			
Collection process specified by type	kg collected separately		1 kg
	kg collected with mixed construction waste		
Recovery system specified by type	kg for reuse		
	kg for recycling		0,95 kg
	kg for energy recovery		-
Disposal specified by type	kg material for final deposition		0,05 kg
Assumptions for scenario development	units as appropriate	Waste materials are transported 75 km by truck to recycling facility with a truck capacity utilization of 45%	

End-of-life description for other materials component

Other materials component			
		Material	Mass
Process flow			
Collection process specified by type	kg collected separately		1 kg
	kg collected with mixed construction waste		
Recovery system specified by type	kg for reuse		
	kg for recycling	Brass	0,002 kg
		Steel	0,34 kg
		Copper	0,000043 kg
Mixed metal		0,00062 kg	
	kg for energy recovery	Plastic	0,44 kg
Disposal specified by type	kg material for final deposition	Silicone Rubber	0,18 kg 0,03 kg
Assumptions for scenario development	units as appropriate	Waste materials are transported 75 km by truck to recycling facility with a truck capacity utilization of 45%	

BIBLIOGRAPHY

- 1 ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.
- 2 ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.
- 3 ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.
- 4 Ecoinvent database v3.8 (2021)
- 5 EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
- 6 EPD Background Report
- 7 Emissions database for construction, Finnish Environmental Institute, 2023. Available at: <https://co2data.fi/>

REVISION HISTORY

30.06.2025

- Text corrections
- Valid until 03.10.2023-03.10.2026
- PERM and PENRM results updated/corrected

ANNEX 1: EPD RESULTS BY RTS PCR REQUIREMENTS

LAMINATED GLASS COMPONENT

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential total	kg CO2e /kg	1.26E+00	1.55E-02	3.97E-01	0.00E+00	7.04E-03	1.45E-03	3.69E-03	-1.36E-01
Abiotic depletion potential (ADP-elements) for non fossil resources	kg Sbe / kg	6.47E-06	3.64E-08	2.24E-08	0.00E+00	1.65E-08	7.65E-09	8.47E-09	-1.74E-06
Abiotic depletion potential (ADP-fossil fuels) for fossil resources (+A2)	MJ / kg	2.55E+01	2.37E-01	6.85E-02	0.00E+00	1.06E-01	2.87E-02	1.01E-01	-1.15E+00
Water use	m3e depr. / kg	1.01E+00	1.09E-03	2.97E-03	0.00E+00	4.73E-04	3.68E-04	3.21E-04	-5.95E-02
Use of secondary materials	kg / kg	3.98E-02	6.68E-05	6.72E-05	0.00E+00	2.94E-05	9.75E-06	2.12E-05	2.44E-01
Biogenic carbon content in product	kg C / kg	0,00E+00	N/A						

TEMPERED GLASS COMPONENT

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential total	kg CO2e /kg	1.54E+00	1.55E-02	3.97E-01	0.00E+00	7.04E-03	1.45E-03	3.69E-03	-1.13E-01
Abiotic depletion potential (ADP-elements) for non fossil resources	kg Sbe / kg	2.68E-05	3.64E-08	2.24E-08	0.00E+00	1.65E-08	7.65E-09	8.47E-09	-1.45E-06
Abiotic depletion potential (ADP-fossil fuels) for fossil resources (+A2)	MJ / kg	2.88E+01	2.37E-01	6.85E-02	0.00E+00	1.06E-01	2.87E-02	1.01E-01	-9.59E-01
Water use	m3e depr. / kg	7.81E-01	1.09E-03	2.97E-03	0.00E+00	4.73E-04	3.68E-04	3.21E-04	-4.96E-02
Use of secondary materials	kg / kg	9.10E-02	6.68E-05	6.72E-05	0.00E+00	2.94E-05	9.75E-06	2.12E-05	2.03E-01
Biogenic carbon content in product	kg C / kg	0,00E+00	N/A						

ALUMINIUM COMPONENT

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential total	kg CO2e /kg	7.31E+00	2.70E-02	3.97E-01	0.00E+00	7.04E-03	2.09E-02	5.29E-04	-4.58E+00
Abiotic depletion potential (ADP-elements) for non fossil resources	kg Sbe / kg	2.45E-05	9.07E-08	2.24E-08	0.00E+00	1.65E-08	2.80E-06	1.77E-09	-7.68E-06
Abiotic depletion potential (ADP-fossil fuels) for fossil resources (+A2)	MJ / kg	9.52E+01	3.93E-01	6.85E-02	0.00E+00	1.06E-01	2.82E-01	1.22E-02	-6.81E+01
Water use	m3e depr. / kg	1.37E+06	1.73E-03	2.97E-03	0.00E+00	4.73E-04	5.47E-03	7.09E-05	-9.24E+00
Use of secondary materials	kg / kg	1.15E-01	1.27E-04	6.72E-05	0.00E+00	2.94E-05	3.14E-04	4.38E-06	5.97E-01
Biogenic carbon content in product	kg C / kg	0,00E+00	N/A						

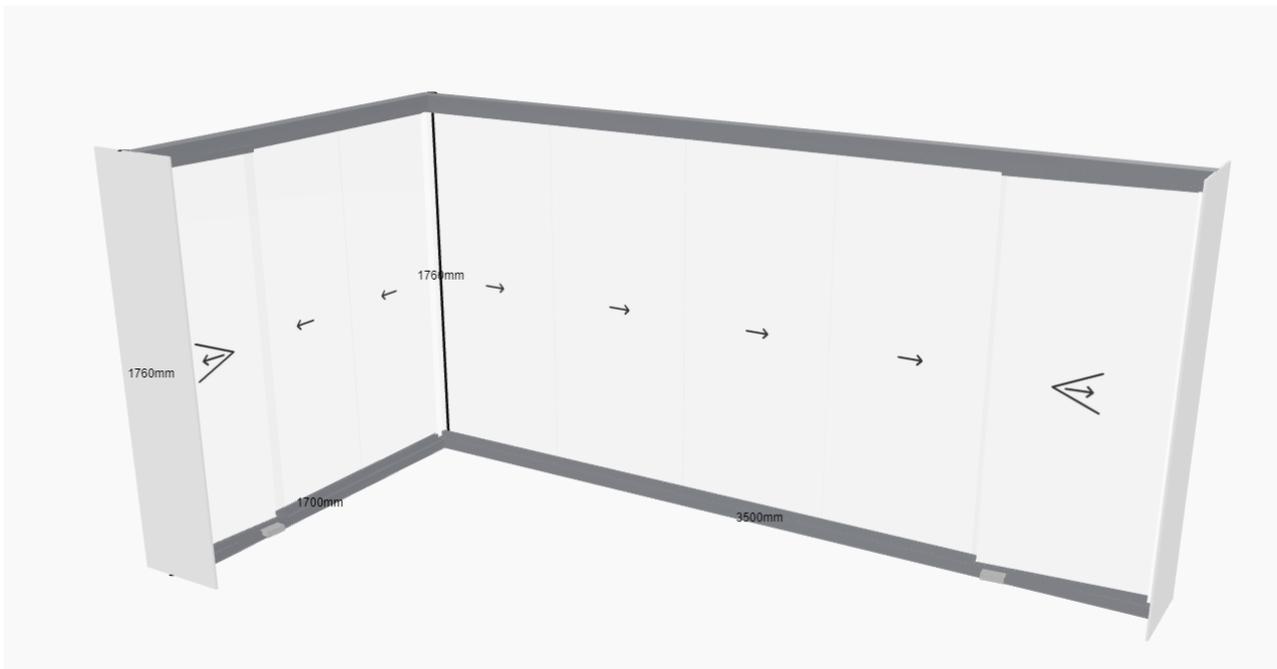
OTHER MATERIALS COMPONENT

Impact category	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential total	kg CO2e /kg	4.46E+00	1.55E-02	3.97E-01	0.00E+00	7.04E-03	7.80E-01	1.75E-02	-4.09E-01
Abiotic depletion potential (ADP-elements) for non fossil resources	kg Sbe / kg	1.04E-05	3.64E-08	2.24E-08	0.00E+00	1.65E-08	1.05E-06	1.05E-08	-4.57E-05
Abiotic depletion potential (ADP-fossil fuels) for fossil resources (+A2)	MJ / kg	2.66E+01	2.37E-01	6.85E-02	0.00E+00	1.06E-01	2.67E-01	5.29E-02	-4.33E+00
Water use	m3e depr. / kg	1.48E+00	1.09E-03	2.97E-03	0.00E+00	4.73E-04	2.34E-02	2.34E-03	-5.79E-02
Use of secondary materials	kg / kg	3.26E-01	6.68E-05	6.72E-05	0.00E+00	2.94E-05	2.51E-04	2.68E-05	8.24E-02
Biogenic carbon content in product	kg C / kg	0,00E+00	N/A						

ANNEX 2: REFERENCE PRODUCTS DESCRIPTION

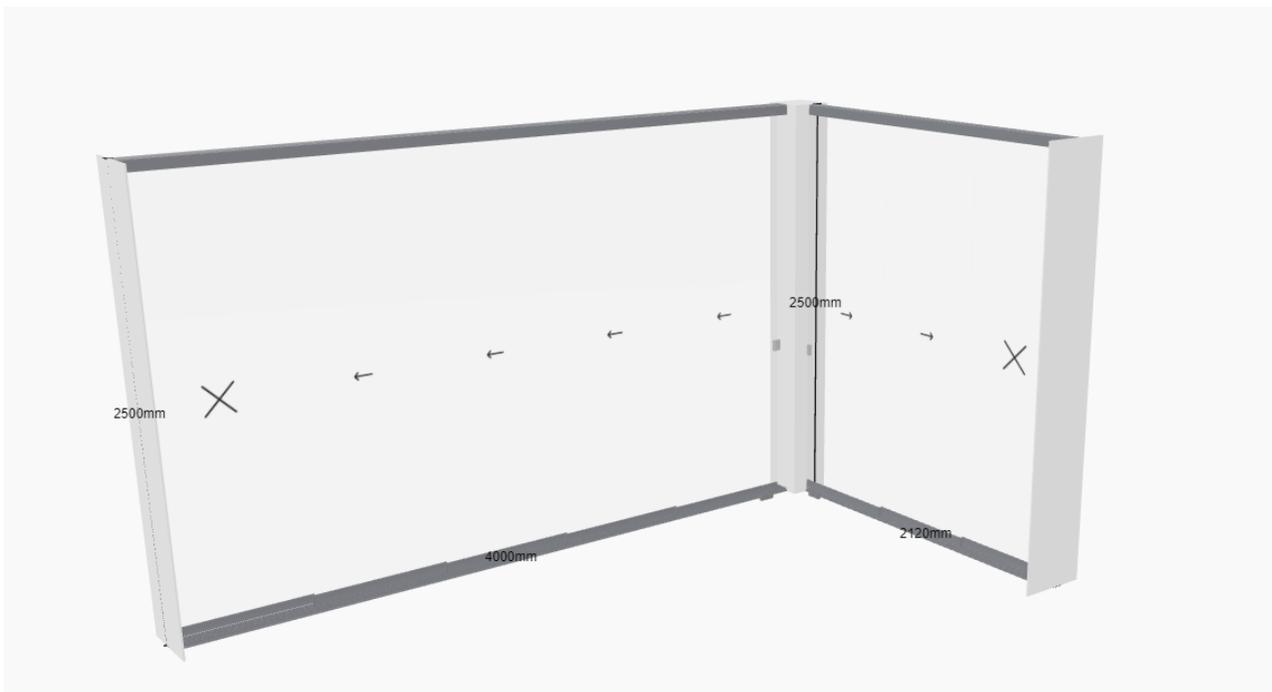
Main materials of Reference product Lumon Glazing Retractable 1700 x 3500 x 1760, 8 panes, glass thickness 6mm

REFERENCE PRODUCT: LUMON GLAZING RETRACTABLE	
Materials	Mass (%)
Tempered glass	80 %
Aluminium	17,6 %
Plastic	1,1 %
Steel	0,7 %
Silicone	0,5 %
Rubber	0,001 %
Total mass of materials KG	152



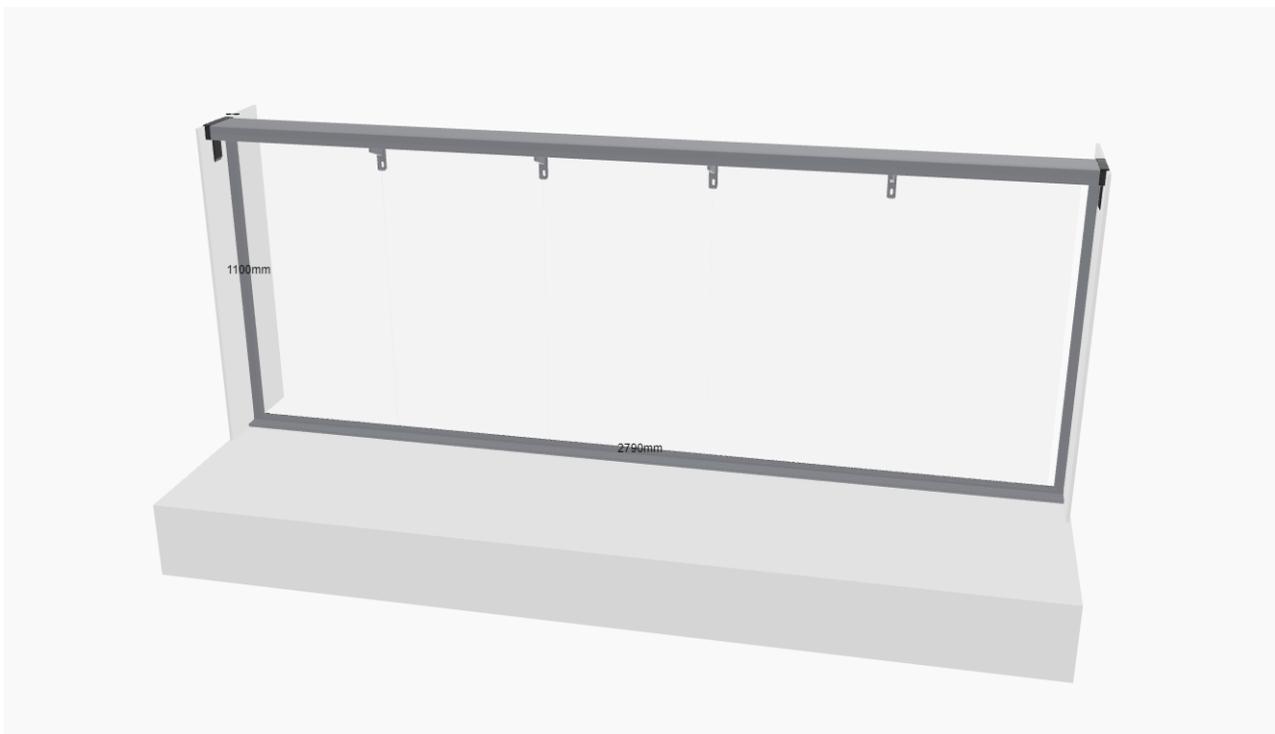
Main materials of Reference product Lumon Glazing Sliding 4000 x 2120 x 2500, 8 panes, glass thickness 8mm

REFERENCE PRODUCT: LUMON GLAZING SLIDING	
Materials	Mass (%)
Tempered glass	90,2 %
Aluminium	8,8 %
Plastic	0,4 %
Steel	0,05 %
Silicone	0,5 %
Rubber	0,1 %
Total mass of materials KG	324



Main materials of Reference product Lumon Railing, 2790 x 1100

REFERENCE PRODUCT: LUMON RAILING	
Materials	Mass (%)
Laminated Glass	61,2 %
Aluminium	35,9 %
Steel	0,8 %
Plastic	2,1 %
Total mass of materials KG	71



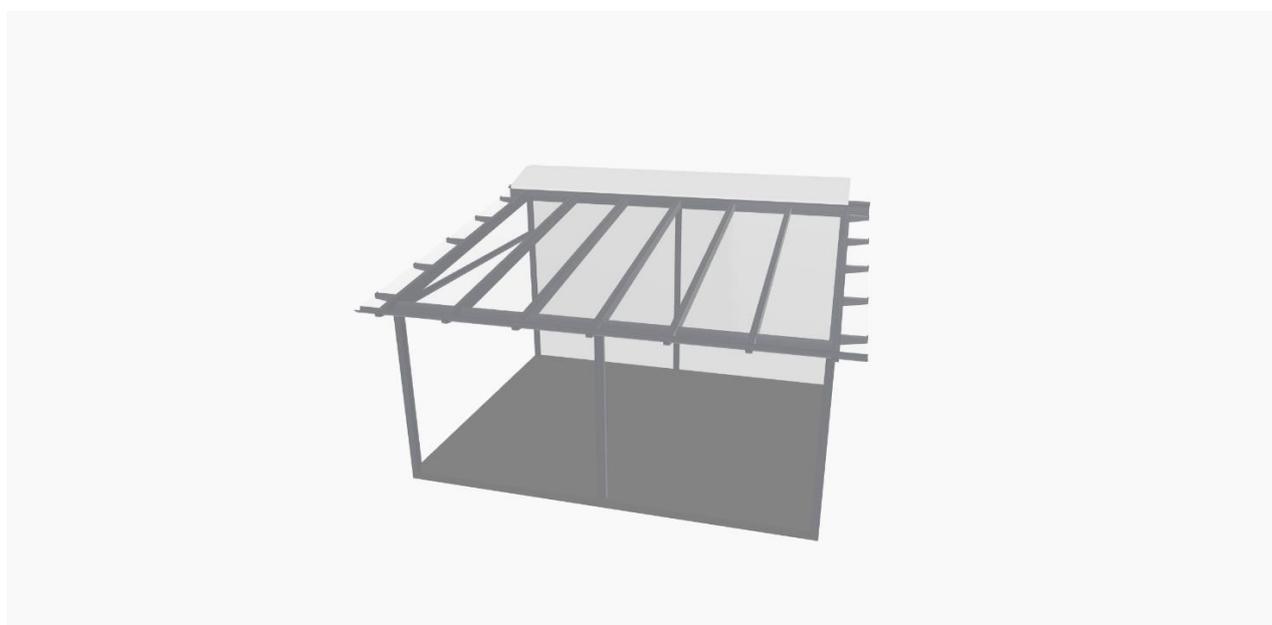
Main materials of Reference product Lumon Post Railing, 3000 x 1350

REFERENCE PRODUCT: LUMON POST RAILING	
Materials	Mass (%)
Laminated Glass	75 %
Aluminium	23,6 %
Steel	0,8 %
Plastic	0,7 %
Total mass of materials KG	103



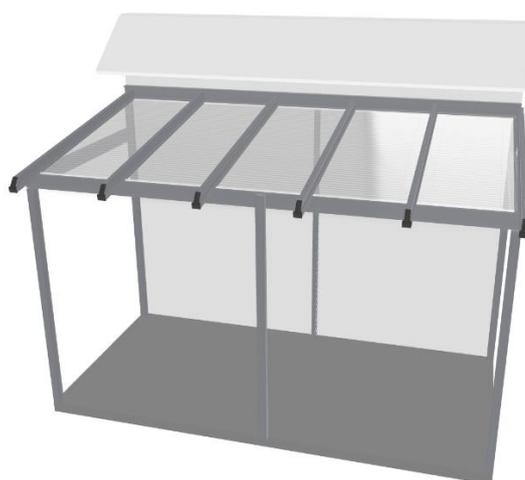
Main materials of Reference product Lumon Roof VT3, 5000 x 4000 /2100/2950

REFERENCE PRODUCT: LUMON ROOF VT3	
Materials	Mass (%)
Tempered glass	42,9 %
Aluminium	54,3 %
Steel	0,5 %
Rubber	1,9 %
Plastic	0,5 %
Total mass of materials KG	1109



Main materials of Reference product Lumon Roof VT4, 4150x2000 x 2200/2800

REFERENCE PRODUCT: LUMON ROOF VT4	
Materials	Mass (%)
Laminated Glass	54,0 %
Aluminium	42,3 %
Steel	0,7 %
Rubber	2,3 %
Plastic	0,7 %
Total mass of materials KG	364



Lumon – Creating more room for life since 1978

We help our customers get more space for life by converting unused terraces and balconies into inspiring and versatile glazed living spaces. Lumon has over one million satisfied customers across the globe.

Our product selection covers balcony glass, glass terraces, various balcony facade solutions, Lumon glazing maintenance services and Visor blinds. Lumon Group's turnover in 2022 was EUR 193 million, and we employ more than 1,300 people.



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