Elitfönster

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019 for

Product family

Elitfönster Harmoni

From

Elitfönster AB

Model

Side-hung window 2+1 Kipp/Dreh

Product name

IKI-AL kd

Publication date 2023-01-25
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Valid for 5 years until 2028-01-24

Programme
The International EPD® System, www.environdec.com

Programme operator
EPD International AB

EPD registration number
S-P-06947

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Environmental Product Declaration

Environmental Product Declarations (EPD) present transparent, verified and comparable information about the life-cycle environmental impact of products.

The International EPD® System is a global program for environmental declarations based on ISO 14025 and EN 15804. The EPD online database currently contains more than 1100 EPDs for a wide range of product categories by organisations in 45 countries.

Differences versus previous version.
2023-02-25 Version 1

2023-03-20 Version 2
Editorial change: Table 2 has been updated from declaring content in FU to declaring content in the product in size 1230x1480 mm as well as packaging and proportion of renewable material.

Company information

Owner of the EPD
Elitfönster AB
Honnörsgatan 2
352 36 Växjö

Description of the organisation
Elitfönster AB is with its wide range of windows, Sweden´s leading window manufacturers with traditions from Småland since 1924. The company has about 1,000 employees and is represented throughout Sweden.

Since 2004 Elitfönster AB has been a part of Inwido. As Europe´s leading window group, Inwido´s business concept is to develop and sell the market´s best customized window and door solutions through a decentralized structure and with a focus on the consumer-driven market, in order to create long-term sustainable growth, organically and through acquisitions. Inwido consists of 28 business units with approximately 4,300 employees in eleven countries.

Contact/Certification and test manager
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Product-related or management system-related certifications
ISO 9001:2015, ISO 14001:2015
Sunda Hus, Byggvarubedömningen, Basta

Average or specific EPD: Average
This EPD is averaged for the production of IKI-AL kd in regard to standard and energy variations. The energy variation has up to 6% higher environmental impacts (The most differing impact category being ADPE). Climate change has about 1% higher impacts for the energy type windows. Since this difference is within +/-10%, both the standard and energy type is covered in this EPD.

Product information

Elitfönster Harmoni 2+1 glass side-hung IKI-AL kd window
An inward opening bottom hung wooden window with external aluminum cladding. The casement consists of two connected sashes, the inner casement consists of wood with a mounted insulating glass with two glasses and a filling, the outer casement is made of aluminum with a single float glass and filling. The casement is attached to the frame via bolt hinges on the bottom piece, which means that when opened, the casement swings inwards in a vertical position.

According to the Construction Products Regulation CPR (EU) no. 305/2011, the essential properties of the product must be declared in the CE marking and the Declaration of Performance.

The technical properties of the window are declared in the Declaration of Performance, DoP no. 40-29-CE3025201 which can be accessed on Elitfönster´s website.

Construction product declaration eBVD nr C-SE556007307301-29

>> Product information

Energy glass
Energy glass consists of a float glass that is coated with a thin film of metal oxide that lets through short-wave solar energy and reflects long-wave room heat.

The coating is almost completely transparent, but there is some difference in light input between coated glass and uncoated glass.

Coated glass is used to achieve better insulating ability in a glass, by combining different numbers of coated glass in a window or insulating glass, you can achieve different levels of insulating ability for a window.

The greater the number of energy glasses a window has, the better the insulation capacity, but also the darker the glass

Gas
An insulating glass consists of glass that are separated from each other by spacers, these spacers can be filled with gas such as argon to give the insulating glass a better insulating ability.

Argon does not affect sunlight radiation but improves the insulating ability of the insulating glass.

An insulating glass with two glasses consists of an argon gas-filled spacer, an insulating glass with three glasses has two spacers, here you can choose to fill one or both spacers with argon gas.

If you fill both distances with gas, you achieve a better insulation capacity than if only one distance is gas-filled.

By combining different sets of energy-coated glass and argon-filled glass spacers, you can get different glass properties for insulation and light input.

If you also combine these components with different types of glass spacing and dimensions of constituent components as well as different choices of type of glass, you have an almost infinite number of different combinations.

In this report, the environmental impact is reported based on two different glass combinations, these are called ”standard” and ”energy”.

Energy
The same construction as the standard glass, except that the glass in the outer frame is also energy-coated

LCA information

Functional Unit	The functional unit used in this report is 1m². The weight is 38,84 kg per m². Standard size is 1230 x 1480mm
Reference Service Life (RSL)	The RSL is set to 50 years. The RSL is based on the fact that windows with aluminum-clad windows have a longer service life than similar windows made of PVC or wood.
Product group classification	UN CPC 42120
Goal and Scope	The result of the LCA will be used to understand what aspects that contribute to most environmental impact and in what phase of the life cycle has the most impact. The result will be communicated with EPD. the International.
Manufacturing Site	Brogårdsgatan 1, 574 38, Vetlanda, Sverige
Geographical Area	Europe
Compliant with	This EPD follows the ¨Book-keeping¨ LCA approach which is defined as an attributional LCA in the ISO 14040 standard. The EPD is compliant with: • ISO 14025 • EN 15804:2012+A2:2019 • Product Category Rules PCR 2019:14 Construction products v1.2.5 • Sub-PCR-007 Windows and doors (EN 17213)
Cut-Off Rules	The procedure below is followed for the exclusion of inputs and outputs according to the EN 15804:2012+ A2:2019 standard: • In the case of insufficient input data or data gaps for a unit process, the cut-off criterion is 1 % of renewable and non-renewable primary energy usage and 1 % of the total mass input to that unit process. • The maximum neglected input flows per declared module (A1- A3) is 5 % of energy usage and mass. No cut-offs have been made concerning specific data in this study.
Foreground data	All site-specific data is collected from the year 2021.
Background Data	The background LCI datasets are from ecoinvent 3.8. When available, published EPDs have been used to represent specific raw materials.
Electricity data	Electricity consumption in the A3 module comes from 100% wind power certified by Guarantee of Origin, Electricity is represented by data in ecoinvent 3.8 regionalized for Sweden.
Assumptions	In A4 the transport distance is assumed to be 320km, based on average distances 2021. The used window is assumed to be transported 50km to the closest waste management facility. There it is disassembled, and the following waste treatment activities performed: • Aluminum and steel are recycled at 90% collection rate • Glass is landfilled at 100% landfilling rate • Wood, paint, plastic, rubber and misc. is assumed to be incinerated with energy recovery at a municipal incineration plant at 90% incineration rate. • Waste not recycled or incinerated is assumed to go to landfill. • Assumptions in module B, the user phase: - Lifespan more than 50 years • For windows maintenance: • - Soap once a year (0,55 ml/year/m2) • - Window cleaning 4 times a year (0,27 dl/time) • - Lubricant for hinges and locking fittings once a year (10 ml oil)

>> LCA information

Allocations	Polluter Pays / Allocation by Classification Two allocation rules are applied: 1) the raw material necessary for the manufacture is allocated by mass of the declared unit 2) the energy necessary for the manufacture is allocated in MJ by production of the declared unit
Impact Assessment methods	Potential environmental impacts are calculated with Environmental Footprint 3.0 method as implemented in SimaPro. Resource use values are calculated from Cumulative Energy Demand V1.11.
Based on LCA Report	Miljögiraff report 973 LCA Elitfönster
LCA Practitioner	Marcus Wendin, Miljögiraff AB
Software	SimaPro 9.4.0.2

The product documented within this EPD contains no substances in the REACH Candidate list. Furthermore, the product does not contain any substances from the Norwegian priority list.

The estimated impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

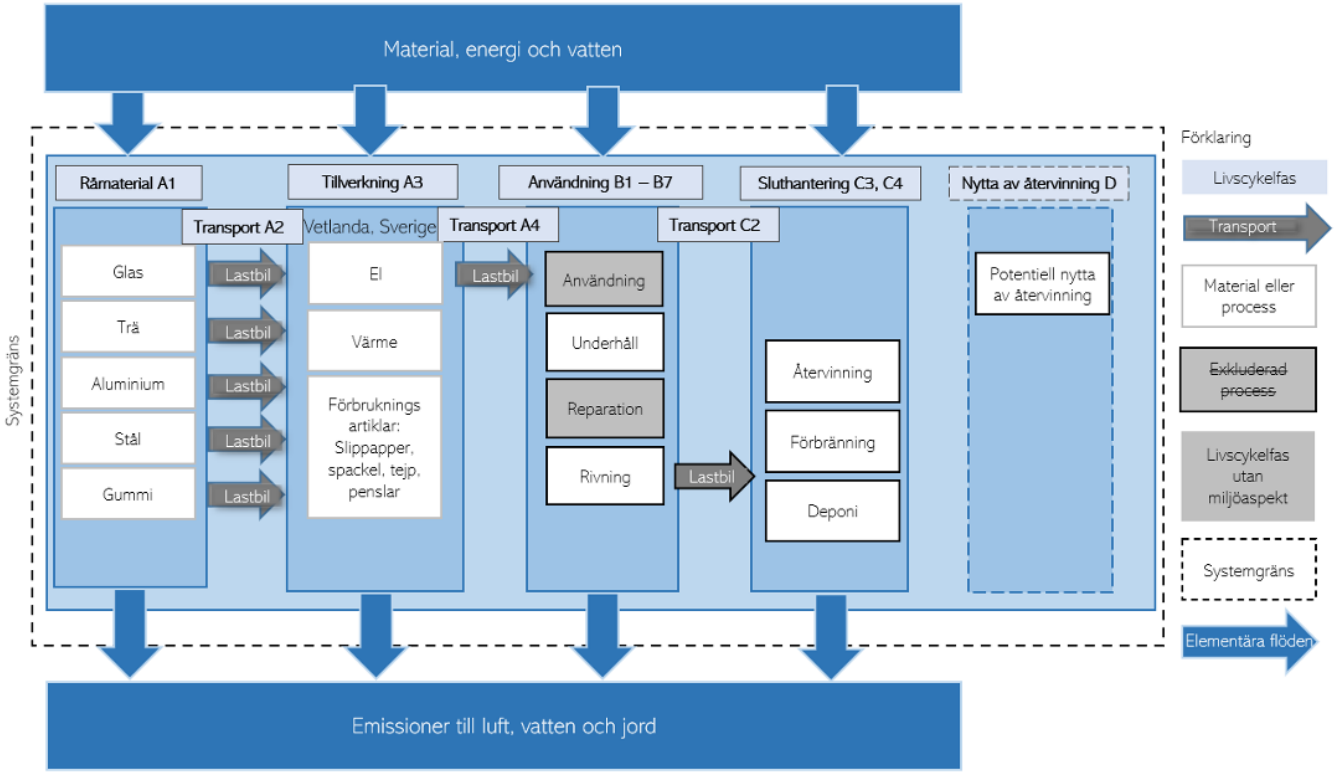
System Boundary

This is a Cradle to Grave with modules A+B+C+D (see Table 1 for included modules). The system boundary mean that all processes needed for raw material extraction, transport, manufacturing and disposal are included in the study.
For an overview of the included processes see Figure 2.

Table 1, show an overview of the included and accounted life cycle phases.

	Product stage		Construction process stage			Use stage							End of life stage					Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demo-lition	Transport	Waste processing	Disposal		Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Modules declared	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X
Geography	Euro	Euro	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE/	SE	SE	SE		SE
Average data varia-bility	-	<10%	<10%	-	-	-	-	-	-	-	-	-	-	-	-	-		-
Specific data	>90%					-	-	-	-	-	-	-	-	-	-	-		-

Figure 2, shows what is included in the different modules.



Content and life cycle information

The inward window 2+1 consist of 15 raw materials.
The weight per product and part recycled material can be seen in Table 2.

Table 2, Product content for IKI-AL kd size 1230 mm x 1480 mm show the weight and share recycled (post-consumer) material for the raw material and packaging.

Products components	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Glass	40,860	6,0%	0%
Argon	0,070	0%	0%
Distance list	0,233	0%	0%
Edge sealing compond	0,524	0%	0%
Butyl	0,023	0%	0%
Desiccant	0,201	0%	0%
Pinewood	17,044	0%	100%
Wood board	0,000	0%	0%
Surface treatment for pine	1,219	0%	0%
Aluminum	5,202	0%	0%
Powder coating aluminum	0,202	0%	0%
Metal handle & Miscellaneous steel parts	2,959	45%	0%
Plastic	0,640	0%	0%
Rubber EPDM	1,230	0%	0%
Silikonlist	0,000	0%	0%
Rubber TPE	0,000	0%	0%
Glue	0,039	0%	0%
Sealant	0,268	0%	0%
Waterproof agent	0,000	0%	0%

Packaging	Weight, kg	Post-consumer material, weight-%	Renewable material, weight-%
Plastic film (stretch film)	0,050	0%	0%
Plywood	0,358	0%	100%
Screw	0,016	0%	0%
Edge protection (cardboard)	0,190	0%	100%
Cardboard angle	0,057	0%	100%
Top cover (plastic film)	0,060	0%	0%
Pallet (wooden)	2,600	0%	100%

The product documented within this EPD contains no substances in the REACH Candidate list or from the candidate list of SVHC for Authorisation.

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>> Content and life cycle information

The wood raw material used is pine supplied by FSC-labeled and / or PEFC-labeled suppliers that glues and finger-joints the wood raw material. The wood is cut and planed and processed in Elitfönster premises in Vetlanda, the finished wood details are surface treated with a water-based paint system. Elitfönster's own glass factory, IGF in Lenhovda, uses flat glass from Europe's largest glass manufacturer. IGF cuts the glass and manufactures the insulating glass. The glass is installed in the product in Elitfönster's manufacturing unit in Vetlanda. Aluminum profiles are delivered by Hydro Extrusion in Vetlanda, they are processed, and powder coated on A-paint in Sävsjö, then transported to Elitfönster's manufacturing unit in Vetlanda for final assembly.

The finished windows are packed on a wooden pallet with plywood slats and cardboard corners and plasticized with shrink plastic. The windows are transported on pallets by truck to the customer.

Electricity is certified wind power electricity.

Due to the enhanced durability of an aluminum clad window's physical properties, no change of IGU is required during the windows 50-year lifespan (Carlsson, 2009).

>> Content and life cycle information

This EPD uses input data from other EPDs, the used EPDs can be viewed below:

Table 3 Overview of utilized EPDs as input data

Material	EPD name	EPD specifications
Uncoated glass by Pilkington	Flat glass, toughened safety glass and laminated safety glass	Sector-EPD for flat plane glass Manufacturer: Pilkington AB EPD Owner: Bundesverband Flachglas e.V. EPD Author: ift Rosenheim GmbH EPD Platform: ift Rosenheim GmbH Geography: Germany Publication number: M-EPD-FEV-GB-002000 Publication date: 2017-12-18
Uncoated glass by Guardian	Uncoated flat glass, laminated safety glass and coated flat glass	Manufacturer: Guardian Europé S.a.r.l. EPD Owner: Guardian Europé S.a.r.l. EPD Author: ift Rosenheim GmbH EPD Platform: ift Rosenheim GmbH Geography: Germany Publication number: EPD-GFEV-GB-19.2 Publication date: 2021-06-29
Distance list	TGI-Spacer M	Manufacturer: Technoform EPD Owner: Technoform EPD Author: Technoform EPD platform: INIES Geography: France Publication number: 7-333:2019 Publication date: 2019-06-15
Pine by Stora Enso	Industrial Components	Manufacturer: Stora Enso EPD Owner: Stora Enso EPD Author: Stora Enso EPD platform: The International EPD® System Geography: Sweden, Finland, Estonia, Lithuania Publication number: S-P-02154 Publication date: 2020-08-03
Surface treatment pine	Water-borne exterior paints	Manufacturer: Teknos EPD Owner: Teknos EPD Author: Bionova Engineering EPD platform: Rakennustieto Geography: Finland Publication number: RTS EPD, RTS_13_18 Publication date: 2018-04-10
Aluminium	EPD Hydro 4.0 Aluminium Extrusion Ingot	Manufacturer: Hydro Aluminium AS EPD Owner: Hydro Aluminium AS EPD Author: Østfoldforskning EPD Platform: EPD-Norge Geography: Norway Publication number: NEPD-1840-468-EN Publication date: 2019-08-05

Environmental Information – IKI-AL kd

Potential environmental impact – mandatory indicators according to EN 15804.

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5
Climate change – Fossil	kg CO_2 eq	52,17	6,36	2,93	61,46	2,06	0,18
Climate change – Biogenic	kg CO_2 eq	-25,07	0,01	7,27	-17,79	0,00	3,77
Climate change – Land use and LU change	kg CO_2 eq	0,04	0,00	0,01	0,05	0,00	0,00
Climate change	kg CO_2 eq	27,21	6,36	10,22	43,79	2,06	3,95
Ozone depletion	kg CFC11 eq	3,08E-06	1,47E-06	1,11E-06	5,65E-06	4,77E-07	3,21E-09
Acidification	mol H+ eq	3,22E-01	2,58E-02	1,69E-02	3,65E-01	8,36E-03	4,46E-04
Eutrophication, freshwater	kg P eq	1,12E-02	4,09E-04	1,02E-03	1,26E-02	1,33E-04	1,24E-05
Eutrophication, freshwater	kg PO4 eq	3,43E-02	1,26E-03	3,12E-03	3,86E-02	4,07E-04	3,79E-05
Eutrophication, marine	kg N eq	2,00E-02	7,77E-03	4,31E-03	3,20E-02	2,52E-03	2,41E-04
Eutrophication, terrestrial	mol N eq	2,43E-01	8,49E-02	4,91E-02	3,77E-01	2,75E-02	2,27E-03
Photochemical ozone formation	kg NMVOC eq	9,42E-02	2,60E-02	1,39E-02	1,34E-01	8,43E-03	5,56E-04
Resource use, minerals and metals	kg Sb eq	7,02E-04	2,21E-05	1,04E-04	8,28E-04	7,16E-06	9,14E-08
Resource use, fossils	MJ	7,89E+02	9,61E+01	3,07E+01	9,16E+02	3,12E+01	3,04E-01
Water use	m3 depriv.	7,76E+00	2,88E-01	1,01E+00	9,05E+00	9,33E-02	7,47E-03
Particulate matter	disease inc.	1,50E-06	5,49E-07	2,34E-07	2,29E-06	1,78E-07	4,43E-09
Ionising radiation	kBq U-235 eq	2,35E+00	4,94E-01	1,78E-01	3,02E+00	1,60E-01	9,95E-04
Ecotoxicity, freshwater	CTUe	9,34E+02	7,50E+01	1,05E+02	1,11E+03	2,43E+01	1,06E+00
Human toxicity, cancer	CTUh	6,48E-08	2,43E-09	8,00E-09	7,52E-08	7,87E-10	1,07E-10
Human toxicity, non-cancer	CTUh	3,93E-07	7,86E-08	1,04E-07	5,76E-07	2,55E-08	5,01E-09
Land use	Pt	2,47E+02	6,60E+01	2,66E+02	5,79E+02	2,14E+01	9,33E-02

** Disclaimer: The results of this environmental impact indicator in the Table above should be applied with care due to the relatively high degree of uncertainty of the results, alongside limited general experience with the indicator.*

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>> Environmental Information – IK-AL kd

Potential environmental impact – mandatory indicators according to EN 15804.

Impact category	Unit	B2	C2	C3	C4	D
Climate change – Fossil	kg CO_2 eq	0,50	0,36	0,04	5,45	-21,14
Climate change – Biogenic	kg CO_2 eq	-0,05	0,00	0,00	14,03	-0,29
Climate change – Land use and LU change	kg CO_2 eq	0,02	0,00	0,00	0,00	-0,60
Climate change	kg CO_2 eq	0,47	0,37	0,04	19,49	-22,10
Ozone depletion	kg CFC11 eq	2,05E-07	8,44E-08	1,64E-09	8,33E-08	-1,63E-06
Acidification	mol H+ eq	3,61E-03	1,48E-03	1,79E-04	3,44E-03	-1,71E-01
Eutrophication, freshwater	kg P eq	1,60E-04	2,35E-05	1,56E-05	8,64E-05	-9,24E-03
Eutrophication, freshwater	kg PO4 eq	4,90E-04	7,21E-05	4,78E-05	2,65E-04	-2,84E-02
Eutrophication, marine	kg N eq	7,60E-04	4,46E-04	5,42E-05	1,62E-03	-3,38E-02
Eutrophication, terrestrial	mol N eq	6,49E-03	4,87E-03	4,99E-04	1,59E-02	-4,06E-01
Photochemical ozone formation	kg NMVOC eq	6,80E-03	1,49E-03	1,14E-04	4,13E-03	-9,97E-02
Resource use, minerals and metals	kg Sb eq	8,15E-06	1,27E-06	6,67E-07	8,56E-07	-1,28E-04
Resource use, fossils	MJ	1,75E+01	5,51E+00	5,12E+00	5,82E+00	-8,69E+02
Water use	m3 depriv.	7,61E-01	1,65E-02	6,34E-02	1,04E-01	-1,22E+01
Particulate matter	disease inc.	3,05E-08	3,15E-08	2,64E-09	4,82E-08	-2,09E-06
Ionising radiation	kBq U-235 eq	9,10E-02	2,83E-02	3,68E-01	2,66E-02	-4,98E+01
Ecotoxicity, freshwater	CTUe	1,73E+01	4,30E+00	1,76E+00	1,18E+01	-9,83E+02
Human toxicity, cancer	CTUh	4,19E-10	1,39E-10	4,55E-11	2,14E-09	-5,99E-08
Human toxicity, non-cancer	CTUh	1,13E-08	4,51E-09	8,35E-10	3,01E-08	-8,33E-07
Land use	Pt	4,96E+00	3,79E+00	1,16E+00	9,32E+00	-9,78E+02

** Disclaimer: The results of this environmental impact indicator in the Table above should be applied with care due to the relatively high degree of uncertainty of the results, alongside limited general experience with the indicator.*

Climate impact – IPCC GWP100 - Elitfönster Harmoni 2+1 glass side-hung IKI-AL kd window

	Unit	A1	A2	A3	A1-A3	A4	A5	B2	C2	C3	C4	D
Climate change	kg CO_2 eq	51,93	6,30	2,90	61,13	2,04	0,18	0,00	0,36	0,04	5,45	-21,33

Use of resources - Elitfönster Harmoni 2+1 glass side-hung IKI-AL kd window

	Unit	A1	A2	A3	A1-A3	A4	A5	B2	C2	C3	C4	D
PERE	MJ	250,8	1,4	118,6	370,7	0,4	0,0	0,0	0,1	2,1	0,1	-528,0
PERM	MJ	293,8	0,0	32,9	326,7	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PERT	MJ	544,5	1,4	151,5	697,4	0,4	0,0	0,0	0,1	2,1	0,1	-528,0
PENRE	MJ	638,0	128,9	31,6	798,5	35,6	0,3	18,6	5,8	5,1	6,1	-841,9
PENRM	MJ	143,1	0,0	2,4	145,5	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PENRT	MJ	781,1	128,9	34,0	944,0	35,6	0,3	18,6	5,8	5,1	6,1	-841,9
SM	Kg	2,1	0,0	0,0	2,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0
RSF	MJ	0,0	0,0	43,3	43,3	0,0	0,0	0,0	0,0	0,0	0,0	0,0
NRSF	MJ	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
FW	M3	2,83	0,02	0,02	2,9	0,01	0,00	0,02	0,00	0,00	0,01	-0,26

Abbreviations

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials;
PERM = Use of renewable primary energy resources used as raw materials;
PERT = Total use of renewable primary energy resources;
PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
PENRM = Use of non-renewable primary energy resources used as raw materials;
PENRT = Total use of non-renewable primary energy re-sources;
SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Use of net fresh water

Waste production and output flows –Elitfönster Harmoni 2+1 glass side-hung IKI-AL kd window

Waste production: No waste is leaving the system boundary of the LCA.

Output flows

	Unit	A1	A2	A3	Tot. A1-A3	A4	A5	B2	C2	C3	C4	D
Components for re-use	kg	0,00E+00	0	0	0,00E+00	0	0	0	0	0	0	0
Material for recycling	kg	0,00E+00	0	3,38	3,38	0	0,011	0	0	0	4,07	0
Materials for energy recovery	kg	0,00E+00	0	7,74	7,74	0	1,691	0	0	0	11,65	0
Exported energy, electricity	MJ	0,00E+00	0	0	0,00	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0,00E+00	0	0	0,00	0	0	0	0	0	0	0

Information on biogenic carbon content – Elitfönster Harmoni 2+1 glass side-hung IKI-AL kd window

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	4,4
Biogenic carbon content in packaging	kg C	0,9

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO_2.

Annex C – Voluntary use stage scenario based on energy balance calculation – Standard glass

Use stage environmental impacts illustrates the annual environmental impacts due to the energy balance of the windows, based on Stockholm heating demand average and an energy balance formula based on the described scenario.

General information		
		Comments
Heating method according to EN 17213 annex C	District heating from natural gas	LCI dataset: Heat, central or small-scale, natural gas {RER}| market group for | Cut-off, U
Cooling method according to EN 17213 annex C	Electricity powered air cooler	LCI dataset: Electricity, low voltage {SE}| market for | Cut-off, U
Climate Zone	III	According to Swedish building standards, used climate file: "Stockholm 1981-2010" from the Swedish Meteorological and Hydrological Institute
Annual average temperature	6,6 °C	Stockholm
Min indoor temperature	21 °C	Heating stops at this temperature
Max indoor temperature	27 °C	Cooling stops at this temperature
Cooling Factor	3	kWh cooling delivered per kWh of electricity
Model (Calculation)	Single room	
Orientation	West (270°)	
Calculation method	Hourly	
Modelling program	VIP-Energy 4.3.2	Modeled as a 1 m^2 room with concrete flooring and no walls or internal loads
Environmental Impact assessment model	Environmental Footprint 3.0	

Technical specifications	
U-value	1,08 w/m^2, K
Gg-value	60 %
Gw-value	43 %
Air leakage class	4
Air leakage flow at +/- 50 Pa	0,2 l/s,m^2
Daylight factor, LT-value	75 %
Glass/frame ratio	0,72
Total heating demand	79 kWh heat/year
Total cooling demand	21 kWh electricity/year

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>>Annex C – Voluntary use stage scenario based on energy balance calculation – Standard glass

The results below are the environmental impacts that are presented in line with instructions from EN 17213 appendix C. It is worth noting that some units are differing from units that are presented in results for the LCA. For comparison, multiply the result below by the following factors:

Acidification: 1.31 to report kg SO2, eq as mol H +, eq
Eutrophication: 0.33 to report kg PO4–3, eq. Kg P, eq
Photochemical Ozone Creation Potential: 1.69 to report kg C2H4, eq as kg NMVOC, eq

Yearly environmental impacts (B6), IKI–AL kd Standard glass			
Impact category	**Unit**	**heating from natural gas**	**cooling from electricity**
Climate change	kg CO2 eq	1,87E+01	5,57E+00
Ozone depletion	kg CFC11 eq	1,95E–06	5,83E–07
Acidification	mol H+ eq	2,16E–02	6,44E–03
Eutrophication, freshwater	kg P eq	6,08E–04	1,81E–04
Photochemical ozone formation	kg NMVOC eq	1,92E–02	5,72E–03
Resource use, minerals and metals	kg Sb eq	2,27E–05	6,78E–06
Resource use, fossils	MJ	2,79E+02	8,34E+01

Yearly environmental impacts (B6), IKI–AL kd Standard glass			
Impact category	**Unit**	**heating from natural gas**	**cooling from electricity**
Climate change	kg CO2 eq	2,20E+01	5,57E+00
Ozone depletion	kg CFC11 eq	2,30E–06	5,83E–07
Acidification	mol H+ eq	2,54E–02	6,44E–03
Eutrophication, freshwater	kg P eq	7,16E–04	1,81E–04
Photochemical ozone formation	kg NMVOC eq	2,26E–02	5,72E–03
Resource use, minerals and metals	kg Sb eq	2,68E–05	6,78E–06
Resource use, fossils	MJ	3,29E+02	8,34E+01

Annex C – Voluntary use stage scenario based on energy balance calculation – Energy glass

Use stage environmental impacts illustrates the annual environmental impacts due to the energy balance of the windows, based on Stockholm heating demand average and an energy balance formula based on the described scenario.

General information		
		Comments
Heating method according to EN 17213 annex C	District heating from natural gas	LCI dataset: Heat, central or small-scale, natural gas {RER}| market group for | Cut-off, U
Cooling method according to EN 17213 annex C	Electricity powered air cooler	LCI dataset: Electricity, low voltage {SE}| market for | Cut-off, U
Climate Zone	III	According to Swedish building standards, used climate file: "Stockholm 1981-2010" from the Swedish Meteorological and Hydrological Institute
Annual average temperature	6,6 °C	Stockholm
Min indoor temperature	21 °C	Heating stops at this temperature
Max indoor temperature	27 °C	Cooling stops at this temperature
Cooling Factor	3	kWh cooling delivered per kWh of electricity
Model (Calculation)	Single room	
Orientation	West (270°)	
Calculation method	Hourly	
Modelling program	VIP-Energy 4.3.2	Modeled as a 1 m^2 room with concrete flooring and no walls or internal loads
Environmental Impact assessment model	Environmental Footprint 3.0	

Technical specifications	
U-value	0,93 w/m^2, K
Gg-value	55 %
Gw-value	39 %
Air leakage class	4
Air leakage flow at +/- 50 Pa	0,2 l/s,m^2
Daylight factor, LT-value	69 %
Glass/frame ratio	0,72
Total heating demand	67 kWh heat/year
Total cooling demand	20 kWh electricity/year

>>Annex C – Voluntary use stage scenario based on energy balance calculation – Energy glass

The results below are the environmental impacts that are presented in line with instructions from EN 17213 appendix C. It is worth noting that some units are differing from units that are presented in results for the LCA. For comparison, multiply the result below by the following factors:

Acidification: 1.31 to report kg SO2, eq as mol H +, eq
Eutrophication: 0.33 to report kg PO4-3, eq. Kg P, eq
Photochemical Ozone Creation Potential: 1.69 to report kg C2H4, eq as kg NMVOC, eq

Yearly environmental impacts (B6), IKI-AL kd Energy glass			
Impact category	**Unit**	**heating from natural gas**	**cooling from electricity**
Climate change	kg CO2 eq	1,87E+01	5,57E+00
Ozone depletion	kg CFC11 eq	1,95E-06	5,83E-07
Acidification	mol H+ eq	2,16E-02	6,44E-03
Eutrophication, freshwater	kg P eq	6,08E-04	1,81E-04
Photochemical ozone formation	kg NMVOC eq	1,92E-02	5,72E-03
Resource use, minerals and metals	kg Sb eq	2,27E-05	6,78E-06
Resource use, fossils	MJ	2,79E+02	8,34E+01

Yearly environmental impacts (B6), IKI-AL kd Energy glass			
Impact category	**Unit**	**heating from natural gas**	**cooling from electricity**
Climate change	kg CO2 eq	1,87E+01	5,57E+00
Ozone depletion	kg CFC11 eq	1,95E-06	5,83E-07
Acidification	mol H+ eq	2,16E-02	6,44E-03
Eutrophication, freshwater	kg P eq	6,08E-04	1,81E-04
Photochemical ozone formation	kg NMVOC eq	1,92E-02	5,72E-03
Resource use, minerals and metals	kg Sb eq	2,27E-05	6,78E-06
Resource use, fossils	MJ	2,79E+02	8,34E+01

General information

Programme information	
Programme:	The International EPD® System
Address:	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website:	www.environdec.com
E-mail:	info@environdec.com

CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product category rules (PCR): Product Category Rules PCR 2019:14
Construction products v1.2.5

PCR review was conducted by: PCR Committee: IVL Swedish Environmental Research Institute, Swedish Environmental Protection Agency, SP Trä, Swedish Wood Preservation Institute, Swedisol, SCDA, Svenskt Limträ AB, SSAB

Moderator: Martin Erlandsson, IVL Swedish Environmental Research Institute

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

☐ EPD process certification ☒ EPD verification

Third party verifier: Martyna Mikusinska, Sweco, Individual verifier approved by the International EPD® System

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

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

EPDs within the same product category but from different programs may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.

References

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