Elitfönster

Environmental Product Declaration

EPD of multiple products, based on worst-case results.
In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for

Product family

Elitfönster Original Alu 100

Model

Top-swing window 3-glass Alu

Product name

AFHC

Standard and energy versions from Elitfönster AB

From

Elitfönster AB
Box 153
574 22 Vetlanda

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

Programme operator
EPD International AB

EPD registration number
S-P-12880

An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com

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

Accountabilities for PCR, LCA and independent, third-party verification

Product Category Rules (PCR)

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

Product Category Rules (PCR): c-PCR-007 Windows and doors EN 17213 (EPD International AB, 2020), UN CPC 42120 and PCR 2019:14 Construction products (EN 15804+A2) (1.3.4)

PCR review was conducted by: Not applicable for the c-PCR. For the PCR 2019:14 Construction products (EN 15804+A2) (1.3.4) the PCR review was conducted by: The Technical Committee of the International EPD System. See www.environdec.com for a list of members.

Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Life Cycle Assessment (LCA)

LCA accountability: Marcus Bernhard & Oline Haggren, Miljögiraff AB

Third-party verification

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

☒ EPD verification by individual verifier

Third-party verifier: Martyna Mikusinska, Sweco

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 registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

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.

Company information

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Description of the organisation
Elitfönster AB is with its wide range of windows Sweden´s leading window manufacturer with Småland traditions since 1924. Elitfönster, which is part of Inwido Group, has approximately 1,000 employees and is represented throughout Sweden.

Product-related or management system-related certifications
ISO 9001:2015, ISO 14001:2015
Sunda Hus, Byggvarubedömningen, Basta

EPD on multiple products
This EPD covers both standard and energy-coated versions of the door. The result is based on the energy-coated version which is the worst-case product. The impact category Climate change (GWP-GHG) is less than 1% higher for the energy-type balcony door, compared to the standard version. Since this difference is within +/-10%, both the standard and energy type is covered in this EPD.

Product information

Top-swing window 3-glass Alu - AFHC

Elitfönster Original Alu 100 Top-swing window is a window with 3-glazed insulating glass and wooden frame clad with durable aluminium on the outside. The frame and sashe consist of impregnated pine which is clad with outer aluminium cladding to ensure long life cycle. The insulating glass consists of three glasses to achieve very good energy management of buildings.

The weight of the finished window is 38,1 kg per m².

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 nr 61-29-CE1011001 which can be accessed on Elitfönster´s website. The product has a building product declaration (eBVD) with document number C-SE556007307301-83.

A picture of the window can be seen to the right.

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>> 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 is 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, and 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. This EPD covers both standard and energy windows, the difference in results is described under "average or specific EPD". The results table is based on the energy glass.

Standard:

The insulating glass consists of three glasses separated by two glass spacers made of plastic (hot edge). The inner glass is energy coated and the inner glass spacer is filled with argon.

Energy:

The same insulating glass construction as standard, except that both the inner and outer glass are energy-coated and that both glass spacers are filled with argon.

LCA information

Functional Unit	**The functional unit used in this report is 1 m².** **The weight is 38,1 kg per m².** Standard size for AFHC is 1230x1480 mm.
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
Manufacturing Site	Industrigatan, 360 73, Lenhovda, Sverige
Geographical Area	Sweden
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/AC:2021 • PCR 2019:14 Construction products (EN 15804+A2) (1.3.4) • 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 2023.
Background Data	The background LCI datasets are from ecoinvent 3.10. When available, published EPDs have been used to represent specific raw materials.
Electricity data	Electricity consumption in the A3 module comes from 100% hydro power certified by Guarantee of Origin, Electricity is represented by data in ecoinvent 3.10 regionalized for Sweden. The carbon footprint of the electricity is 0,0044 kg CO2-eq/kWh.
Assumptions	In A4 the transport distance is assumed to be 295 km, based on average distances 2023. The used window is assumed to be transported 75km to the closest waste management facility. There it is disassembled, and the following waste treatment activities performed: • In A4 the transport distance is assumed to be 295 km, based on average distances 2023. The used window is assumed to be transported 75km to the closest waste management facility. There it is disassembled, and the following waste treatment activities performed: • Aluminum and steel are recycled. • 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. • For windows maintenance: o Soap once a year (10 ml/year) o Window cleaning 4 times a year (0,3 dl/time) o Lubricant for hinges and locking fittings once a year (5 ml oil)

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>> LCA information

Allocations	Polluter Pays / Allocation by Classification Two allocation rules are applied: 1) the raw material necessary for manufacturing is allocated to products based on complexity and product size of the declared unit 2) the energy necessary for manufacturing is allocated to products based on complexity and product size of the declared unit
Infrastructure	Specific data for infrastructure/capital goods have not been collected in either upstream, core, or downstream processes in accordance with PCR 2019:14 Construction product. However, ecoinvent generally includes infrastructure in many processes. These have not been removed from the background data.
Based on LCA Report	1339_LCA_Rapport_Elitfönster.docx
LCA Practitioner	Marcus Bernhard & Oline Haggren, Miljögiraff AB
Software	Ecoinvent 3.10 and SimaPro 9.6 using EF 3.1 as EN 15804 reference package.

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

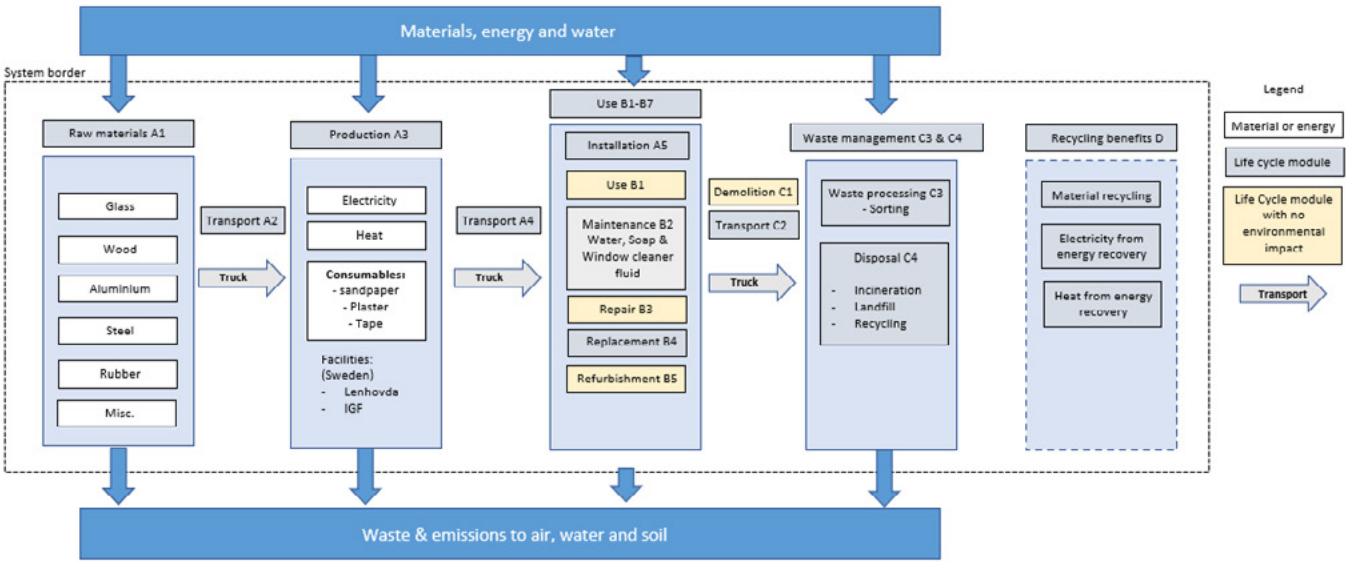
Cradle-to-Grave with modules A+B+C+D (see Table 1 for included modules). The system boundary means that all processes needed for raw material extraction, transport, manufacturing, and disposal are included in the study. For an overview of the included processes see Figure 1.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

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	ND	ND	X	X	X	X		X
Geography	SE	SE	SE	SE	SE	SE	SE	SE	SE	SE			SE	SE	SE	SE		SE
Specific data used	~60%					-	-	-	-	-	-	-	-	-	-	-		-
Variation – products	<1%					-	-	-	-	-	-	-	-	-	-	-		-
Variation – sites	0%					-	-	-	-	-	-	-	-	-	-	-		-

Figure 1, shows what is included in the different modules.



Content and life cycle information

The product consists of 18 raw materials. The weight per FU and the share of post-consumer material, as well as the amount of biogenic material are shown in Table 2 below.

Table 2, show the weight and part recycled material for the raw material.

Products components	Weight, kg/m²	Post-consumer material, weight-% per m²	Biogenic material, weight-% per m² and kg C/m²
Energy coated glass	14,970	Unknown, 0% assumed	0% and 0
Uncoated glass	7,485	Unknown, 0% assumed	0% and 0
Argon	0,043		0% and 0
Spacer bars	0,280		0% and 0
Edge sealing compound	0,650		0% and 0
Butyl	0,051		0% and 0
Absorbent	0,123		0% and 0
Pinewood	9,199		97% and 3,93
Surface treatment for pine	0,748		0% and 0
Aluminium	1,670	1%	0% and 0
Powder coating aluminium	0,074		0% and 0
Steel	2,123	Market average assumed, 23%	0% and 0
Plastic	0,219		0% and 0
Rubber EPDM	0,326		0% and 0
Rubber TPE	0,019		0% and 0
Glue	0,021		0% and 0
Sealants	0,044		0% and 0
Impregnation	0,004		0% and 0
TOTAL	38,1	1%	23% and 3,93

Packaging materials	Weight, kg/m²	Weight-% per m² (versus the product)	Biogenic material, weight-% per m² and kg C/m²
Plastic film	0,027		0% and 0
Plywood	0,197		100% and 0,09
Screws (steel)	0,009		0% and 0
Edge protection (cardboard)	0,104	62%	100% and 0,05
Cardboard angles	0,031	62%	100% and 0,01
Top cover (plastic film)	0,033		0% and 0
Pallet (wood)	1,428		100% and 0,63
TOTAL	1,829	5%	96% and 0,78

The product does not contain any Substances of Very High Concern (SVHC) that exceeds 0.1% of the product weight. Furthermore, the product does not contain any substances from the Norwegian priority list.

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>> Content and life cycle information

A1-A3

Raw pine wood is supplied by FSC-certified and/or PEFC-certified suppliers who laminate and finger-joint the raw wood. The wood material is cut, planed, processed, and fitted at Elitfönster´s facilities in Lenhovda. The finished wooden components are vacuum impregnated and surface-treated with a solvent-based paint system. Insulating glass units are manufactured at Elitfönster´s own window factory IGF in Lenhovda or purchased from Pressglas in Poland. At IGF´s production of insulating glass units, glass is cut from Europe´s largest flat glass suppliers, spacer bars are cut and bent, and filled with desiccant before being sealed. The insulating glass is then assembled on an assembly line, sealed with edge sealing compound, and packed on return pallets. The glass is fitted into the product at Elitfönster´s manufacturing unit in Lenhovda. Aluminum profiles are supplied by Hydro Extrusion in Vetlanda, powder-coated at A-lackering in Sävsjö, and processed and finally assembled at Elitfönster´s facilities in Lenhovda. The finished windows are packed on pallets with plywood, cardboard corners, and wrapped in shrink plastic.

To produce 1 m^2 product, 19,3 kWh of electricity and 18,75 kWh of heat is used. Electricity is certified hydro power electricity. The heat comes from own combustion from wood waste created during production.

In total, around 18% of the total incoming raw materials becomes production waste. A large part of the waste is wood.

A4-A5

All the finished products are loaded onto a truck, which is then transported a transport distance of 294.59 km within Sweden. The transport distance is based on an average distance for shipments reported by Schenker in 2023.

The plastic packaging materials are assumed to be incinerated while cardboard is assumed to be recycled 75% and incinerated 25%. The wood packaging is assumed to be incinerated.

B1-B5

No impact is expected to occur for module B1, B3 and B5. For B2, cleaning consumables and lubrication has been added for the products lifetime of 50 years.

To comply with EN 17213, a change of insulating glass unit (IGU) has been added after 31 years for module B4. However, due to the enhanced durability of an aluminium clad window´s physical properties such a change of IGU is likely not needed (Carlsson, 2005).

During usage, no indoor emissions arise.

C1-C4

No impact is assumed to occur in module C1. The product is assumed to be transported 75 km to the nearest waste treatment facility (C2). There it is assumed to be fragmented using 0,87 kWh per m2 ofwindow. The materials that are separated are wood that is sent to energy recycling, plastic that is sent to energy recycling, steel that is sent to material recycling and aluminium that is sent to material recycling (B3). Other material, including the glass, is sent to landfill where it serves as construction material (B4).

>> 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	Pilkington Float Glass	EPD Owner: Pilkington Group Limited EPD Platform: The International EPD® System Publication number: S-P-08816
Coated glass by Pilkington	Pilkington Offline Coated Float Glass	EPD Owner: Pilkington Group Limited EPD Platform: The International EPD® SystemPublication number: S.P.08819
Uncoated glass by Saint-gobain	PLANICLEAR® 2 mm - 19 mm Clear float glass	EPD Owner: Saint-Gobain Glass Industry, Europe EPD Platform: The International EPD® System Publication number: S-P-00882
Spacer bars	Spacers SP12, SP13 and SP14	EPD Owner: Technoform EPD platform: INIES Publication number: 7-333:2019 Publication date: 2019-06-15
Pine by Stora Enso	Industrial Components	EPD Owner: Stora Enso EPD platform: The International EPD® System Publication number: S-P-02154
Pine, laminated wood	Laminated wood	EPD Owner: AS Barrus EPD platform: EPD Hub Publication number: EPD HUB, HUB-0100
Aluminium parts	Aluminium profiles implemented with hydro redux a billet; mill finished profile	EPD Owner: Hydro Extrusion Sweden AB EPD platform: The International EPD® System Publication number: S-P-07377

Results of the environmental performance indicators

Mandatory and voluntary impact category indicators according to EN 15804

Results per functional unit

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5
Climate change - Fossil	kg CO_2 eq.	6,16E+01	2,17E+00	1,70E-01	0	2,01E+00	0	3,81E+01	0
Climate change - Biogenic	kg CO_2 eq.	-1,65E+01	1,49E-03	1,22E+00	0	-3,88E-01	0	6,63E-03	0
Climate change - Land use and LU change	kg CO_2 eq.	2,26E-01	7,09E-04	8,00E-06	0	1,24E-01	0	1,45E-01	0
Climate change	kg CO_2 eq.	4,54E+01	2,17E+00	1,39E+00	0	1,74E+00	0	3,83E+01	0
Ozone depletion	kg CFC 11 eq.	3,92E-06	4,31E-08	4,43E-10	0	5,92E-08	0	2,44E-06	0
Acidification	mol H+ eq.	3,26E-01	6,79E-03	2,42E-04	0	1,27E-02	0	1,97E-01	0
Eutrophication, freshwater	kg P eq.	4,36E-03	1,67E-05	3,31E-07	0	1,21E-04	0	3,14E-03	0
Eutrophication, marine	kg N eq.	6,54E-02	2,26E-03	1,12E-04	0	3,59E-03	0	4,16E-02	0
Eutrophication, terrestrial	mol N eq.	7,91E-01	2,49E-02	1,19E-03	0	2,69E-02	0	5,22E-01	0
Photochemical ozone formation	kg NMVOC eq.	2,44E-01	1,06E-02	3,23E-04	0	1,40E-02	0	1,48E-01	0
Resource use, minerals and metals[1 3]	kg Sb eq.	7,46E-04	6,94E-06	6,62E-08	0	2,17E-05	0	5,98E-04	0
Resource use, fossils[1 3]	MJ	8,57E+02	3,05E+01	3,17E-01	0	4,03E+01	0	5,18E+02	0
Water use[1]	m^3	2,67E+01	1,25E-01	5,84E-03	0	1,77E+00	0	1,85E+01	0
Particulate matter	disease inc.	4,53E-06	1,70E-07	3,44E-09	0	1,35E-07	0	6,57E-07	0
Ionising radiation[2]	kBq U-235 eq	2,07E+00	1,39E-02	1,62E-04	0	4,92E-02	0	1,48E-01	0
Ecotoxicity, freshwater[1 3]	CTUe	6,74E+02	8,18E+00	5,63E-01	0	2,56E+01	0	2,80E+02	0
Human toxicity, cancer[1 3]	CTUh	4,20E-07	1,52E-08	3,77E-10	0	1,09E-08	0	9,16E-08	0
Human toxicity, non-cancer[1 3]	CTUh	7,00E-07	1,90E-08	2,37E-09	0	2,29E-08	0	1,68E-07	0
Land use[1 3]	Pt	6,84E+02	1,81E+01	1,65E-01	0	2,76E+01	0	6,96E+01	0

Disclaimer: It is discouraged to use the results of modules A1 to A3 without considering the results of module C.
[1] Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
[2] Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effect due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal un underground facilities. Potential ionizing radiation from the soil, from radon and from construction materials is also not measured by this indicator.
[3] Disclaimer: The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack tempo-ral, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

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>> Results of the environmental performance indicators

Results per functional unit

Indicator	Unit	C1	C2	C3	C4	D
Climate change - Fossil	kg CO2 eq	0	5,52E-01	3,76E+00	1,32E-01	-1,29E+01
Climate change - Biogenic	kg CO2 eq	0	3,79E-04	1,57E+01	3,38E-04	-1,16E-02
Climate change - Land use and LU change	kg CO2 eq	0	1,81E-04	3,19E-03	2,11E-05	-2,94E-01
Climate change	kg CO2 eq	0	5,53E-01	1,94E+01	1,33E-01	-1,32E+01
Ozone depletion	kg CFC11 eq	0	1,10E-08	5,54E-09	4,93E-09	-2,36E-07
Acidification	mol H+ eq	0	1,73E-03	2,74E-03	8,23E-04	-6,07E-02
Eutrophication, freshwater	kg P eq	0	4,25E-06	4,61E-06	7,46E-07	-6,55E-04
Eutrophication, marine	kg PO4 eq	0	5,76E-04	1,24E-03	3,51E-04	-1,06E-02
Eutrophication, terrestrial	kg N eq	0	6,34E-03	1,32E-02	3,85E-03	-1,20E-01
Photochemical ozone formation	mol N eq	0	2,71E-03	3,55E-03	1,55E-03	-4,71E-02
Resource use, minerals and metals[1] [3]	kg NMVOC eq	0	1,77E-06	1,22E-06	1,66E-07	1,29E-04
Resource use, fossils[1] [3]	kg Sb eq	0	7,76E+00	7,01E+00	3,29E+00	-2,77E+02
Water use[1]	MJ	0	3,18E-02	1,70E-01	1,14E-02	-6,03E-01
Particulate matter	m^3 depriv.	0	4,32E-08	3,27E-08	2,08E-08	-1,03E-06
Ionising radiation[2]	disease inc.	0	3,54E-03	1,31E-01	1,06E-03	-4,50E+00
Ecotoxicity, freshwater[1] [3]	kBq U-235 eq	0	2,08E+00	7,31E+00	3,36E-01	-3,74E+02
Human toxicity, cancer[1] [3]	CTUe	0	3,86E-09	5,64E-09	5,56E-10	-1,52E-06
Human toxicity, non-cancer[1] [3]	CTUh	0	4,84E-09	3,31E-08	4,85E-10	-3,18E-08
Land use[1] [3]	CTUh	0	4,62E+00	2,54E+00	6,66E+00	-1,74E+02

Disclaimer: It is discouraged to use the results of modules A1 to A3 without considering the results of module C.
[1] Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.
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[3] Disclaimer: The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Climate impact – IPCC 2021 GWP100

Results per functional unit

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5
GWP-GHG[4]	Kg CO2,eq	62,06	2,17	0,17	0,00	2,13	0,00	38,46	0,00
	Unit	**C1**	**C2**	**C3**	**C4**	**D**			
GWP-GHG[4]	Kg CO2,eq	0,00	0,55	3,77	0,13	-13,18			

[4] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO2 is set to zero.

Resource use indicators

Results per functional unit

	Unit	A1-A3	A4	A5	B1	B2	B3	B4	B5
PERE	MJ	4,85E+02	5,17E-01	7,57E-03	**0**	9,44E+00	0	4,33E+01	0
PERM	MJ	2,97E+02	0,00E+00	-3,30E+01	**0**	0,00E+00	0	0,00E+00	0
PERT	MJ	7,82E+02	5,17E-01	-3,30E+01	**0**	9,44E+00	0	4,33E+01	0
PENRE	MJ	7,79E+02	3,24E+01	3,41E-01	**0**	4,34E+01	0	5,22E+02	0
PENRM	MJ	9,59E+01	0,00E+00	-1,86E+00	**0**	0,00E+00	0	0,00E+00	0
PENRT	MJ	8,75E+02	3,24E+01	-1,52E+00	**0**	4,34E+01	0	5,22E+02	0
SM	Kg	5,89E-01	0,00E+00	0,00E+00	**0**	0,00E+00	0	0,00E+00	0
RSF	MJ	0,00E+00	0,00E+00	0,00E+00	**0**	0,00E+00	0	0,00E+00	0
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	**0**	0,00E+00	0	0,00E+00	0
FW	M3	2,36E-01	4,53E-03	5,46E-04	**0**	8,04E-02	0	6,47E-02	0
	Unit	**C1**	**C2**	**C3**	**C4**	**D**			
PERE	MJ	0	1,32E-01	2,57E+00	6,74E-02	-1,66E+02			
PERM	MJ	0	0,00E+00	-2,64E+02	0,00E+00	0,00E+00			
PERT	MJ	0	1,32E-01	-2,62E+02	6,74E-02	-1,66E+02			
PENRE	MJ	0	8,25E+00	7,28E+00	3,50E+00	-2,87E+02			
PENRM	MJ	0	0,00E+00	-9,40E+01	0,00E+00	0,00E+00			
PENRT	MJ	0	8,25E+00	-8,68E+01	3,50E+00	-2,87E+02			
SM	Kg	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00			
RSF	MJ	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00			
NRSF	MJ	0	0,00E+00	0,00E+00	0,00E+00	0,00E+00			
FW	m^3	0	1,15E-03	7,56E-03	3,51E-03	-6,75E-02			
Acronyms	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

Waste indicators

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4
Hazardous waste disposed	kg	13,81	0,00	0,00	0,00	0,00	0,00	13,73
Non-hazardous waste disposed	kg	7,96	0,00	0,00	0,00	0,00	0,00	1,24
Radioactive waste disposed	kg	0,01	0,00	0,00	0,00	0,00	0,00	0,01
Indicator	**Unit**	**B5**	**C1**	**C2**	**C3**	**C4**	**D**	
Materials for energy recovery	kg	0,00	0,00	0,00	0,00	0,00	0,00	
Exported energy, electricity	MJ	0,00	0,00	0,00	0,00	0,00	0,00	
Exported energy, thermal	MJ	0,00	0,00	0,00	0,00	0,00	0,00	

Output flow indicators

Indicator	Unit	A1-A3	A4	A5	B1	B2	B3	B4
Components for re-use	kg	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Material for recycling	kg	3,83	0,00	0,00	0,00	0,00	0,00	0,26
Materials for energy recovery	kg	0,03	0,00	0,00	0,00	0,00	0,00	0,00
Exported energy, electricity	MJ	0,00	0,00	8,36	0,00	0,00	0,00	0,00
Exported energy, thermal	MJ	0,01	0,00	19,52	0,00	0,00	0,00	0,00
Indicator	**Unit**	**B5**	**C1**	**C2**	**C3**	**C4**	**D**	
Components for re-use	kg	0,00	0,00	0,00	0,00	0,00	0,00	
Material for recycling	kg	0,00	0,00	0,00	6,00	0,00	0,00	
Materials for energy recovery	kg	0,00	0,00	0,00	0,00	0,00	0,00	
Exported energy, electricity	MJ	0,00	0,00	0,00	61,07	0,00	0,00	
Exported energy, thermal	MJ	0,00	0,00	0,00	142,51	0,00	0,00	

Voluntary use stage scenario based on energy balance calculation according to Annex C in EN 17213 – AFHC 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	BIM Energy 2024	Modelled as a 1 m^2 room with concrete flooring and no walls or internal loads
Environmental Impact assessment model	Environmental Footprint 3.1	

Technical specifications	
U-value	0,81 w/m^2, K
Gg-value	53 %
Gw-value	38 %
Air leakage class	4
Daylight factor, LT-value	74 %
Glass/frame ratio	0,71
Total heating demand	58 kWh heat/year
Total cooling demand	17 kWh electricity/year

>>Voluntary use stage scenario based on energy balance calculation according to Annex C in EN 17213 – AFHC 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			
Environmental impact category	**Unit**	**Environmental impacts of heating, natural gas**	**Environmental impacts of cooling, electricity**
Global Warming Potential	kg $CO_{2,eq}$	16,2	0,6
Ozone Depletion Potential	kg CFC-11$_{eq}$	6,47E-07	1,68E-08
Acidification Potential	kg $SO_{2,eq}$	9,65E-03	5,26E-03
Eutrophication Potential	kg $PO_4^{-3}{}_{,eq}$	1,59E-03	1,51E-03
Photochemical Ozone Creation Potential	kg C_2H_4	1,64E-02	1,64E-03
Abiotic Depletion Potential, minerals & metals	kg $Sb_{,eq}$	1,59E-05	6,74E-05
Abiotic Depletion Potential, fuels.	MJ	2,55E+02	7,52E+01

Voluntary use stage scenario based on energy balance calculation according to Annex C in EN 17213 – AFHC 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	BIM Energy 2024	Modelled as a 1 m^2 room with concrete flooring and no walls or internal loads
Environmental Impact assessment model	Environmental Footprint 3.1	

Technical specifications	
U-value	1,05 w/m^2, K
Gg-value	60 %
Gw-value	43 %
Air leakage class	4
Daylight factor, LT-value	75 %
Glass/frame ratio	0,71
Total heating demand	77 kWh heat/year
Total cooling demand	17 kWh electricity/year

>>Voluntary use stage scenario based on energy balance calculation according to Annex C in EN 17213 – AFHC 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			
Environmental impact category	**Unit**	**Environmental impacts of heating, natural gas**	**Environmental impacts of cooling, electricity**
Global Warming Potential	kg $CO_{2,eq}$	21,6	0,6
Ozone Depletion Potential	kg CFC-11$_{eq}$	8,59E-07	1,68E-08
Acidification Potential	kg $SO_{2,eq}$	1,28E-02	5,26E-03
Eutrophication Potential	kg $PO_4^{-3}{}_{,eq}$	2,11E-03	1,51E-03
Photochemical Ozone Creation Potential	kg C_2H_4	2,18E-02	1,64E-03
Abiotic Depletion Potential, minerals & metals	kg $Sb_{,eq}$	2,12E-05	6,74E-05
Abiotic Depletion Potential, fuels.	MJ	3,38E+02	7,52E+01

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