

Environmental Product Declaration

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

Product family

Elitfönster Harmoni

Model

Fixed frame

Product name

EFL-AL

From

Elitfönster AB

Box 153

574 22 Vetlanda

Publication date 2021-08-27

Valid for 5 years until 2026-08-27

Programme

The International EPD® System, www.environdec.com

Programme operator

EPD International AB

EPD registration number

S-P-03739

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



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.

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:

Specific



Product information

Fixed frame - EFL-AL

Fixed wooden frame with external aluminum cladding and a 3-glazed insulating glass glazed from the inside.

According to the Construction Products Ordinance CPR (EU) no. 305/2011, the essential properties of the product must be declared in the CE marking and Declaration of Performance. The technical properties of the window are declared in the Declaration of Performance, DoP no. 40-29-CE3015101 which can be accessed on Elitfönster's website.



LCA information

Functional Unit	<p>The functional unit used in this report is 1 m². The weight of finished EFL-AL is 35,08 kg per m². Standard size is 1230 x 1480mm</p>
Reference Service Life (RSL)	<p>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.</p>
Product group classification	<p>UN CPC 42120</p>
Goal and Scope	<p>The result will be used to understand where the environmental burden for the product occurs during the life cycle and aim to lay a road map for development to reduce this burden. The result will be communicated by the International EPD system.</p>
Manufacturing Site	<p>Brogårdsgatan 1, 574 38, Vetlanda, Sverige,</p>
Geographical Area	<p>Europe</p>
Compliant with	<p>This EPD follows the "Book-keeping" LCA approach which is defined as an attributional LCA in the ISO 14040 standard.</p> <p>The EPD is compliant with:</p> <ul style="list-style-type: none"> • ISO 14025 • EN 15804:2012+A2:2019 • Product Category Rules PCR 2019-12-20. Construction products and construction services. Version 2.33 • Sub-PCR-007 Windows and doors (EN 17213)
Cut-Off Rules	<p>The procedure below is followed for the exclusion of inputs and outputs according to the EN 15804:2012+ A2:2019 standard:</p> <ul style="list-style-type: none"> • 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. <p>No cut-offs have been made concerning specific data in this study.</p>
Background Data	<p>The data quality of the background data is considered good. All site-specific data is collected from the year 2019. ecoinvent is the world's biggest LCI data library and the latest and most updated version was used. ecoinvent's data library contain data for the specific geographical regions relevant for this study.</p> <p>The assessment considers all available data from the production process, including all raw materials and auxiliary materials used as well as the energy consumption in relation to available ecoinvent 3.6 datasets for the manufacture of concrete piles.</p> <p>The background data from ecoinvent 3.6 are from 2016-2019</p>
Electricity data	<p>Electricity consumption in the A3 module comes from 100% wind power certified by Guarantee of Origin, Electricity is represented by data in ecoinvent 3.6 regionalized for Sweden.</p>
Assumptions	<p>In A4 the transport distance is assumed to be 320km, based on average distances 2020.</p> <p>When installing and uninstalling the window no environmental aspects in addition to using of electrical machines is assumed according to installation instructions from Elitfönster.</p> <p>The used window is assumed to be transported 50km to the closest waste management facility.</p> <p>The window is assumed to require 60 ml/m² of cleaning solution per year.</p> <p>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:</p> <ul style="list-style-type: none"> • 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. <p>Waste not recycled or incinerated is assumed to go to landfill.</p>

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 9.1. Resource use values are calculated from Cumulative Energy Demand V1.11.
Based on LCA Report	Miljögiraff report 943 LCA Elitfönster
LCA Practitioner	Viktor Hakkarainen, Miljögiraff AB
Software	SimaPro 9.1.1.7

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.

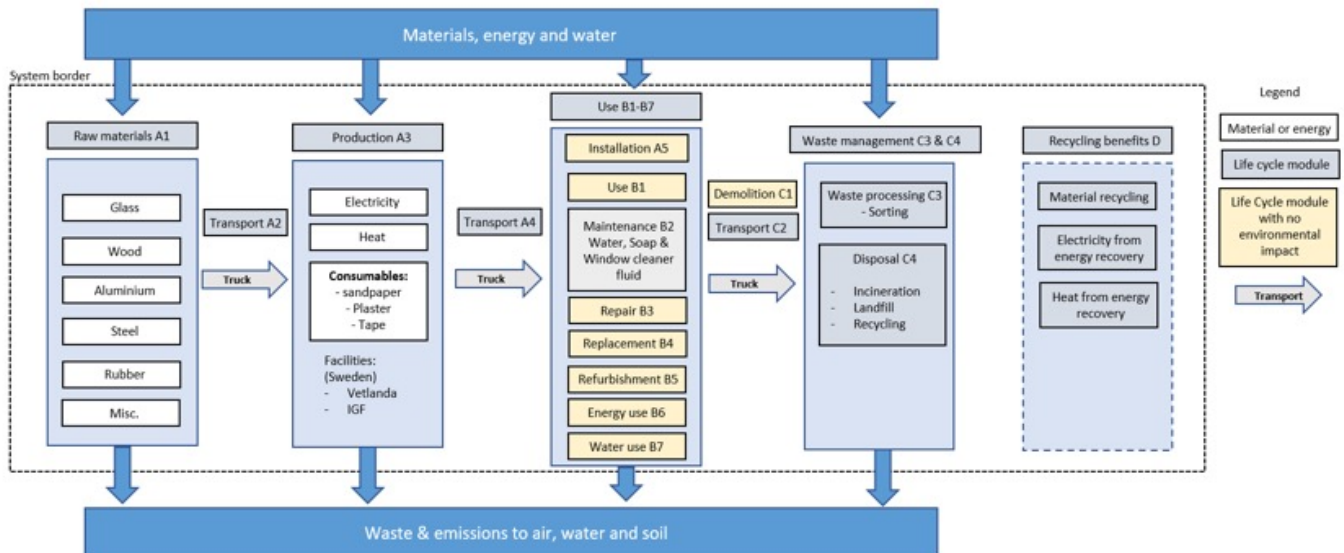
System Boundary

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 demolition	Transport	Waste processing	Disposal	
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
Specific data	>90%					-	-	-	-	-	-	-	-	-	-	-	-

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



Content and life cycle information

Fixed frame - EFL-AL consist of 15 raw materials.
The weight per FU and part recycled material can be seen in Table 2.

Table 2, show the weight and part recycled material for the raw material in Fixed frame - EFL-AL

Raw material	kg per m ² Fixed frame – EFL-AL	Post-consumer material, weight-%
Glass	28,297	9,3
Argon	0,043	0
Distance list	0,269	0
Edge sealing compound	0,609	0
Butyl	0,054	0
Desiccant	0,232	0
Pinewood	8,81	0
Surface treatment pine	0,485	0
Aluminum	1,53	30
Powder coating aluminum	0,057	0
Steel	0,06	45
Plastic	0,206	0
Rubber EPDM	0,219	0
Glue	0,021	0
Sealant	0,029	0

During production, the wood raw material is cut and planed in Elitfönster's premises in Vetlanda. The finished wood details are surface treated with a water-based paint system. As wood raw material, pine used by FSC-labeled and / or PEFC-labeled suppliers such as lamella glues and finger joints, the wood raw material is used.

Elitfönster's own glass factory IGF in Lenhovda buys flat glass. IGF cuts the glass and manufactures the insulating glass. The glasses are installed in the product in Elitfönster's manufacturing unit in Vetlanda.

Aluminum profiles are delivered by Profilgruppen in Åseda, they are processed, and powder coated on A-painting in Sävsjö, then transported to Elitfönster's manufacturing unit in Vetlanda for final assembly.

To produce 1 m² Fixed frame - EFL-AL, 9,96 kWh of electricity and 4,91 kWh of heat is used. Electricity is certified wind power electricity.

1,7 kWh of the heat comes from own combustion from waste in production, the rest comes from the district heating network in Vetlanda. District heating in Vetlanda comes to 98.7% from renewable sources.

In total, 14 % of waste is generated in production. A large part of the waste is wood.

During usage, no indoor emissions arise. The paint used is water based and all the other raw materials do not emit any emissions.

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).

Environmental Information – Fixed frame – EFL-AL

Potential environmental impact – mandatory indicators according to EN 15804.

Impact category	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Climate change	kg CO _{2eq}	24,93	5,88	3,80	34,61	1,89	2,57	0,00	2,78	0,00
Climate change - Fossil	kg CO _{2eq}	42,39	5,87	1,56	49,82	1,88	0,17	0,00	3,16	0,00
Climate change - Biogenic	kg CO _{2eq}	-17,51	0,01	2,23	-15,26	0,00	2,41	0,00	-0,57	0,00
Climate change - Land use and LU change	kg CO _{2eq}	0,05	0,00	0,01	0,06	0,00	0,00	0,00	0,18	0,00
Ozone depletion	kg CFC11 _{eq}	5,78E-06	1,33E-06	1,20E-07	7,23E-06	4,28E-07	2,11E-09	0,00E+00	3,94E-07	0,00E+00
Acidification	mol H ⁺ _{eq}	0,38	0,02	0,01	0,41	0,01	0,00	0,00	0,02	0,00
Eutrophication, freshwater	kg P _{eq}	0,008	0,000	0,001	0,009	0,000	0,000	0,000	0,001	0,000
Eutrophication, freshwater	kg PO _{4eq}	0,026	0,001	0,002	0,029	0,000	0,000	0,000	0,004	0,000
Eutrophication, marine	kg N _{eq}	0,061	0,007	0,002	0,071	0,002	0,000	0,000	0,006	0,000
Eutrophication, terrestrial	mol N _{eq}	0,71	0,08	0,03	0,82	0,03	0,00	0,00	0,04	0,00
Photochemical ozone formation	kg NMVOC _{eq}	0,20	0,02	0,01	0,24	0,01	0,00	0,00	0,01	0,00
Resource use, minerals and metals	kg Sb _{eq}	6,04E-04	2,11E-05	6,77E-05	6,93E-04	6,78E-06	5,20E-08	0,00E+00	4,17E-05	0,00E+00
Resource use, fossils	MJ	579	89	20	687	28	0	0	50	0
Water use	m ³ depriv.	10,51	0,24	0,53	11,28	0,08	0,00	0,00	67,53	0,00
Particulate matter	disease inc.	4,25E-06	4,06E-07	2,53E-07	4,91E-06	1,30E-07	3,18E-09	0,00E+00	2,00E-07	0,00E+00
Ionising radiation	kBq U-235 _{eq}	3,11	0,46	0,12	3,70	0,15	0,00	0,00	0,36	0,00
Ecotoxicity, freshwater	CTUe	1422	68	54	1543	22	1	0	111	0
Human toxicity, cancer	CTUh	6,15E-08	2,42E-09	4,10E-09	6,80E-08	7,76E-10	7,42E-11	0,00E+00	4,62E-09	0,00E+00
Human toxicity, non-cancer	CTUh	7,78E-07	6,89E-08	4,11E-08	8,88E-07	2,21E-08	3,27E-09	0,00E+00	8,70E-08	0,00E+00
Land use	Pt	745	61	251	1056	20	0	0	38	0

>> Environmental Information – Fixed frame – EFL-AL

Potential environmental impact – mandatory indicators according to EN 15804.

Impact category	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Climate change	kg CO _{2eq}	0,00	0,00	0,00	0,00	0,00	0,44	0,02	14,63	-5,00
Climate change - Fossil	kg CO _{2eq}	0,00	0,00	0,00	0,00	0,00	0,44	0,01	2,04	-5,35
Climate change - Biogenic	kg CO _{2eq}	0,00	0,00	0,00	0,00	0,00	0,00	0,01	12,59	0,53
Climate change - Land use and LU change	kg CO _{2eq}	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	-0,17
Ozone depletion	kg CFC11 _{eq}	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,00E-07	6,39E-10	7,21E-08	-4,40E-07
Acidification	mol H ⁺ _{eq}	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	-0,05
Eutrophication, freshwater	kg P _{eq}	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,000	-0,002
Eutrophication, freshwater	kg PO _{4eq}	0,000	0,000	0,000	0,000	0,000	0,000	0,000	0,00	-0,01
Eutrophication, marine	kg N _{eq}	0,000	0,000	0,000	0,000	0,000	0,001	0,000	0,00	-0,01
Eutrophication, terrestrial	mol N _{eq}	0,00	0,00	0,00	0,00	0,00	0,01	0,00	0,01	-0,10
Photochemical ozone formation	kg NMVOC _{eq}	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	-0,02
Resource use, minerals and metals	kg Sb _{eq}	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,59E-06	3,15E-07	0,00	0,00
Resource use, fossils	MJ	0	0	0	0	0	7	2	5	-209
Water use	m ³ depriv.	0,00	0,00	0,00	0,00	0,00	0,02	0,03	0,13	-2,99
Particulate matter	disease inc.	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	3,06E-08	9,73E-10	0,00	0,00
Ionising radiation	kBq U-235 _{eq}	0,00	0,00	0,00	0,00	0,00	0,03	0,16	0,02	-11,58
Ecotoxicity, freshwater	CTUe	0	0	0	0	0	5	1	8	-238
Human toxicity, cancer	CTUh	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	1,82E-10	2,12E-11	1,16E-09	-1,46E-08
Human toxicity, non-cancer	CTUh	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,18E-09	2,69E-10	2,30E-08	-2,15E-07
Land use	Pt	0	0	0	0	0	5	1	9	-227

Use of resources - Fixed frame - EFL-AL

	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
PERE	MJ	279,6	1,2	33,1	313,8	0,4	0,0	0,0	11,6	0,0
PERM	MJ	127,5	0,0	56,8	184,3	0,0	0,0	0,0	0,0	0,0
PERT	MJ	407,1	1,2	89,8	498,1	0,4	0,0	0,0	11,6	0,0
PENRE	MJ	584,9	94,2	16,6	695,8	30,2	0,2	0,0	54,1	0,0
PENRM	MJ	40,0	0,0	4,4	44,4	0,0	0,0	0,0	0,0	0,0
PENRT	MJ	625,0	94,2	21,0	740,2	30,2	0,2	0,0	54,1	0,0
SM	Kg	3,1	0,0	0,0	3,1	0,0	0,0	0,0	0,0	0,0
RSF	MJ	0,0	0,0	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
FW	m ³	0,27	0,02	0,01	0,3	0,00	0,00	0,00	2,65	0,00
	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	0,0	0,0	0,0	0,0	0,0	0,1	1,0	0,1	-133,2
PERM	MJ	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PERT	MJ	0,0	0,0	0,0	0,0	0,0	0,1	1,0	0,1	-133,2
PENRE	MJ	0,0	0,0	0,0	0,0	0,0	7,1	2,2	5,4	-213,0
PENRM	MJ	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
PENRT	MJ	0,0	0,0	0,0	0,0	0,0	7,1	2,2	5,4	-213,0
SM	Kg	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0
RSF	MJ	0,0	0,0	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
FW	m ³	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,01	-0,06
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 - Fixed frame - EFL-AL
Waste production

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Hazardous waste disposed	kg	0	0	0	0	0	0	0	0	0
Non-hazardous waste disposed	kg	0	0	0	0	0	0	0	0	0
Radioactive waste disposed	kg	0	0	0	0	0	0	0	0	0
Indicator	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Materials for energy recovery	kg	0	0	0	0	0	0	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0

Output flows

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3
Components for re-use	kg	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0,1	0,1	0	0,02	0	0	0
Materials for energy recovery	kg	0	0	3,4	3,4	0	3,3	0	0	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0
Indicator	Unit	B4	B5	B6	B7	C1	C2	C3	C4	D
Components for re-use	kg	0	0	0	0	0	0	0	0	0
Material for recycling	kg	0	0	0	0	0	0	0	1,4	0
Materials for energy recovery	kg	0	0	0	0	0	0	0	7,9	0
Exported energy, electricity	MJ	0	0	0	0	0	0	0	0	0
Exported energy, thermal	MJ	0	0	0	0	0	0	0	0	0

Information on biogenic carbon content

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	3,4
Biogenic carbon content in packaging	kg C	1,6

Note: 1 kg biogenic carbon is equivalent to 44/12 kg CO₂.

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

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	6,8 °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	1,2 w/m², K
Gg-value	60 %
Gw-value	48 %
Air leakage class	4
Air leakage flow at +/- 50 Pa	0,2 l/s,m ²
Daylight factor, LT-value	75 %
Glass/frame ratio	0,79
Total heating demand	88 kWh heat/year
Total cooling demand	23 kWh electricity/year

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

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}	24,13	1,44
Ozone Depletion Potential	kg CFC-11 _{eq}	2,38E-06	4,34E-08
Acidification Potential	kg SO _{2,eq}	2,00E-02	3,50E-03
Eutrophication Potential	kg PO ₄ - ³ , _{eq}	2,46E-03	1,52E-03
Photochemical Ozone Creation Potential	kg C ₂ H ₄	1,41E-02	1,90E-03
Abiotic Depletion Potential, minerals & metals	kg Sb, _{eq}	3,00E-05	7,48E-05
Abiotic Depletion Potential, fuels.	MJ	342	134

General information

Programme information

Programme: The International EPD® System

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

Product category rules (PCR): Construction products and construction services. Version 1.1

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

General Programme Instructions of the International EPD® System. Version 3.01.

EN 15804:2012+A2:2019, "Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products"

EN ISO 14025:2014-02 Environmental labels and declarations - Type III environmental declarations - Principles and procedures, Edited in 2010.

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