



Before.



After.



SUMMARY

LCA analysis and EPD based on suppliers EPD and generic data from Ecoinvent modelled in Ecochain MOBIUS

Thomas Bajer

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EPD

Grundels ClimateGlass

General Information

The Environmental Product Declaration (EPD) is based on the PCR CEN Standard EN 15804 A2
Based on 1 m² of ClimateGlass

EPD Owner

Grundels Window Solution AB
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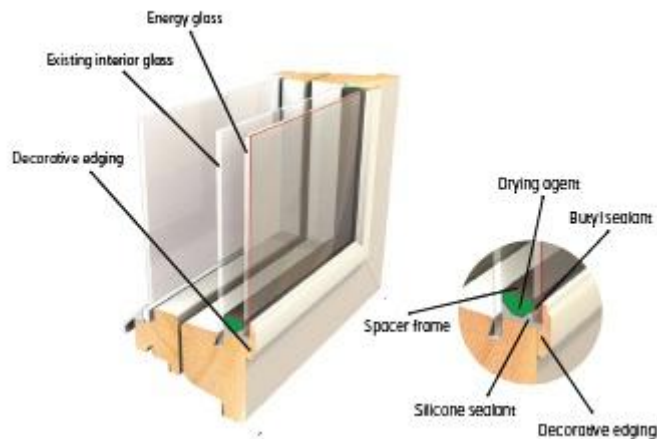
EPD Consultant Thomas Bajer Consulting

Tel +46 (0) 70 – 201 92 21
Tool used: Ecochain Mobius

Publication date: 2025-10-20

Product Description

Grundels ClimateGlass turns your double-glazed windows into energy-efficient triple-glazed windows.



Grundels sealed glazed unit, built- in place, are a tremendously simple, cost-effective – and therefore profitable – way of insulating your windows for energy and noise. The product has been tested according to SP testing standards (requiring a lifetime of at least 30 years).

Our product is for everyone with double-glazed windows: residences, offices, schools, hospitals, other public locations, houses, and especially listed buildings. The installation is done from the inside and does not affect the window's external appearance.

Technical information

- All our glass is custom made, to fit the existing windows inner frame measure.
- The spacer used in the system is made in one piece, without any corner joints and filled with moisture-absorbent drying agent that will last at least 100 years.
- The spacer thickness and measurement in general are also adapted to fit the existing glass area and groove profile.
- A decorative finish, framing can be made of wood, aluminum or any other material that goes with the existing window framing.

Product Composition and Materials

- Energy glass and existing interior glass
- Spacer frame (single-piece, moisture-absorbent drying agent lasting ≥ 100 years)
- Butyl and silicone sealants
- Decorative edging (wood, aluminum, or matching materials)

Technical Data

Property	Value	Notes
General U-value (existing double-glazed window)	2.8 W/m ² °C	Reference baseline
U-value (with Climate Glass)	1.3 W/m ² °C	Verified by SP testing
Noise dampening	3–9 dB	Depending on glass type
Service life	≥ 30 years	P-certified
Installation time	≈ 30 min per window	Internal mounting only

Material in m ² of ClimateGlass				
Material	Weight%	Material	Unit	Waste
Spacer	5,3%	0,630	Kg	5%
Glass	88,9%	11.00	Kg	10%
Drying agent	1,1%	0,123	Kg	
Silicone	2,7%	0,304	Kg	
Butyl	0,2%	0,023	Kg	
Wood frame	1,7%	0,191	Kg	
Paint	0,1%	0,011	Kg	
Green electricity		0,950	kWh	
Total weight		12.28	Kg	

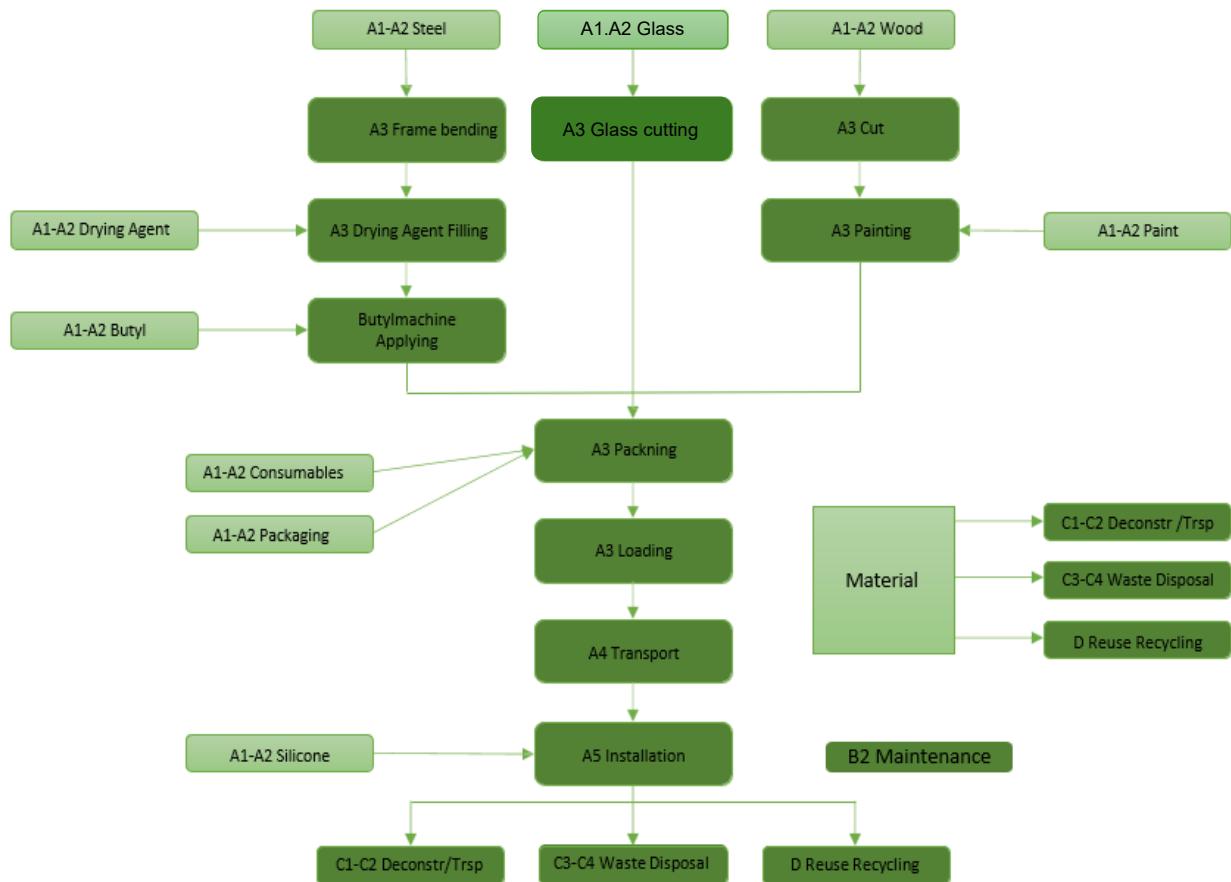
Packaging material in m ² of ClimateGlass				
Material	Weight%	Material	Unit	Waste
Silicon paper		0,008	Kg	
Tape		0,029	Kg	
Pallet wood		0,343	Kg	
Nails		0,004	Kg	
Makulator paper		0,004	Kg	
Cork feet		0,00001	Kg	
Plastic film		0,007	Kg	
Polyester band		0,001	Kg	
Steel Locks Polyester band		0,0006	Kg	
Total weight		0,467	Kg	

Material ClimateGlass	EPD or General	Specification
Glass	AGC GLASS EUROPE	4 mm Low-Carbon Planibel Clearlite Creation date: 04/12/2024 Mother EPD registration number: 20240940455-FC Configured EPD unique ID: 20240940455-FC_95186_1061651
Spacer	Alu-Pro	Cromatech Ultra F S-P-08910
Drying agent	Ecoinvent v3.9.1 Europe and Global	Zeolite, slurry, without water, in 50% solution state zeolite, slurry, without water, in 50% solution state and activated bentonite
Butyl	Dowzil 335	Silicone-based products, group 1. Declaration number EPD-DBC-20220179-IBF1-EN. DBC, Mainzer Landstr. 55, D-60329 Frankfurt a.M. EFCC, 172 Boulevard du Triomphe, B-1160 Brussels FEICA, Rue Belliard 40, B-1040 Brussels IVK, Völklingerstr. 4, D-40219 Düsseldorf
Silicone	LAflexseal Compatible with EPD-FEI-20220021-IBG1-EN	Same supplier as Dowsil 335
Wood frame	Dalalist	Swedish sawn and planed wood product, Swedish Wood S-P-02657
Paint	Everal Aqua Semi Matt 40	PPG Tikkurila, Heidehofintie 2, 01300 Vantaa, Finland
Electricity	Ecoinvent v3.9.1 Sweden	Electricity production, nuclear, boiling water reactor electricity, high voltage

Material Packing	EDP or General	Specification
Pallet wood	Hedins	Swedish sawn and planed wood product, Swedish Wood S-P-02657
Nails	General Purpose Nails	Herco Sp. z o.o. Address: Cielądz 28 C, 96-214 Cielądz, Poland
Tape	PVC Protection Tape	Stokvis Tape Group EPD-IES-0016776
Makulator paper	Ecoinvent v3.11 Europe	Graphic paper production, 100% recycled
Silicon paper	Ecoinvent v3.11 Europe	Single use paper wrap production, for food packaging, from virgin fibre
Cork feet	Ecoinvent v3.9.1 Europe	Cork slab
Plastic film	Ecoinvent v3.11 Europe	Packaging film production, low density polyethylene
Polyester band	Ecoinvent v3.11 Global	Spray-up of resin and fibres
Steel locks Polyester band	Ecoinvent v3.11 Global	Wire drawing, steel

Life Cycle Assessment (LCA)

System boundaries: X=included, MND= module not declared, MNR=module not relevant.																		
	Product stage			Construction process stage		Use stage							End of life stage					Beyond the system boundary
	Raw materials	Transport	Manufacturing	Transport	Construction, installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal		Reuse-Recovery
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	MND	X	MND	MND	MND	MND	MND	X	X	X	X		X
Geography	SE	SE	SE	SE	SE	—	—	—	—	—	—	—	SE	SE	SE	SE		SE



LCA Scenarios and Technical information

A1-A3

ClimateGlass material has a total weight of 12.28 kg, with 1.032 kg of waste, resulting in a net weight of 11.25 kg. For glass waste, 90% is recycled to be feedstock for glass insulation and is reported in category D. The rest 10% of the glass is reported at C4 disposal.

The waste from the distance list is recycled and reported in category D.
In the end of the lifecycle, 50% of the glass is recycled to feedstock for glass insulation and is reported in category D. The other 50% is reported in category C4.

Material waste / m ²	Kg
Spacer	0,032
Glass	1,00
Total	1,032

Transport A2 EURO6 Ecoinvent 3.9.1 / m ²	Transport	Weight Kg	Km	Tonkm
Spacer	Truck	0,630	594	0,37422
Spacer	Ferry	0,630	173	0,10899
Glass	Truck	11.00	1570	17,27
Drying agent	Truck	0,123	375	0,071625
Silicone	Truck	0,304	142	0,043168
Butyl	Truck	0,023	142	0,003266
Wood frame	Truck	0,191	300	0,0033
Paint	Truck	0,011	474	0,058302
Total weight		12,28		

Transport A2 EURO6 Ecoinvent 3.9.1 / m ²	Transport	Weight Kg	Km	Tonkm
Silicon paper	Truck	0,08	69	0,00552
Tape	Truck	0,029	133	0,003857
Pallet wood	Truck	0,343	75	0,025725
Nails	Truck	0,004	5	0,00002
Makulator paper	Truck	0,004	90	0,00036
Cork feet	Truck	0,00001	110	1,18E-06
Plastic film	Truck	0,007	110	0,00077
Polyester band	Truck	0,001	90	0,00009
Steel locks Polyester band	Truck	0,0006	90	0,000054
Total weight		0,4767		

A4

Transport to client, the weight of 1 m² ClimateGlass with packaging is 11.73 kg and the average distance to client is 115 km.

Transport A4 EURO6 Ecoinvent 3.9.1 / m ²	Transport	Weight Kg	Km	Tonkm
ClimateGlass with packaging	Truck	11,73	115	1,45

A5

When installing ClimateGlass at client, silicone is being used at this moment. The packaging (0,477 kg and 50 km distance) is transported to waste and recycling and is reported in C1-C4 and D.

B2

This module is maintenance of the glass.

C1-C4 and D

Depending on the materials used, some are going to waste processing and some to recycling. Wood material is used as energy and the plastics are disposed of or used as energy. 50% of the glass is recycled as glass insulation and 50% is reported as waste. 90% of the waste glass from the manufacturing is recycled as glass insulation and 10% is waste.

Transport A4 EURO6 Ecoinvent 3.9.1 / m ²	Transport	Weight Kg	Km	Tonkm
ClimateGlass end of use and packaging To C and D	Truck	12,75	50	0,64

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BASELINE ENVIRONMENTAL IMPACT INDICATORS										
Impact category name	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
Climate change - total (GWP-t)	kg CO ₂ eq	7,85E+00	1,79E+00	3,80E-03	1,35E-01	1,50E-01	1,16E-01	1,89E-04	6,52E-02	6,92E-01
Climate change - fossil (GWP-f)	kg CO ₂ eq	8,70E+00	1,78E+00	8,84E-03	1,35E-01	6,60E-01	3,32E-02	8,51E-05	6,51E-02	6,85E-01
Climate change - biogenic (GWP-b)	kg CO ₂ eq	-8,34E-01	1,41E-03	1,98E-05	1,08E-04	3,48E-02	4,02E-02	3,97E-06	4,13E-05	1,33E-02
Climate change - land use and LU change (GWP-luluc)	kg CO ₂ eq	1,50E-01	8,73E-04	5,35E-03	6,60E-05	6,74E-01	4,26E-02	1,00E-04	2,42E-05	3,10E-03
Ozone depletion (ODP)	kg CFC11 eq	5,70E-08	4,04E-08	5,55E-10	3,07E-09	1,67E-10	0,00E+00	0,00E+00	1,48E-09	0,00E+00
Acidification (AP)	mol H ⁺ eq	9,66E-02	4,77E-03	2,27E-05	3,35E-04	2,02E-05	4,10E-04	1,15E-06	1,58E-04	4,00E-06
Eutrophication, freshwater (EP-fw)	kg P eq	8,36E-05	1,49E-05	1,37E-07	1,13E-06	1,68E-07	1,62E-05	1,92E-11	5,12E-07	0,00E+00
Eutrophication, marine (EP-m)	kg N eq	1,12E-02	1,27E-03	8,15E-06	8,93E-05	8,18E-06	4,42E-04	5,22E-07	4,08E-05	0,00E+00
Eutrophication, terrestrial (EP-t)	mol N eq	1,20E-01	1,34E-02	5,92E-05	9,36E-04	9,48E-05	1,50E-03	9,73E-06	4,51E-04	3,02E-03
Photochemical ozone formation (POCP)	kg NMVOC eq	3,05E-02	7,45E-03	4,38E-05	5,46E-04	3,22E-03	2,14E-04	1,57E-06	2,65E-04	4,00E-06
Resource use, minerals and metals (ADP-mm)	kg Sb eq	8,13E-06	4,96E-06	4,39E-08	3,78E-07	2,49E-09	5,00E-07	3,16E-12	1,90E-07	0,00E+00
Resource use, fossils (ADP-f)	MJ	1,38E+02	2,70E+01	4,10E+00	2,05E+00	3,83E-01	4,00E-01	2,57E-03	9,81E-01	2,68E-01
Water use (WDP)	m ³ -world eq	1,41E+00	1,29E-01	4,13E-02	9,85E-03	1,57E-02	1,66E-01	1,69E-07	5,23E-03	6,92E-02
Climate change - excl. CO ₂ biogenic (GWP-GHG)	kg CO ₂ eq	1,05E+00	1,78E+00	3,81E-03	1,35E-01	9,06E-02	0,00E+00	0,00E+00	6,52E-02	1,10E-03

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RESOURCE UTILIZATION										
Impact category name	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
Particulate matter (PM)	disease inc.	1,83E-08	1,75E-07	1,71E-10	1,33E-08	4,22E-11	0,00E+00	0,00E+00	6,44E-09	0,00E+00
Ionizing radiation (IR)	kBq U235 _{eq}	9,39E-02	1,30E-02	1,84E-01	9,87E-04	2,82E-06	0,00E+00	0,00E+00	4,07E-04	4,00E-04
Ecotoxicity, freshwater (ETF)	CTUe	1,74E+01	1,30E+01	2,95E-02	9,87E-01	9,90E-03	0,00E+00	0,00E+00	1,16E-01	1,78E-01
Human toxicity, cancer (HTC)	CTUh	8,49E-10	7,93E-10	8,13E-11	6,01E-11	1,18E-12	0,00E+00	0,00E+00	1,07E-11	0,00E+00
Land use (SQP)	Pt	2,65E+00	2,73E+01	1,59E-02	2,08E+00	4,27E-03	0,00E+00	0,00E+00	9,93E-01	1,77E-02
Energy, primary, renewable, excluding materials (PERE)	MJ	2,64E+01	0,00E+00	3,06E-05	0,00E+00	2,30E-01	1,80E+00	1,18E-05	0,00E+00	2,75E-02
Energy, primary, renewable, materials (PERM)	MJ	9,18E+00	0,00E+00	-5,47E-02	0,00E+00	-1,96E-01	0,00E+00	0,00E+00	0,00E+00	2,80E-03
Energy, primary, renewable (PERT)	MJ	3,37E+01	3,94E-01	-4,78E-02	3,00E-02	3,38E-02	1,80E+00	1,18E-05	1,52E-02	2,75E-02
Energy, primary, non-renewable, excluding materials (PENRE)	MJ	1,15E+02	0,00E+00	1,86E-04	0,00E+00	6,80E-01	4,00E-01	2,65E-03	0,00E+00	6,91E+00
Energy, primary, non-renewable, materials (PENRM)	MJ	9,09E+00	0,00E+00	-2,07E-04	0,00E+00	-4,96E-01	5,94E-02	0,00E+00	0,00E+00	-6,64E+00
Energy, primary, non-renewable (PENRT)	MJ	1,26E+02	2,87E+01	4,10E+00	2,18E+00	1,91E-01	4,59E-01	2,65E-03	1,04E+00	2,58E-01
Secondary material (SM)	kg	2,12E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	5,66E-03
Secondary fuel, renewable (RSF)	MJ	3,03E-05	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Secondary fuel, non-renewable (NRSF)	MJ	4,60E-07	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Water, freshwater use (FW)	m ³	2,19E-02	3,91E-03	8,90E-04	2,98E-04	1,44E-04	3,87E-03	6,91E-09	1,55E-04	3,00E-03

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WASTE CATEGORY										
Impact category name	Unit	A1-A3	A4	A5	B2	C1	C2	C3	C4	D
Waste, hazardous (HWD)	kg	2,56E-01	1,68E-04	5,05E-07	1,28E-05	8,38E-08	0,00E+00	8,00E-15	6,58E-06	4,00E-03
Waste, nonhazardous (NHWD)	kg	5,23E-01	2,35E+00	4,14E-03	1,80E-01	4,36E-02	5,96E-03	1,25E-07	8,51E-02	5,80E-03
Waste, radioactive (RWD)	kg	1,31E-03	8,20E-06	7,08E-05	6,25E-07	3,61E-03	3,25E-06	1,31E-09	2,72E-07	8,00E-06
OUTFLOWS										
Components for re-use (CRU)	kg	8,69E-02	0,00E+00	8,95E-04	0,00E+00	5,32E-09	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for recycling (MFR)	kg	3,29E-02	0,00E+00	4,37E-02	0,00E+00	1,60E-03	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Materials for energy recovery (MER)	kg	5,41E-03	0,00E+00	0,00E+00	0,00E+00	3,42E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Exported energy, thermal (EET)	MJ	7,33E-02	0,00E+00	0,00E+00	0,00E+00	1,99E-01	0,00E+00	0,00E+00	0,00E+00	1,97E-01
Exported energy, electricity (EEE)	MJ	6,28E-03	0,00E+00	0,00E+00	0,00E+00	3,55E-01	0,00E+00	0,00E+00	0,00E+00	0,00E+00
Toxicity										
Ecotoxicity, freshwater - organics (ETF-o)	CTUe	1,32E-01	5,03E-01	1,08E-03	3,82E-02	6,16E-05	0,00E+00	0,00E+00	4,61E-03	0,00E+00
Ecotoxicity, freshwater - inorganics (ETF-i)	CTUe	1,86E+00	1,25E+01	2,84E-02	9,49E-01	6,94E-03	0,00E+00	0,00E+00	1,11E-01	0,00E+00
Human toxicity, cancer - organics (HTC-o)	CTUh	3,04E-10	3,88E-10	2,85E-12	2,94E-11	1,01E-12	0,00E+00	0,00E+00	4,76E-12	0,00E+00
Human toxicity, cancer - inorganics (HTC-i)	CTUh	1,03E-08	1,92E-08	1,04E-10	1,47E-09	4,62E-11	0,00E+00	0,00E+00	6,33E-10	0,00E+00
Human toxicity, non-cancer (HTNC)	CTUh	6,22E-11	4,05E-10	7,85E-11	3,08E-11	1,64E-13	0,00E+00	0,00E+00	5,94E-12	0,00E+00
Human toxicity, non-cancer - organics (HTNC-o)	CTUh	1,69E-10	9,81E-10	5,89E-12	7,48E-11	5,17E-13	0,00E+00	0,00E+00	3,63E-11	0,00E+00
Human toxicity, non-cancer - inorganics (HTNC-i)	CTUh	7,19E-09	1,83E-08	9,77E-11	1,39E-09	4,57E-11	0,00E+00	0,00E+00	5,97E-10	0,00E+00

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Impact per item in kg CO2 eq

