

ENVIRONMENTAL PRODUCT DECLARATION

as per ISO 14025 and EN 15804+A2

Owner of the Declaration	Glas Trösch Holding AG
Publisher	Institut Bauen und Umwelt e.V. (IBU)
Programme holder	Institut Bauen und Umwelt e.V. (IBU)
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Valid to	04.02.2029

Laminated safety glass EUROLAMEX Glas Trösch Holding AG

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EPD
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1. General Information

Glas Trösch Holding AG

Programme holder

IBU – Institut Bauen und Umwelt e.V.
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10117 Berlin
Germany

Declaration number

EPD-GLS-20230183-IBB3-EN

This declaration is based on the product category rules:

Plate glass for construction and interlayers, 01.08.2021
(PCR checked and approved by the SVR)

Issue date

05.02.2024

Valid to

04.02.2029



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Laminated safety glass EUROLAMEX

Owner of the declaration

Glas Trösch Holding AG
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4922 Bützberg
Switzerland

Declared product / declared unit

1 m² EUROLAMEX laminated safety glass consisting of 2 panes of float glass 3 mm thick and 1 film made of polyvinyl butyral (PVB).

Scope:

The EPD covers 100% of the production of laminated safety glass by Glas Trösch Holding AG at the plants in Osterweddingen (D), Haldensleben (D) and Ujazd (PL).

The owner of the declaration shall be liable for the underlying information and evidence; the IBU shall not be liable with respect to manufacturer information, life cycle assessment data and evidences.

The EPD was created according to the specifications of EN 15804+A2. In the following, the standard will be simplified as *EN 15804*.

Verification

The standard EN 15804 serves as the core PCR

Independent verification of the declaration and data according to ISO 14025:2011

internally externally



Angela Schindler,
(Independent verifier)

2. Product

2.1 Product description/Product definition

Laminated safety glass (LSG) consists of at least two superimposed panes of float glass and one or more layers of a tear-resistant and viscoplastic film between the panes, which is usually made of polyvinyl butyral (PVB).

Laminated safety glass binds splinters in the event of glass breakage and thus significantly reduces the risk of injury. In addition, laminated safety glass offers a significantly improved residual load-bearing capacity compared to float glass in the event of glass breakage.

This EPD applies to the following products:

Product name and build-up of the LSG

EUROLAMEX 6.1 33.1 (declared as representative product)

EUROLAMEX 6.2 33.2

EUROLAMEX 8.1 44.1

EUROLAMEX 8.2 44.2

EUROLAMEX 8.4 44.4

EUROLAMEX 10.1 55.1

EUROLAMEX 10.2 55.2

EUROLAMEX 12.1 66.1

EUROLAMEX 12.2 66.2

EUROLAMEX 16.1 88.1

EUROLAMEX 16.2 88.2

For the placing on the market of the product in the European Union/European Free Trade Association (EU/EFTA) (with the exception of Switzerland) *Regulation (EU) No. 305/2011 (CPR)* applies. The product needs a declaration of performance taking into consideration *EN 14449:2005-07, Glass in building - Laminated glass and laminated safety glass - Evaluation of conformity/Product standard* and the CE-marking. For the application and use the respective national provisions apply.

2.2 Application

Laminated safety glass is the starting material for the manufacture of a wide range of products, not only in the construction industry. These include their use as windows or façade elements in the building envelope or in the expansion of buildings and structures.

2.3 Technical Data

Technical data: EUROLAMEX 6.1 (LSG 33.1)

Name	Value	Unit
Heat transfer coefficient acc. to EN 673	5.6	W/(m ² K)
Total energy transmittance acc. to EN 410	81	%
Light transmission level acc. to EN 410	90	%
Airborne sound reduction acc. to EN 12758	32	dB
Lichreflexion außen acc. to EN 410	8	%

Performance data of the product in accordance with the declaration of performance with respect to its essential

characteristics according to:

- *EN 14449:2005-07, Glass in building - Laminated glass and laminated safety glass - Evaluation of conformity/Product standard*

2.4 Delivery status

Standard size in Europe: 6000 mm × 3210 mm.

Cuts and excess lengths on customer request are possible.

2.5 Base materials/Ancillary materials

Laminated safety glass consists of:

- Floatglas (> 95 %)
- Film made from polyvinylbutyral (PVB) (< 5 %)

This product contains substances listed in the *ECHA candidate list* (date: 22.11.2022) exceeding 0.1 percentage by mass:

- no

This product contains other carcinogenic, mutagenic, reprotoxic (CMR) substances in categories 1A or 1B which are not on the *ECHA candidate list*, exceeding 0.1 percentage by mass:

- no

Biocide products were added to this construction product or it has been treated with biocide products (this then concerns a treated product as defined by the *(EU) Ordinance on Biocide Products No. 528/2012*:

- no

2.6 Manufacture

In the production of laminated safety glass, float glass panes are bonded together using a PVB film in an autoclave under the influence of heat and pressure, with variations possible in the thickness of the glass or film, the type of glass and the number of panes bonded together. In the construction sector, laminated safety glass consisting of 2 panes (and a PVB film) is usually used.

All sites where float glass and laminated safety glass are manufactured are certified to *ISO 9001*.

2.7 Environment and health during manufacturing

The manufacturing conditions do not require any special health protection measures. The MAK values (= maximum permissible concentration) (Germany) are not exceeded at any point in the plant.

Emissions into the air: The exhaust air generated during production is cleaned in accordance with legal requirements. Emissions are below the legal country-specific limits.

Emissions to water/soil: No contamination of water and soil. No production-related waste water.

Noise: Noise protection analyses have shown that all values communicated inside and outside the production facilities are below the applicable standards.

Environmental protection is a high priority for the Glas Trösch Group. All sites where float glass and laminated safety glass is manufactured are certified to *ISO 14001*. The majority of sites also have *ISO 50001* certification.

2.8 Product processing/Installation

Laminated safety glass is primarily used for glazing in buildings. However, it can also be used for other applications such as interiors or industrial applications. Laminated safety glass is a semi-finished or finished product that is used in numerous

applications.

2.9 Packaging

The glass is transported on a suitable metal rack, which is integrated into the transport system used and is reusable. Small quantities of cardboard and wood are used to protect the glass during transportation. Both are used several times and then recycled or used for energy recovery.

2.10 Condition of use

The composition of the product and its inherent material properties do not change over its service life.

2.11 Environment and health during use

There are no known emissions, namely of volatile organic compounds (VOCs) from laminated safety glass.

2.12 Reference service life

The service life of laminated safety glass depends on the service life of the product for which production it is used. The service life of the product can be assumed to be 30 years. This duration does not reflect the actual service life of the product, which is generally given by the service life or time until a building is renovated. It is merely a matter of taking into account that after more than 30 years, it may be appropriate to renovate windows, for example.

2.13 Extraordinary effects

Fire

Fire protection according to EN 13501-1 (EUROLAMEX 6.1)

Name	Value
Building material class (EUROLAMEX 6.1)	B
Burning droplets	s1
Smoke gas development	d2

Water

The composition and technical properties of laminated safety glass do not change as a result of unforeseen exposure to water, e.g. flooding.

The film may become cloudy.

Mechanical destruction

In exceptional cases, mechanical destruction of laminated safety glass can result in a very small number of sharp edges and splinters. The risk of injury is significantly reduced by the adhesion of the cullet to the film.

2.14 Re-use phase

Laminated safety glass is 100% recyclable. Clean cullet from production can be completely recycled back into float glass (and laminated safety glass) if it is heavily crushed. However, recycling is more common in the manufacture of glass wool, foam glass, etc., as the quality requirements for the cullet are lower here.

Laminated safety glass from the post-consumer sector can be used as a substitute for gravel in road beddings; it is often landfilled.

2.15 Disposal

As an inert material, laminated safety glass can be landfilled without any problems. However, as a 100% recyclable material, it should be returned to the cycle.

The waste code according to the European Waste Catalogue (AVV) is: 17 02 02 (glass)

2.16 Further information

Further information on laminated safety glass from Glas Trösch Holding AG can be obtained from:

<https://www.glastroesch.com>

3. LCA: Calculation rules

3.1 Declared Unit

Laminated safety glass VSG EUROLAMEX 6.01 (2 panes of float glass 3 mm, 1 PVB film of 0.38 mm) is declared as the best-selling and therefore representative product in the construction industry.

Declared value and mass referenceug

Name	Value	Unit
Declared unit	1	m ²
Grammage	15.4	kg/m ²
Layer thickness	0.006	m

The declared values represent the average value of the three production sites named in the scope of validity, weighted by production volume.

3.2 System boundary

Type of EPD: "from the cradle to the factory gate with modules C1-C4 and module D (A1-A3, C and D)".

In the manufacture of 2-pane laminated safety glass (modules A1-A3), 2 panes of flat glass, each 3 mm thick, are bonded with a PVB film. LSG is usually loaded onto metal racks that are often reused; accordingly, only small quantities of packaging material are produced - if any at all - that have to be disposed of.

In connection with the modeling of the production of flat glass, the following system limits were assumed in terms of the "end ofwaste" status:

- Cullet is considered a "product" according to *REGULATION (EU) No. 1179/2012 of December 10, 2012*. Broken glass has reached "end of waste" status when it is available as sorted cullet.

External cullet enters the product system as sorted cullet and is therefore a "secondary material" according to EN 15804. No secondary fuel is used as input for the modeling.

Due to the negligible quantity, the content of biogenic carbon in the packaging is not explicitly taken into account when quantifying the "GWP" indicator (according to the cut-off criteria).

Modules A1-A3 of the production stage comprise the manufacture of the products, including raw material extraction and processing, energy generation, the manufacture of by-products and packaging materials, and all waste treatment processes.

Module A4 is not declared, as declared glass is first transported to processors and then on to the construction site; accordingly, the transports must be declared in EPDs for the products in which laminated safety glass is used.

No inputs and outputs are attributed to the actual installation in order to avoid double counting by the user of laminated safety glass. Laminated safety glass is generally loaded onto metal racks that are often reused; accordingly, only small quantities of packaging material - if any - are produced that need to be disposed of; **module A5** is therefore not declared.

The maintenance (**module B2**) of the laminated safety glass, namely its cleaning, is not declared, as it depends heavily on the area of application of the laminated safety glass. These inputs and outputs must be taken into account in the declaration of the product in which the laminated safety glass is installed.

Two scenarios are declared in the end-of-life:

- Scenario 1, recycling: the utilization of the deconstructed glass as a gravel substitute;
- Scenario 2, disposal: landfilling in an inert material landfill.

As dismantling takes place at the end of life of the final product, module C1 is not declared.

Module C2_1 comprises the transportation of the laminated safety glass (installed in a product) over 50 km to a sorting plant for building materials.

Module C2_2 comprises the transportation of the laminated safety glass (installed in a product) over 50 km to an inert material landfill.

Module C3_1 describes the processing of the laminated safety glass into gravel substitute for scenario 1.

Module C4_2 describes the landfilling of the laminated safety glass for scenario 2.

Module D_1 describes the avoidance of the extraction of primary gravel for scenario 1, whereby a net flow calculation is carried out in relation to the input and output of cullet.

No credits result from the landfilling of the laminated safety glass.

The declaration of benefits from the recycling of minimal quantities of waste from production or minimal quantities of packaging from transport packaging is neglected in both D-modules.

The corresponding residual mixes from the *ecoinvent v3.9.1* database are used, whereby the Osterweddingen plant purchases certified electricity from renewable sources.

3.3 Estimates and assumptions

Beyond the assumptions and estimates mentioned in Chapters 3 and 4, no assumptions were made that would be of significance for the interpretation of the LCA.

3.4 Cut-off criteria

All data from the detailed plant data survey was taken into account in the life cycle assessment. The data from the individual plants was cross-checked for plausibility and checked for incorrect or missing values.

Expenses for management, research and development, administration and marketing are not taken into account where known.

This approach considers also material and energy flows with a share of less than 1% of the total material and energy flows used in the manufacture of float glass.

The production of any packaging for the raw materials and additives was neglected. If packaging is used at all, reusable containers are used, the quantities and environmental impacts of which are not relevant for the LCA. Furthermore, no material or energy flows were neglected in the LCA that were known to the project managers and that could be

expected to have a significant environmental impact with regard to the indicators shown. It can therefore also be assumed that the sum of the neglected processes does not exceed 5% of the impact categories.

The criteria for the exclusion of inputs and outputs in accordance with *EN 15804* are therefore fulfilled.

3.5 Background data

Ecoinvent v3.9.1 (system model "cut-off by classification") was used as the background database.

The PVB film was inventoried using a manufacturer-specific LCA inventory calculated with the *GaBi software* (version 10.7.1.28, based on the MASTER_DB_CUP_2023.2 database).

3.6 Data quality

The foreground data was collected without significant data gaps and linked to current background data.

Known methodological deviations of the background data from the requirements of *EN 15804* are not relevant for the LCA of this product. The conformity of the life cycle assessment according to *ISO 14040/ISO 14044* for the PVB film with *EN 15804* cannot be assessed.

No methodological decisions had to be made that are not supported by *EN 15804*.

Against this background, there are neither methodological nor data-related restrictions for the use of the results in an EPD.

The representativeness for laminated safety glass manufactured by Glas Trösch Holding AG is 100%.

3.7 Period under review

The process data and production volumes used for the modeling represent the year 2021.

3.8 Geographic Representativeness

Land or region, in which the declared product system is manufactured, used or handled at the end of the product's lifespan: Europe

3.9 Allocation

When modeling the actual processes for the production of laminated safety glass, there are no process steps that would require a co-product allocation.

The allocation of inputs and outputs in the plants to the production of float glass and laminated safety glass, was process-related due to different production lines. Within the production of laminated safety glass, the allocation was based on mass.

No processes were modeled that would have required a multi-input allocation.

Reuse, recycling and recovery were modeled according to the specifications of *EN 15804*. This means that the secondary materials used in glass production - namely cullet from external sources - are modeled from the system boundary of the product system; they are accounted for from the point at which the waste flow from the upstream system reaches the end of the waste state in accordance with *EN 15804* and are inventoried without loads from the upstream product system.

In contrast, internal cullet is modeled as a "closed loop".

Glass production does not generate any waste or secondary

materials or raw materials that are used in a subsequent product system.

3.10 Comparability

Basically, a comparison or an evaluation of EPD data is only possible if all the data sets to be compared were created according to *EN 15804* and the building context, respectively

the product-specific characteristics of performance, are taken into account. *Ecoinvent v3.9.1* (system model "cut-off by classification") was used as the background database. The PVB film was inventoried using a manufacturer-specific LCA inventory calculated with the *GaBi software* (version 10.7.1.28, based on the MASTER_DB_CUP_2023.2 database).

4. LCA: Scenarios and additional technical information

Characteristic product properties of biogenic carbon

Information on the description of the biogenic carbon content at the factory gate

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

Name	Value	Unit
Biogenic carbon content in product	-	kg C
Biogenic carbon content in accompanying packaging	-	kg C

End of life (C1-C4)

Two scenarios are declared in the end-of-life:

- Scenario 1, recycling of the dismantled glass as a substitute for crushed stone, e.g. for the coffering of roads
- Scenario 2, disposal: landfilling in an inert material landfill

Name	Value	Unit
Collected separately waste type	-	kg
Collected as mixed construction waste	15.4	kg
Reuse	-	kg
Recycling (Scenario 1)	15.4	kg
Energy recovery	-	kg
Landfilling (Scenario 2)	15.4	kg

Reuse, recovery and recycling potential (D), relevant scenario data

Module D_1 describes the avoidance of the extraction of primary gravel for scenario 1, whereby a net flow calculation is carried out in relation to the input and output of cullet. No credits result from the landfilling of the laminated safety glass.

There is no declaration of benefits from the recycling of minimal quantities of waste from production or minimal quantities of packaging from transport packaging in Module D.

5. LCA: Results

Used characterization factors: Version EF 3.1

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE OR INDICATOR NOT DECLARED; MNR = MODULE NOT RELEVANT)

Product stage			Construction process stage		Use stage							End of life stage				Benefits and loads beyond the system boundaries
Raw material supply	Transport	Manufacturing	Transport from the gate to the site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MNR	MNR	MNR	MND	MND	X	X	X	X	X

RESULTS OF THE LCA - ENVIRONMENTAL IMPACT according to EN 15804+A2: 1 m² laminated safety glass EUROLAMEX 6.01

Parameter	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C4/2	D/1	D/2
GWP-total	kg CO ₂ eq	1.67E+01	ND	7.94E-02	7.94E-02	3.33E-01	9.27E-02	-4.6E-02	0
GWP-fossil	kg CO ₂ eq	1.67E+01	ND	7.93E-02	7.93E-02	2.08E-01	9.24E-02	-4.43E-02	0
GWP-biogenic	kg CO ₂ eq	6.28E-02	ND	6.93E-05	6.93E-05	1.25E-01	2.98E-04	-1.76E-03	0
GWP-luluc	kg CO ₂ eq	3.9E-03	ND	3.79E-05	3.79E-05	2.73E-04	1.73E-05	-3.19E-05	0
ODP	kg CFC11 eq	4.01E-07	ND	1.75E-09	1.75E-09	2.15E-09	3.02E-09	-7.1E-10	0
AP	mol H ⁺ eq	9.07E-02	ND	1.91E-04	1.91E-04	6.92E-04	5.63E-04	-3.57E-04	0
EP-freshwater	kg P eq	4.06E-04	ND	6.47E-07	6.47E-07	3.52E-06	4.99E-07	-1.08E-06	0
EP-marine	kg N eq	1.36E-02	ND	5.1E-05	5.1E-05	2.74E-04	2.45E-04	-1.04E-04	0
EP-terrestrial	mol N eq	2.23E-01	ND	5.34E-04	5.34E-04	2.52E-03	2.63E-03	-1.41E-03	0
POCP	kg NMVOC eq	4.88E-02	ND	3.12E-04	3.12E-04	8.38E-04	1.04E-03	-3.6E-04	0
ADPE	kg Sb eq	9.62E-05	ND	2.16E-07	2.16E-07	5.27E-07	9.18E-08	-5.98E-07	0
ADPF	MJ	2.15E+02	ND	1.17E+00	1.17E+00	1.85E+00	2.21E+00	-6.43E-01	0
WDP	m ³ world eq deprived	8.36E+00	ND	5.67E-03	5.67E-03	8.28E-02	8.07E-03	-1.09E-02	0

GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential of land and water; EP = Eutrophication potential; POCP = Formation potential of tropospheric ozone photochemical oxidants; ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential

RESULTS OF THE LCA - INDICATORS TO DESCRIBE RESOURCE USE according to EN 15804+A2: 1 m² laminated safety glass EUROLAMEX 6.01

Parameter	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C4/2	D/1	D/2
PERE	MJ	1.32E+01	ND	1.69E-02	1.69E-02	1.23E-01	4.29E-02	-2.03E-01	0
PERM	MJ	0	ND	0	0	0	0	0	0
PERT	MJ	1.32E+01	ND	1.69E-02	1.69E-02	1.23E-01	4.29E-02	-2.03E-01	0
PENRE	MJ	2.05E+02	ND	1.17E+00	1.17E+00	1.85E+00	2.22E+00	-6.43E-01	0
PENRM	MJ	9.95E+00	ND	0	0	0	0	0	0
PENRT	MJ	2.15E+02	ND	1.17E+00	1.17E+00	1.85E+00	2.22E+00	-6.43E-01	0
SM	kg	3.18E+00	ND	0	0	0	0	1.22E+01	0
RSF	MJ	0	ND	0	0	0	0	0	0
NRSF	MJ	0	ND	0	0	0	0	0	0
FW	m ³	2.96E-01	ND	3.46E-04	3.46E-04	3.1E-03	3.01E-04	-4.63E-03	0

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 resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

RESULTS OF THE LCA - WASTE CATEGORIES AND OUTPUT FLOWS according to EN 15804+A2: 1 m² laminated safety glass EUROLAMEX 6.01

Parameter	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C4/2	D/1	D/2
HWD	kg	6.41E-04	ND	7.28E-06	7.28E-06	9.18E-06	1.08E-05	-4.24E-06	0
NHWD	kg	1.95E+00	ND	1.03E-01	1.03E-01	8.98E-01	1.54E+01	-1.2E-02	0
RWD	kg	8.45E-04	ND	6.18E-07	6.18E-07	6.87E-06	8.55E-07	-4.38E-06	0
CRU	kg	0	ND	0	0	0	0	0	0
MFR	kg	0	ND	0	0	1.54E+01	0	0	0
MER	kg	0	ND	0	0	0	0	0	0
EEE	MJ	0	ND	0	0	0	0	0	0
EET	MJ	0	ND	0	0	0	0	0	0

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy

**RESULTS OF THE LCA – additional impact categories according to EN 15804+A2-optional:
1 m² laminated safety glass EUROLAMEX 6.01**

Parameter	Unit	A1-A3	C1	C2/1	C2/2	C3/1	C4/2	D/1	D/2
PM	Disease incidence	1.56E-04	ND	7.62E-09	7.62E-09	1.4E-08	1.42E-08	-7.79E-09	0
IR	kBq U235 eq	2.83E-01	ND	5.63E-04	5.63E-04	5.04E-03	8.67E-04	-4.42E-03	0
ETP-fw	CTUe	3.1E+02	ND	6.13E-01	6.13E-01	1.51E+00	9.84E-01	-3.51E-01	0
HTP-c	CTUh	4.33E-09	ND	3.43E-11	3.43E-11	2.85E-10	2.96E-11	-8.39E-11	0
HTP-nc	CTUh	1.67E-07	ND	1.05E-09	1.05E-09	2.97E-09	7.3E-10	-1.04E-09	0
SQP	SQP	4.55E+01	ND	1.19E+00	1.19E+00	1.57E+00	4.57E+00	-1.27E+00	0

PM = Potential incidence of disease due to PM emissions; IR = Potential Human exposure efficiency relative to U235; ETP-fw = Potential comparative Toxic Unit for ecosystems; HTP-c = Potential comparative Toxic Unit for humans (cancerogenic); HTP-nc = Potential comparative Toxic Unit for humans (not cancerogenic); SQP = Potential soil quality index

Disclaimer 1 – for the indicator “Potential Human exposure efficiency relative to U235”. 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 effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, radon and from some construction materials is also not measured by this indicator.

Disclaimer 2 – for the indicators “abiotic depletion potential for non-fossil resources”, “abiotic depletion potential for fossil resources”, “water (user) deprivation potential, deprivation-weighted water consumption”, “potential comparative toxic unit for ecosystems”, “potential comparative toxic unit for humans – cancerogenic”, “Potential comparative toxic unit for humans - not cancerogenic”, “potential soil quality index”. The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high as there is limited experience with the indicator.

6. LCA: Interpretation

Figure 1 shows the contributions of the individual sections of the life cycle for the "recycling" EoL scenario:

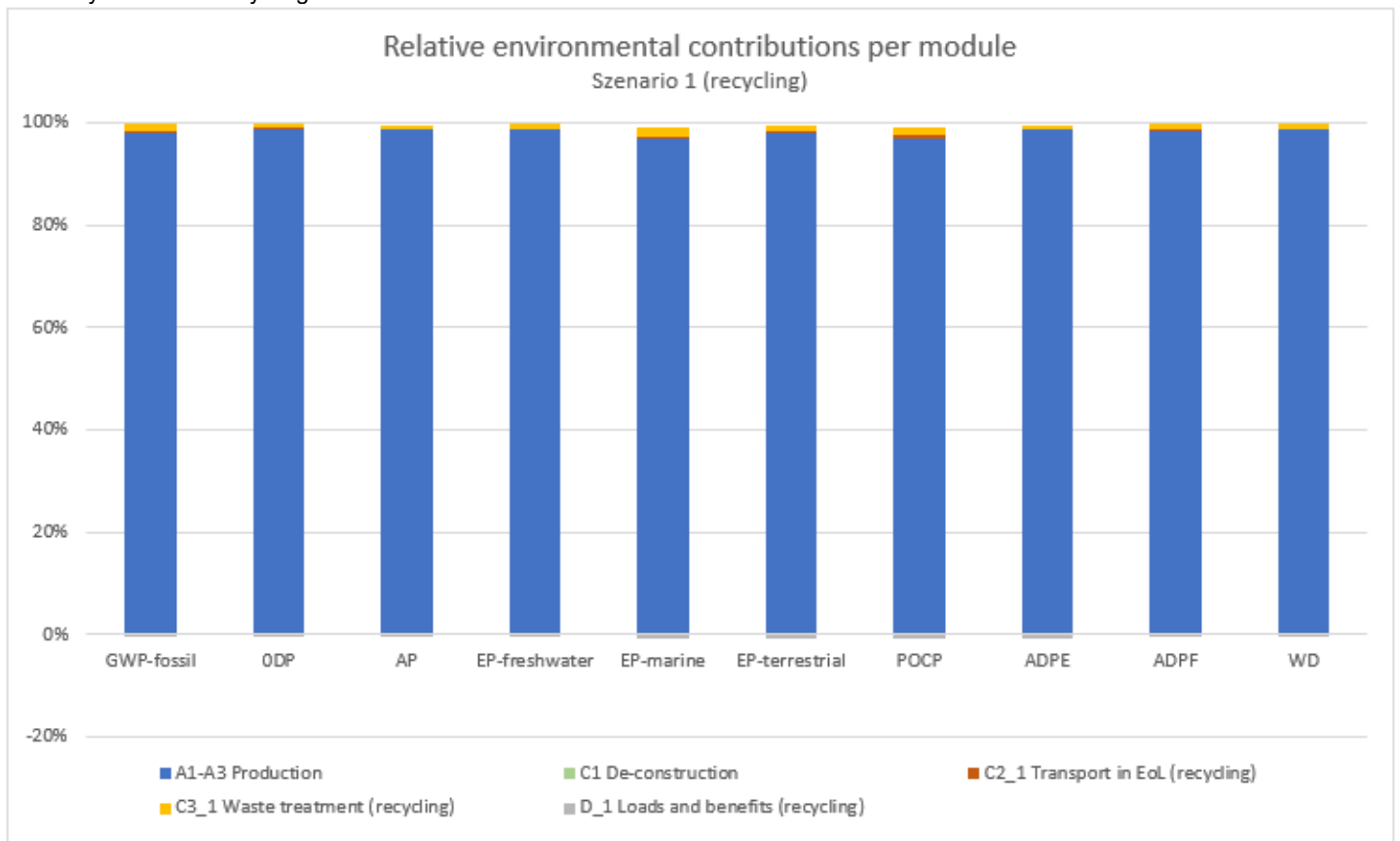


Figure 1: Relative contributions of the individual stages of the life cycle of laminated safety glass to the impact assessment indicators (EoL scenario: recycling); modules A1-C4 = 100 %

It can be seen here that the production of laminated safety

glass dominates the environmental impact over the life cycle. The contributions of the flat glass fluctuate between 79 % and 100 % and the contributions of the PVB film between 0 % and 21 % (excluding EP-freshwater and POCP, which show negative values for the PVB film). The PVB film is modeled using a fully aggregated data set from a manufacturer that has been independently critically reviewed in accordance with ISO

14040/ISO 14044; deviations from the methodological specifications of EN 15804 are possible.

In the case of recycling laminated safety glass in gravel substitute, recycling in Module D results in hardly any significant advantages in terms of the overall impact of the life cycle.

In the case of landfilling, Module D is balanced as "zero"; accordingly, production dominates the entire life cycle of laminated safety glass.

When scaled using the weight per unit area, the maximum error for the glasses under consideration is between -20 % and +33 %, depending on the structure and indicator, which is due to the variance of the glass with 5 panes and 4 films. For the products with 2 to 3 panes or 1 to 2 films, the maximum error across all indicators is between -15 % and +18 %.

The following values apply as an estimate of the GWP for modules A1-A3 for the products considered in this EPD:

Product name	Build-up LSG	GWP (kg CO ₂ eq/m ²)
EUROLAMEX 06.1	33.1	16,7
EUROLAMEX 06.2	33.2	18,6
EUROLAMEX 08.1	44.1	21,7
EUROLAMEX 08.2	44.2	23,5
EUROLAMEX 08.4	44.4	27,2
EUROLAMEX 10.1	55.1	26,6
EUROLAMEX 10.2	55.2	28,5
EUROLAMEX 12.1	66.1	31,5
EUROLAMEX 12.2	66.2	33,4
EUROLAMEX 16.1	88.1	41,4
EUROLAMEX 16.2	88.2	43,2

7. Requisite evidence

According to the underlying PCR, no evidences are required.

8. References

Standards

EN 410

DIN EN 410:2011-04, Glass in building - Determination of photometric and radiometric performance of glazing.

EN 572-1

DIN EN 5721:2016-06, Glass in building - Basic soda lime silicate glass products - Part 1: Definitions and general physical and mechanical properties.

EN 572-9

DIN EN 5729:2005-01, Glass in building - Basic soda lime silicate glass products - Part 9: Evaluation of conformity/ Product standard.

EN 673

DIN EN 673:2011-04, Glass in building - Determination of thermal transmittance (U-value) - Calculation method.

EN 12758

DIN EN 12758:2019-12, Glass in building - Glass and airborne sound insulation - Product descriptions, determination of properties and extension rules.

EN 14449

DIN EN 14449:2005-07, Glass in building - Laminated glass and laminated safety glass - Evaluation of conformity/Product standard.

EN 15804

DIN EN 15804+A2:2022-03, Sustainability of construction works - Environmental product declarations - Core rules for the product category construction products.

EN 17074

DIN EN 17074:2020-02, Glass in building - Environmental product declarations - Product category rules for flat glass products.

ISO 9001

DIN EN ISO 9001:2015-09, Quality management systems -

Requirements.

ISO 12543-1

DIN EN ISO 12543-1:2022-03, Glass in building - Laminated glass and laminated safety glass - Part 1: Definitions and description of components (ISO 12543-1:2021).

ISO 12543-2

DIN EN ISO 12543-2:2022-03, Glass in building - Laminated glass and laminated safety glass - Part 2: Laminated safety glass (ISO 12543-2:2021).

ISO 12543-3

DIN EN ISO 12543-3:2022-03, Glass in building - Laminated glass and laminated safety glass - Part 3: Laminated glass (ISO 12543-3:2021).

ISO 14001

DIN EN ISO 14001:2015-11, Environmental management systems - Requirements with guidance for use.

ISO 14025

DIN EN ISO 14025:2007-10, Environmental labels and declarations - Type III environmental declarations - Principles and procedures.

ISO 14044

DIN EN ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidance.

ISO 50001

DIN EN ISO 50001:2018-12, Energy management systems - Requirements with guidance for use (ISO 50001:2018).

Further references

AVV

Waste List Ordinance of December 10, 2001 (BGBl. IS. 3379),

last amended by Article 2 of the Ordinance of July 17, 2017 (BGBl. I p. 2644).
<http://www.gesetzeiminternet.de/avv/anlage.html>

ECHA Candidate List

The Candidate List of Substances of Very High Concern, available at: <https://echa.europa.eu/candidate-listtable>.

ecoinvent v3.9.1

ecoinvent v3.9.1, life cycle assessment database, 12/2022. ecoinvent, Zurich.

GaBi software

GaBi LCA software and database, version 10.7.1.28, based on the database MASTER_DB_CUP_2023.2.

IBU (2021)

Institut Bauen und Umwelt e.V. (ed.): Product category rules for building-related products and services. Part A: Calculation rules for the life cycle assessment and requirements for the project report. Version 1.3, Berlin. www.ibuepd.com.

IBU (2023)

Institut Bauen und Umwelt e.V. (ed.): PCR guidance texts for building-related products and services. Part B: Requirements

for the EPD for flat glass in buildings. 202307 Berlin.

Regulation (EU) No. 305/2011 (CPR)

REGULATION (EU) No 305/2011 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of March 9, 2011 laying down harmonized conditions for the marketing of construction products and repealing Council Directive 89/106/EEC.

Regulation (EU) No 528/2012

REGULATION (EU) No 528/2012 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of May 22, 2012 on the making available on the market and use of biocidal products.

REGULATION (EU) No 1179/2012

COMMISSION REGULATION (EU) No 1179/2012 of December 10, 2012 establishing criteria for determining when certain types of cullet cease to be waste in accordance with Directive 2008/98/EC of the European Parliament and of the Council.

Weidema et al. (2013)

Weidema, B., C. Bauer, R. Hischer, C. Mutel, T. Nemecek, J. Reinhard, C.O. Vadenbo, G. Wernet (2013): Overview and methodology, Data quality guideline for the ecoinvent database version 3. ecoinvent report no. 1 (v3), St. Gallen (CH).



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