

# Background report – glass

6.7.2020 (accessibility updated: 18.12.2024)

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## 1. General description

The major environmental impact of glass production is caused by atmospheric emissions from melting activities during the float glass production process. Regarding processed glass products, the use of electricity and the GHG values of electricity may have a very significant effect.

Soda lime silicate glass (float glass): The raw materials are introduced as a mixture into the furnace where they are melted at a temperature of approx. 1,560 °C, generally using gas as an energy resource. The glass is shaped by distributing the mass of liquid glass over a bath of molten tin. The glass sheet is then cooled evenly and cut to size. Coated glass is float glass that has been coated with a metal-oxide-based coating using various processes (sputtering, evaporation, pyrolytic processes). The coating is a few atom layers thick.

In the manufacture of toughened safety glass, float glass is heated to its transition temperature (min. 640 °C) and then rapidly cooled. This causes the surfaces of the glass to cool and contract faster than the remaining material. This creates additional compressive strength in the surfaces that makes the resulting glass tougher. For the manufacture of laminated safety glass, a PVB film is placed between the panes of glass, and these are pressed together in an autoclave under the action of heat and pressure.

The manufacturing processes described are applicable to all manufacturing sites of all manufacturers in Europe; no production processes are used for the manufacture that differ significantly from the above.<sup>1</sup>

## 2. Market description

Float glass and coated float glass are not manufactured in the Nordic countries. Safety glass (laminated and tempered) and insulated glass units are manufactured in Nordic countries.

Regarding safety glasses and insulated glass units, both imports and exports are significant.

In accordance with the Finnish toll statistics, the biggest imports come from Germany and Russia (see Appendix 2). Roughly 90% of float glass and roughly 50% of safety glass are imported from Russia and Germany.

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<sup>1</sup> [https://www.euroglas.com/fileadmin/content/euroglas/Deutsch/Service/Zertifizierungen/EPD/2019-02-13\\_Euroglas\\_M-EPD\\_FG\\_ESG\\_VSG\\_efin.pdf](https://www.euroglas.com/fileadmin/content/euroglas/Deutsch/Service/Zertifizierungen/EPD/2019-02-13_Euroglas_M-EPD_FG_ESG_VSG_efin.pdf)

After service life of glass products in building, the rate of separate collection and recycling is high in Finland in the context of refurbishment projects. Glass is recycled and used in the manufacture of foamed glass aggregates and other products.

### 3. Selected typical values

The following sources (see Annex 1) were used to compare the values of indicators and select the typical values:

- EPD owned and published EUROGLAS GmbH
- EPDs owned by AGC Glass Europe and provided by sustainability@eu.agc.com
- IBU, EPDs by different manufacturers
- ÖKOBAUDAT, generic and specific EPDs
- EPD International (Environdec), specific EPDs
- IVL
- ICE

The outline of products, the essential methods of the manufacturing process, key issues that affect the carbon footprint of the product, and the current market were discussed together with a representative of the Finnish float glass association (Tasolasiyhdistys).

Several EPDs are available for float glass and processed glass. The manufacturing process is claimed to be similar in different plants in Europe. However, the GWP(A1-A3) values vary quite much (from 0,9 to roughly 1,35). Only few results are available for toughened and laminated products, and values vary very much for those. The EPDs provided by Asahi India explain that a significant share of the GWP value of processed glass is based on the electricity consumption. Thus, there can be big variation between processed glasses manufactured in Finland and Sweden compared to imported products for example from Poland and Russia.

Glass cullet in the production of float glass is estimated to be 5 %.

Summary of reference sources and data considered is shown in the following table:

| Source                     | Float | Thermally toughened | Laminated | Coated | Low-e/<br>Solar-control | Mirror | IGU        |
|----------------------------|-------|---------------------|-----------|--------|-------------------------|--------|------------|
| AGC Glass Europe generic   | 1,16  |                     | 1,39      | 1,15   | 1,51/<br>1,25           | 1,67   | 1,90*      |
| Euro Glas generic          | 0,972 | 1,384               | 3,17      |        |                         |        |            |
| Ökobaumat Germany generic  | 1,333 |                     |           |        |                         |        |            |
| Ökobaumat AGC Belgium      | 1,357 |                     |           |        |                         |        |            |
| Ökobaumat specific Germany | 0,97  |                     |           |        |                         |        |            |
| Ökobaumat specific Germany | 0,92  |                     |           |        |                         |        |            |
| Ökobaumat specific Germany | 1,357 |                     |           |        |                         |        |            |
| Saint Gobain Group         | 1,19  | 1,73                | 1,52      | 1,33   |                         |        | 1,63*<br>* |

|                                        |       |      |       |                           |      |      |      |
|----------------------------------------|-------|------|-------|---------------------------|------|------|------|
| Okalux                                 |       |      |       |                           |      |      | 1,42 |
| IBU specific Trakya                    | 1,178 |      | 1,144 | 1,257/<br>1,308<br>tinted |      |      |      |
| ASAHI INDIA GLASS                      | 1,29  | 2,98 | 6,24  |                           |      |      |      |
| IVL                                    | 1,12  |      | 1,62  |                           |      |      |      |
| ICE                                    | 1,44  | 1,67 |       |                           |      |      |      |
| Average (excluding ASAHI, IVL and ICE) | 1,16  | 1,56 | 1,80  | 1,30                      | 1,30 | 1,67 | 1,65 |

\*Coated, \*\*also safety glasses

Values reported by AGC are recent values. AGC Glass Europe results for float glass equals to the average for the studied (found) European values based on EPDs. It is considered to use the average value for float glass and values reported by AGC for other glass products in building outlined as follows:

- Float glass (EN 572-9)v
- Coated glass (EN 1096-4)
- Laminated glass (EN 14449)
- Thermally toughened glass (EN 12150-2)
- Mirror glass
- Insulating glass unit / Triple glazing unit (EN 1279-5)
- Insulating glass unit / Double glazing unit (EN 1279-5)

| Name                                                        | Standard                                                                                                                                        | GWP(A1-A3)<br>kg/kg | Coverion<br>GWP(A1-A3)<br>kg/m2    | Glass<br>density<br>kg/m3 |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------------------------------------|---------------------------|
| Float glass,<br>Tasolasi,<br>Planglas                       | EN 572-9 Glass in building.<br>Basic soda lime silicate glass<br>products. Part 9: Evaluation of<br>conformity/Product standard                 | 1,16                | 11,6<br>(glass thickness 4<br>mm)  | 2500                      |
| Coated glass<br>Pinnoitettu lasi<br>X                       | EN 1096-4:2018 Glass in<br>building. Coated glass. Product<br>standard                                                                          | 1,30                | 20,65<br>(glass thickness 6<br>mm) | 2500                      |
| Thermally<br>toughened<br>glass<br>Lämpökarkaistu lasi<br>X | 12150-2 Glass in building -<br>Thermally toughened soda<br>lime silicate safety glass - Part<br>2: Evaluation of<br>conformity/Product standard | 1,56                | 13,8<br>(glass thickness 4<br>mm)  | 2500                      |
| Laminated<br>glass<br>Laminoitu lasi<br>Lamellglas          | EN 14449 Glass in building.<br>Laminated glass and laminated<br>safety glass. Evaluation of<br>conformity/Product standard                      | 1,72                | 28,8<br>(2x4 mm glass +<br>PVB)    | 2500                      |

|                                |                                                                                                                                                     |      |                                                                                 |      |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------|------|
| Mirror glass<br>Peililasi<br>X | EN 572-1 Glass in building -<br>Basic soda lime silicate glass<br>products Part 1: Definitions<br>and general physical and<br>mechanical properties | 1,67 | 16,7<br>(glass thickness 4<br>mm)                                               | 2500 |
| Insulating glass<br>unit       | EN 1279-5 Glass in building.<br>Insulating glass units. Part 5:<br>Product standard                                                                 | 1,65 | Example 59,7<br>(Triple glazing unit<br>with 3*4 mm glass<br>panes, low-e, AGC) | 2500 |

Now, following *items* are declared within the database:

- *Float glass*
- *Coated glass*
- *Thermally toughened glass*
- *Laminated glass*
- *Mirror glass*
- *Insulating glass unit*

Following indicators are determined for each *item* according to selected sources:

- GWP fossil (A1-A3)
- Conversion factor
- Content of renewable materials
- Content of recycled materials
- Content and type of harmful substances (SVHC)

Waste processing (C3) emissions and carbon handprints are declared as stand-alone items within other database sections. See those sections<sup>2</sup>, including background reports, for more information.

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<sup>2</sup> [Rakentamisen päästötietokanta](#) (see sections: waste process & carbon handprint)

## Annex 1. Reference values

### AGC Glass Europe

(provided by [sustainability@eu.agc.com](mailto:sustainability@eu.agc.com))

|                                                                                                                                                                                         |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| GWP fossil (A1 – A3)                                                                                                                                                                    | 1,16  |
| Carbon handprint (D)<br>Carbon storage                                                                                                                                                  | 0     |
| The content of renewable rawmaterials                                                                                                                                                   | 0     |
| The content of secondary materials<br>Glass cullet in                                                                                                                                   |       |
| Substances of Very High Concern<br>Substances from REACH candidate list                                                                                                                 | <0,1% |
| End-of life-scenario is based on worst case scenario, considering that 100% of the float glass is sent to landfill for inert material in the end of life.<br><br>Reference service life | 30    |

#### FLOAT GLASS 2018

EPD is representative for float glass sold by AGC Glass Europe operating in 10 production sites in Europe and providing float glass to French and European market. Results reflect data collected from all these sites. The functional unit is to ensure 1m<sup>2</sup> of facade glazing over 30 years. AGC Planibel range covered by the EPD is a float glass of 4 mm (reference thickness) clear, extra-clear or tinted.

Product mass 10 kg/m<sup>2</sup>.

Generic composition: Forming materials (silica sand, external cullet) 62%, Intermediate materials (sodium carbonate, dolomite, limestone, feldspar, sodim sulphate) 37%, colouring agents(iron oxides and other metallic oxides) 1%.

GWP(A1-A3) =11,6 kg/m<sup>2</sup> -> 1,16 kg/kg

### AGC Glass Europe

(provided by [sustainability@eu.agc.com](mailto:sustainability@eu.agc.com))

|                                                                                      |      |
|--------------------------------------------------------------------------------------|------|
| GWP fossil (A1 – A3)                                                                 | 1,15 |
| Carbon handprint (D)<br>Carbon storage                                               | 0    |
| The content of renewable rawmaterials                                                | 0    |
| The content of secondary materials<br>Glass cullet in the production of float glass. |      |

|                                                                            |       |
|----------------------------------------------------------------------------|-------|
| Substances of Very High Concern<br>Substances from REACH candidate<br>list | <0,1% |
| End-of life                                                                |       |

#### HARD COATED GLASS 2016

A glass comprising a sheet of float substrate, one side of which is covered with a thin transparent metal-oxide pyrolytic coating which can also be referred as hard coated glass.

Reference unit 1 m<sup>2</sup> and 4 mm.

GWP(A1-A3)=11,5 kg/m<sup>2</sup> -> 1,15 kg/kg

#### AGC Glass Europe

(provided by [sustainability@eu.agc.com](mailto:sustainability@eu.agc.com))

|                                                                                                                                                                                                  |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| GWP fossil (A1 – A3)                                                                                                                                                                             | 1,39  |
| Carbon handprint (D)<br>Carbon storage                                                                                                                                                           | 0     |
| The content of renewable rawmaterials                                                                                                                                                            | 0     |
| The content of secondary materials                                                                                                                                                               |       |
| Substances of Very High Concern<br>Substances from REACH candidate<br>list                                                                                                                       | <0,1% |
| End-of life-scenario is based on worst case scenario,<br>considering that 100% of the float<br>glass is sent to landfill for inert<br>material in the end of life.<br><br>Reference service life | 30    |

#### LAMINATED GLASS

EPD is representative for laminated glass sold by AGC Glass Europe operating in 10 production sites in Europe and providing laminated glass to French and European market. Results reflect data collected from 8 sites covering 97% of production. The functional unit is to ensure 1m<sup>2</sup> of facade glazing over 30 years. The EPD covers laminated glass of 4 mm (reference thickness) clear, extra-clear or tinted.

Product mass 20 kg/m<sup>2</sup> (2 panes of float glass) +0,79 kg (PVB).

Generic composition: Float glass 96% and PVB 4%.

Production: Float glass loading, float washing, application of PVB, second glass pane deposition, calendaring to remove air, autoclave (high temperature and low pressure) to remove air bubbles and ensure perfect adhesion.

GWP(A1-A3) =28,8 kg/m<sup>2</sup> -> 1,39 kg/kg

## AGC Glass Europe

(provided by [sustainability@eu.agc.com](mailto:sustainability@eu.agc.com))

|                                                                                      |       |
|--------------------------------------------------------------------------------------|-------|
| GWP fossil (A1 – A3)                                                                 | 1,506 |
|                                                                                      | 1,25  |
|                                                                                      | 1,67  |
| Carbon handprint (D)<br>Carbon storage                                               | 0     |
| The content of renewable rawmaterials                                                | 0     |
| The content of secondary materials<br>Glass cullet in the production of float glass. |       |
| Substances of Very High Concern<br>Substances from REACH candidate<br>list           | <0,1% |
| End-of life<br><br>Reference service life 30 years                                   |       |

### SOLAR CONTROL MAGNETRON COATED GLASS 2019

REFERENCE PRODUCT: 6 mm thick, non-toughened

Declared unit 1 m<sup>2</sup>

Composition: 6 mm float glass of thick 15 kg (99,98%), emissivity coating layer of 2780 mg (0,02%).

GWP(A1-A3)=22,6 kg/m<sup>2</sup> ->

GWP(A1-A3)=1,506 kg/kg

### LOW-E MAGNETRON COATED GLASS 2019

Declared unit 1 m<sup>2</sup>, 6 mm thick

Composition: 6 mm float glass of thick 15 kg, emissivity coating layer of 1009 mg.

(In this EPD D is negative referring to the cullet use in float glass production process. recycling benefits and loads covers: avoided production of batch raw materials, avoided decarbonisation at melting furnace, avoided energy consumption due to 25% energy reduction from glass melting while using cullet instead of raw materials.)

GWP(A1-A3)=18,7 kg/m<sup>2</sup> ->

GWP(A1-A3)=1,25 kg/kg

### MIRROR

Composition 98 % float glass and 2 % silvering.

GWP(A1-A3)=16,7 kg/m<sup>2</sup> (4 mm thick)

GWP(A1-A3)=1,67 kg/k

## AGC Glass Europe

(provided by [sustainability@eu.agc.com](mailto:sustainability@eu.agc.com))

|                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|
| GWP fossil (A1 – A3)                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1,50  |
| Carbon handprint (D)<br>Carbon storage                                                                                                                                                                                                                                                                                                                                                                                                                   | 0     |
| The content of renewable rawmaterials                                                                                                                                                                                                                                                                                                                                                                                                                    | 0     |
| The content of secondary materials                                                                                                                                                                                                                                                                                                                                                                                                                       | 0     |
| Substances of Very High Concern<br>Substances from REACH candidate<br>list                                                                                                                                                                                                                                                                                                                                                                               | <0,1% |
| End-of life<br>The EPD says that Glass is recyclable as well as sorted glazing units. It could be assumed nowadays that about 5-20% of end-of-life flat glass units are dismantled and collected separately and recycled for glass manufacturing (post-consumer cullet), about 80-95% ends up in demolition waste. <u>This EPD was modelled by assuming that 100% goes landfilled as inert demolition waste.</u><br><br>Reference service life 30 years. |       |

### FIRE RESISTANT GLASS 2015

Reference unit 1 m<sup>2</sup> fire resistant glass. The reference structure is 21,1 mm of glazing unit.

Composition: 85% float glass, intumescent layer 13%, lamination 2%.

GWP(A1-A3)=71,6 kg/m<sup>2</sup>

Non-hazardous waste disposed (C4)=47,6 kg /m<sup>2</sup>

GWP(A1-A3)=71,6/47,6=1,504 kg/kg

## EPD

[https://www.euroglas.com/fileadmin/content/euroglas/Deutsch/Service/Zertifizierungen/EPD/2019-02-13\\_Euroglas\\_M-EPD\\_FG\\_ESG\\_VSG\\_efin.pdf](https://www.euroglas.com/fileadmin/content/euroglas/Deutsch/Service/Zertifizierungen/EPD/2019-02-13_Euroglas_M-EPD_FG_ESG_VSG_efin.pdf)

Exactly same values are also reported in:

[https://www.okalux.com/fileadmin/user\\_upload/aktuell/Downloads/Zertifikate/EPD\\_Zertifikat\\_FG\\_ESG\\_VSG\\_OKALUX%40\\_EN.pdf](https://www.okalux.com/fileadmin/user_upload/aktuell/Downloads/Zertifikate/EPD_Zertifikat_FG_ESG_VSG_OKALUX%40_EN.pdf)

by Okalux

|                      |                                 |
|----------------------|---------------------------------|
| GWP fossil (A1 – A3) | FG<br>0,972<br><br>TSG<br>1,384 |
|----------------------|---------------------------------|

|                                                                                                                                                                                |             |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
|                                                                                                                                                                                | LSG<br>3,17 |
| Carbon handprint (D)<br>Carbon storage                                                                                                                                         | 0           |
| The content of renewable rawmaterials                                                                                                                                          | 0           |
| The content of secondary materials                                                                                                                                             | 0           |
| Substances of Very High Concern                                                                                                                                                | 0           |
| End-of life-scenario<br>The average disposal routes were considered. Approximately 70% of glass is disposed of at a construction waste landfill.<br><br>Reference service life | 30 years    |

EUROGLAS is one of the largest glass manufacturing companies in Europe. The four plants in Haldensleben (DE), Osterweddingen (DE), Hombourg (FR) and Ujazd (PL) were founded together with medium-sized partners. The EUROGLAS Group produces float glass (FG), extra-white glass, laminated safety glass (LSG) and toughened safety glass (TSG) and coated glass<sup>3</sup>.

The declaration owner is EUROGLASS GmbH, Haldensleben Germany. The base data include data collected from at the Euroglass GmbH production site.

The additional declaration holders for flat glass are: EUROGLASS Hombourg France, EUROGLASS Osiedle Niewiadów Poland, and EUROGLASS Osterweddingen Germany.

Flat glass FG, toughened safety glass TSG and laminated safety glass LSG for processing into insulating glass units and for use as glass for buildings (in the building envelope and for finishing works/structures).

Flat glass (FG) refers to both uncoated and coated float glass. Float glass is a clear, flat soda lime silicate glass with parallel, fire-polished surfaces, in some cases bearing metal-oxide-based coatings to modify the radiation (thermal insulation and/or solar control) properties of the glass.

Toughened safety glass (TSG) consists of a single pane that has been specially heat-treated to give the glass increased impact resistance. If the glass breaks under exposure to a high load, it disintegrates into very small fragments without forming sharp edges. (Relevant standard: Rakennuslasit. Lämpökarkaistu soodakalkkisilikaattiturvalasi. EN 12150-2)

Laminated safety glass (LSG) consists of at least two glass panes lying one on top of the other, with one or several layers of a tear-resistant, viscoelastic film positioned between the panes, which consist of polyvinyl butyral (PVB). Relevant standard:

Rakennuslasit. Laminoitu lasi ja laminoitu turvalasi. EN 14449

<sup>3</sup> <https://www.euroglas.com/en/company/about-us.html>

The main components of float glass are the naturally occurring raw materials sand (silicon carbonate, 58%), soda (sodium carbonate, 18%), dolomite (15%), lime (calcium carbonate, 5%) and sulphate (1%).

Explanation of materials:

- Flat glass: Soda lime silicate glass
- Coated flat glass: Soda lime silica glass + metal oxide
- TSG: Soda lime silicate glass
- LSG: Soda lime silicate glass + PVB film.

According to prEN 17074, FG, TSG, LSG are collected up to 30%, shipped to central collection points and recycled, for example for the production of container glass, insulating wool, sandpaper or glass bricks, flat glass.

Declared unit:

1 m<sup>2</sup> area and

1 mm glass thickness. (Results are given per 1 m<sup>2</sup> and 1 mm of FG, TSG, LSG)-

Density of glass 2500 kg/m<sup>3</sup><sup>4</sup>

GWP(A1-A3):

FG: 2,43 kg/m<sup>2</sup> -> 0,972 kg/kg

TSG: 3,46 kg/m<sup>2</sup> -> 1,384 kg/kg

LSG: 7,93 kg/m<sup>2</sup> -> 3,172 kg/kg

If calculated based on weight of disposed waste in C4 and considered percentage of disposed waste (70%), the result equals to above for FG and TSG but differs slightly for LSG. For LSG GWP(A1-A3)=7,93/(1,81/0,7)=2,82.

## Ökobaudat

[https://oekobaudat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=1490b480-2c36-43f2-ba8b-4ea49948f7c3&stock=OBD\\_2020\\_II&lang=en](https://oekobaudat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=1490b480-2c36-43f2-ba8b-4ea49948f7c3&stock=OBD_2020_II&lang=en)

|                                                        |       |
|--------------------------------------------------------|-------|
| GWP fossil (A1 – A3)                                   | 1,333 |
| Carbon handprint (D)<br>Carbon storage                 | 0     |
| The content of renewable rawmaterials                  | 0     |
| The content of secondary materials                     |       |
| Substances of Very High Concern                        | 0     |
| End-of life-scenario<br>Recycling and energy recovery. |       |

### FLOAT GLASS

The data set represents the country specific situation in Germany, focusing on the main technologies, the region-specific characteristics and / or import statistics.

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<sup>4</sup> Lasifakta / Pilkington

Window glass, single; 10 kg/m<sup>2</sup>  
Single glass sheet, 4mm thick (in m<sup>2</sup>)  
GWP(A1-A3)=13,33 kg/m<sup>2</sup> > 1,333 kg/kg

## Ökobaumat

[https://oekobaumat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=0b87fabb-7beb-4faa-86dc-5d13bde3957b&stock=OBD\\_2020\\_II&lang=en](https://oekobaumat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=0b87fabb-7beb-4faa-86dc-5d13bde3957b&stock=OBD_2020_II&lang=en)

|                                                        |       |
|--------------------------------------------------------|-------|
| GWP fossil (A1 – A3)                                   | 1,357 |
| Carbon handprint (D)<br>Carbon storage                 | 0     |
| The content of renewable rawmaterials                  | 0     |
| The content of secondary materials                     |       |
| Substances of Very High Concern                        | 0     |
| End-of life-scenario<br>Recycling and energy recovery. |       |

### FIRE-RESISTANT SPECIFIC

This data set represents the situation of the company AGC Glass Europe in 1348 Louvain-la-Neuve, Belgium, with regard to the most important technologies and the legal framework.

Glass - AGC Glass Europe - Fire-resistant glass; 1 m<sup>2</sup> area, 21,1 mm thickness.

For indoor or outdoor use in combination with an insulating glazing.

GWP(A1-A3) = 71,6 kg/m<sup>2</sup>

Density 2500 kg/m<sup>3</sup>

Weight 52,75 kg/m<sup>2</sup>

GWP(A1-A3) = 1,357 kg/kg

## Ökobaumat

[https://oekobaumat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=f7384d7c-90ba-4ec7-ab80-f9b1b79fd0eb&stock=OBD\\_2020\\_II&lang=en](https://oekobaumat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=f7384d7c-90ba-4ec7-ab80-f9b1b79fd0eb&stock=OBD_2020_II&lang=en)

|                                        |      |
|----------------------------------------|------|
| GWP fossil (A1 – A3)                   | 0,97 |
| Carbon handprint (D)<br>Carbon storage | 0    |
| The content of renewable rawmaterials  | 0    |
| The content of secondary materials     |      |

|                                                        |   |
|--------------------------------------------------------|---|
| Substances of Very High Concern                        | 0 |
| End-of life-scenario<br>Recycling and energy recovery. |   |

#### FLOAT GLASS

This data set represents the situation of the member companies of the Bundesverband Flachglas e.V., with regard to the most important technologies and the legal framework.

FG; Floatglas; Soda lime silicate glass

Owner: Bundesverband Flachglas e.V.

Reference flows: Glass - Bundesverband Flachglas e.V. - Flat glass

Per 1 m<sup>2</sup>, Thickness ? 4 mm?

GWP(A1-A3)=9,71

If 4 mm and density 2500 kg/m<sup>3</sup> >

$9,71/(2500*0,004*1)=0,97 \text{ kg/kg}$

#### Ökobaumat

[https://oekobaumat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=096273e5-a370-4edd-852c-f2abfa9cfb83&stock=OBD\\_2020\\_II&lang=en](https://oekobaumat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=096273e5-a370-4edd-852c-f2abfa9cfb83&stock=OBD_2020_II&lang=en)

|                                                        |      |
|--------------------------------------------------------|------|
| GWP fossil (A1 – A3)                                   | 0,92 |
| Carbon handprint (D)<br>Carbon storage                 | 0    |
| The content of renewable rawmaterials                  | 0    |
| The content of secondary materials                     |      |
| Substances of Very High Concern                        | 0    |
| End-of life-scenario<br>Recycling and energy recovery. |      |

#### FLOAT GLASS

Flachglas - Guardian - Flachglas unbeschichtet; 1 m<sup>2</sup> Fläche, 1 mm Dicke.

Dieser Datensatz repräsentiert die Situation des Unternehmens Guardian Europe S.à r.l., Luxembourg im Hinblick auf die wichtigsten Technologien und die gesetzlichen Rahmenbedingungen.

GWP(A1-A3)=2,3 kg/m<sup>2</sup>

Density 2500 kg/m<sup>3</sup>

GWP(A1-A3)=0,92 kg/kg

## Ökobaudat

[https://oekobaudat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=f44d2f80-3b83-4f28-96fc-36d4279edf8b&stock=OBD\\_2020\\_II&lang=de](https://oekobaudat.de/OEKOBAU.DAT/datasetdetail/process.xhtml?uuid=f44d2f80-3b83-4f28-96fc-36d4279edf8b&stock=OBD_2020_II&lang=de)

|                                                        |       |
|--------------------------------------------------------|-------|
| GWP fossil (A1 – A3)                                   | 1,357 |
| Carbon handprint (D)<br>Carbon storage                 | 0     |
| The content of renewable rawmaterials                  | 0     |
| The content of secondary materials                     |       |
| Substances of Very High Concern                        | 0     |
| End-of life-scenario<br>Recycling and energy recovery. |       |

## FLOAT GLASS

Dieser Datensatz repräsentiert die Situation des Unternehmens Promat GmbH in 40878 Ratings im Hinblick auf die wichtigsten Technologien und die gesetzlichen Rahmenbedingungen.

Glas - Promat GmbH - Brandschutzglas; 1 m<sup>2</sup> Fläche, 21,1 mm Dicke

Im Innenbereich oder Außenbereich in Verbindung mit einer Wärmeschutzverglasung.

Owner: Promat GmbH

GWP(A1-A3)=71,6 kg/m<sup>2</sup>

Density 2500 kg/m<sup>2</sup> ->

GWP(A1-A3)=71,6/(2500\*0,0211)=1,357 kg/kg

## Source

<https://gryphon4.environdec.com/system/data/files/6/12111/S-P-00882%20Saint-Gobain%20Planiclear%20Clear%20float%20glass.pdf>

|                                        |      |
|----------------------------------------|------|
| GWP fossil (A1 – A3)                   | 1,19 |
| Carbon handprint (D)<br>Carbon storage | 0    |

|                                                        |   |
|--------------------------------------------------------|---|
| The content of renewable rawmaterials                  | 0 |
| The content of secondary materials                     |   |
| Substances of Very High Concern                        | 0 |
| End-of life-scenario<br>Recycling and energy recovery. |   |

Clear FLOAT GLASS

Saint-Gobain Group

thicknesses 2, 3, 4, 5, 6, 8, 10, 112, 15, 19 mm.

GWP(A-A#)=1,19 kg/kg

### Source

<https://glassolutions.ee/sites/glassolutions.eu/files/2017-07/Kirgas%20klaas%20SGG%20Planiclear%20EPDKirgas%20klaas%20SGG%20Planiclear%20EPDKirgas%20klaas%20SGG%20Planiclear%20EPD.pdf>

|                                                        |      |
|--------------------------------------------------------|------|
| GWP fossil (A1 – A3)                                   | 1,33 |
| Carbon handprint (D)<br>Carbon storage                 | 0    |
| The content of renewable rawmaterials                  | 0    |
| The content of secondary materials                     |      |
| Substances of Very High Concern                        | 0    |
| End-of life-scenario<br>Recycling and energy recovery. |      |

MAGNETRON COATED GLASS

Saint-Gobain Group

Magnetron coated glass is soda-lime silicate glass produced using the float procedure, on which a magnetron coating has been applied.

Depending on the composition of the metal oxide transparent coating layers, several different products can be produced. The EPD covers 19 products. Thicknesses vary between 2 and 19 mm.

GWP(A1-A3) varies between 1,21 and 1,44. In average 1,33 kg/kg.

No “Substance of Very High Concern” (SVHC) in concentration above 0.1% by weight.

|     |           |     |
|-----|-----------|-----|
| gwp | Thickness | gwp |
|-----|-----------|-----|

| per m2 | -  | per kg |
|--------|----|--------|
| 7,22   | 2  | 1,44   |
| 10,2   | 3  | 1,36   |
| 13,2   | 4  | 1,32   |
| 16,1   | 5  | 1,29   |
| 19,1   | 6  | 1,27   |
| 25     | 8  | 1,25   |
| 30,9   | 10 | 1,24   |
| 36,9   | 12 | 1,23   |
| 45,8   | 15 | 1,22   |
| 57,6   | 19 | 1,21   |
| 11,1   | 3  | 1,48   |
| 14,3   | 4  | 1,43   |
| 17,6   | 5  | 1,41   |
| 20,8   | 6  | 1,39   |
| 27,3   | 8  | 1,37   |
| 33,8   | 10 | 1,35   |
| 40,3   | 12 | 1,34   |
| 50,1   | 15 | 1,34   |
| 63,1   | 19 | 1,33   |
|        |    | 1,33   |

## Environdec

[https://glassolutions.ee/sites/glassolutions.eu/files/2017-07/epd\\_laminated\\_glass -  
sgg\\_stadip.pdf](https://glassolutions.ee/sites/glassolutions.eu/files/2017-07/epd_laminated_glass_-_sgg_stadip.pdf)

|                                                        |      |
|--------------------------------------------------------|------|
| GWP fossil (A1 – A3)                                   | 1,52 |
| Carbon handprint (D)<br>Carbon storage                 | 0    |
| The content of renewable rawmaterials                  | 0    |
| The content of secondary materials                     |      |
| Substances of Very High Concern                        | 0    |
| End-of life-scenario<br>Recycling and energy recovery. |      |

LAMINATED GLASS

SAINT GOBAIN

EPD for 6 laminated glass products (safty glasses). Comprise two or more sheets of glass bonded together with one or more interlayers of polyvinyl butyral (PVB) film. It is meant to be used in building, furniture and industrial applications.

In addition to the impact due to glass production that is around 2/3 of the impacts, the production of PVB accounts for nearly 20% of the global warming potential.

The share of post-consumer cullet <1%.

GWP results (A1-A3) for the products:

| Weight | GWP  | kg/kg |
|--------|------|-------|
| 15,4   | 23,2 | 1,51  |
| 20,4   | 29,1 | 1,43  |
| 15,8   | 26,1 | 1,65  |
| 20,8   | 32   | 1,54  |
| 25,8   | 40,8 | 1,58  |
| 30,8   | 43,8 | 1,42  |

In table, average of kg/kg values is 1,52.

### Saint Gobain Environdec

<https://gryphon4.environdec.com/system/data/files/6/12116/epd927%20Saint-Gobain%20Securit%202016%20V.02.pdf>

|                                                        |      |
|--------------------------------------------------------|------|
| GWP fossil (A1 – A3)                                   | 1,73 |
| Carbon handprint (D)<br>Carbon storage                 | 0    |
| The content of renewable rawmaterials                  | 0    |
| The content of secondary materials                     |      |
| Substances of Very High Concern                        | 0    |
| End-of life-scenario<br>Recycling and energy recovery. |      |

SAFETY GLASS

TERMALLY TOUGHENED GLASS

SAINT GOBAIN

The product is 100% glass.

No “Substance of Very High Concern” (SVHC) in concentration above 0.1% by weight.

The EPD covers altogether 26 products with different thicknesses.

The GWP(A1-A3) varies between 1,35 – 244. The lowest values are for biggest thicknesses (up to 19 mm) and highest for smallest thicknesses (2 mm). The average value was calculated by assuming density 2500 kg/m<sup>2</sup>. The average value is 1,73.

| GWP<br>(kg/m <sup>2</sup> ) | thickness | GWP<br>(kg/kg) |
|-----------------------------|-----------|----------------|
| 12,2                        | 2         | 2,44           |
| 15,6                        | 3         | 2,08           |
| 19                          | 4         | 1,90           |
| 22,4                        | 5         | 1,79           |
| 25,8                        | 6         | 1,72           |
| 32,6                        | 8         | 1,63           |
| 39,4                        | 10        | 1,58           |
| 46,2                        | 12        | 1,54           |
| 56,5                        | 15        | 1,51           |
| 70,1                        | 19        | 1,48           |
| 16,6                        | 3         | 2,21           |
| 20,3                        | 4         | 2,03           |
| 24,1                        | 5         | 1,93           |
| 27,8                        | 6         | 1,85           |
| 35,3                        | 8         | 1,77           |
| 42,8                        | 10        | 1,71           |
| 50,2                        | 12        | 1,67           |
| 61,5                        | 15        | 1,64           |
| 76,4                        | 19        | 1,61           |
| 14,2                        | 3         | 1,89           |
| 17,1                        | 4         | 1,71           |
| 20                          | 5         | 1,60           |
| 23                          | 6         | 1,53           |
| 28,8                        | 8         | 1,44           |
| 34,7                        | 10        | 1,39           |
| 40,6                        | 12        | 1,35           |

## Source

<https://gryphon4.environdec.com/system/data/files/6/12111/S-P-00882%20Saint-Gobain%20Planiclear%20Clear%20float%20glass.pdf>

|                                        |      |
|----------------------------------------|------|
| GWP fossil (A1 – A3)                   | 1,19 |
| Carbon handprint (D)<br>Carbon storage | 0    |

|                                                        |   |
|--------------------------------------------------------|---|
| The content of renewable rawmaterials                  | 0 |
| The content of secondary materials                     |   |
| Substances of Very High Concern                        | 0 |
| End-of life-scenario<br>Recycling and energy recovery. |   |

Clear FLOAT GLASS

Saint-Gobain Group

thicknesses 2, 3, 4, 5, 6, 8, 10, 112, 15, 19 mm.

GWP(A-A#)=1,19 kg/kg

### EPD by AGC 2015

<https://www.agcnederland.nl/wp-content/uploads/EPD-AGC-Planibel.pdf>

|                                                        |                   |
|--------------------------------------------------------|-------------------|
| GWP fossil (A1 – A3)                                   | 1,13              |
| Carbon handprint (D)<br>Carbon storage                 | 0                 |
| The content of renewable rawmaterials                  | 0                 |
| The content of secondary materials                     | 8% (glass cullet) |
| Substances of Very High Concern                        | 0                 |
| End-of life-scenario<br>Recycling and energy recovery. |                   |

FLOAT GLASS 2015

The range of AGC float glasses Reference thickness: 4 mm

AGC Glass Europe – Flat glass

Declared unit 1 m<sup>2</sup>

AGC Glass Europe produces, processes and distributes flat glass for the building industry (external glazing and interior decorative glass), the automotive industry (OEM and replacement glass) and various other sectors. More than 100 sites throughout Europe from Spain to Russia<sup>5</sup>.

The major environmental impact of glass production is caused by atmospheric emissions from melting activities during the float glass production process. "As an alternative to the usual float glass furnace design using air as oxidant and gas as fuel, AGC Glass Europe has introduced a furnace working with pure oxygen instead of air, which resulted in one of the most ecological furnaces in the world"<sup>6</sup>.

<sup>5</sup> <http://www.agc-glass.eu/en/about/company>

<sup>6</sup> <http://www.agc-glass.eu/en/sustainability/production-process-and-technologies>

Conventional float process: The basic principle of the float glass process is to mix the raw materials, melt them in the furnace and pour the molten glass onto a bath of molten tin. The combustion in the furnace uses air and natural gas. The glass solidifies as it floats on the tin bath. Sometimes coatings can be applied on the glass at the end or just after the tin bath. Subsequently, the glass ribbon passes on to an annealing zone where it cools down gradually while being carried on rollers. At the end of the annealing zone the glass is cut into sheets.

Basic materials: Glass forming materials are silica sand (57%) and external glass cullet (8%); - intermediate and modifying materials such as sodium carbonate (17%), dolomite (14%), limestone (3%), feldspar & blast furnace slag (2%), sodium sulphate (1%).

GWP(A1-A3)=11,3 kg/m<sup>2</sup> (4 mm)

GWP(A1-A3)=11,3/(2500\*1\*1\*0,004)=1,13 kg/kg

## EPD by AGC

|                                                        |                                                                                                      |
|--------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| GWP fossil (A1 – A3)                                   | TRIPLE<br>59,7 kg/m <sup>2</sup><br>1,91 kg/kg<br><br>DOUBLE<br>39,2 kg/m <sup>2</sup><br>1,90 kg/kg |
| Carbon handprint (D)<br>Carbon storage                 | 0                                                                                                    |
| The content of renewable rawmaterials                  | 0                                                                                                    |
| The content of secondary materials                     |                                                                                                      |
| Substances of Very High Concern                        | 0                                                                                                    |
| End-of life-scenario<br>Recycling and energy recovery. |                                                                                                      |

IGU/AGC/Triple and double glazing units

TRIPLE GLAZING UNIT 2019

This EPD is representative of triple glazing units sold by AGC Glass Europe / AGC Interpane in France. AGC Glass Europe operates 32 production sites in Europe providing triple glazing units to French and European market.

Standard EN 1279-5 Glass in building - Insulating glass units (IGU).

Triple glazing unit with one flat glass and two magnetron coated (soft coated) glasses, 3 X 4 mm, low-e, no thermal toughening. Thermal insulation of  $U_g \leq 1.1 \text{ W}/(\text{m}^2 \cdot \text{K})$  for a reference service life (RSL) of 30 years.

- Three flat glass panes of 4 mm, for a total mass of 30 kg

- Two spacers, desiccant, sealants and insulating gas (cumulative mass of  $\approx 1.3$  kg)

#### Composition:

Flat glass, 3 panes, mass 30 kg

Magnetron coating Mass 0.002 kg

Total 96% of the whole unit.

Cavity, Argon, Mass 48 g

Spacer, stainless steel, aluminium, polyamide/steel. Mass 300 – 500 g

Desiccant, zeolite, mass 140 g

Inner sealant polyisobutylene, mass 60 g

Outer sealant Polysulfide, Silicone, Polyurethane,  $\approx 600$  g

Total 4% of the whole unit.

Regarding A5: No breakage during transport and installation has been considered, following prEN 17074:2017.

Regarding C4: landfilling of demolition wastes. End of life scenario is based on worst case scenario, considering that 100% of the IGU is sent to landfill for inert material in the end of life.

GWP(A1-A3)=59,7 kg/m<sup>2</sup>

GWP(A1-A3)=1,91 kg/kg

DOUBLE GLAZING UNIT 2019

Low-er/solar control double glazing units

2X 4 mm. Corresponding structure as above.

GWP(A1-A3)=39,2 kg/m<sup>2</sup>

GWP(A1-A3)=1,90 kg/kg

#### Source

<https://gryphon4.environdec.com/system/data/files/6/12121/epd932%20Saint-Gobain%20Climaplust%20V.02.pdf>

|                                        |      |
|----------------------------------------|------|
| GWP fossil (A1 – A3)                   | 1,63 |
| Carbon handprint (D)<br>Carbon storage | 0    |
| The content of renewable rawmaterials  | 0    |
| The content of secondary materials     |      |
| Substances of Very High Concern        | 0    |

## INSULATING GLASS UNIT (IGU)

### SGG

The EPD covers 1 m<sup>2</sup> of 6 different glazing configurations:

1. CLIMAPLUS 4-16-4 (glass thickness+cavity+glass thickness)
2. CLIMAPLUS 4-16-33.1
3. CLIMAPLUS 4-16-44.2
4. CLIMAPLUS 6-15-4
5. CLIMAPLUS 6t-12-6t
6. CLIMAPLUS 6t-16-6

33.1 means laminated glass, thickness 3+3 mm and 1-layer PVB. 44.2 means laminated glass, thickness 4+4 mm and 2 layers PVB. 6t means safety glass thickness 6 mm.

The main components: glass 97%, coating <0,1%, sealant 1%, spacer bar (aluminium or plastic composite) 1%, desiccant 1%, gas 0,1%, PVB interlayer 0,2%.

No "Substance of Very High Concern" (SVHC) in concentration above 0.1% by weight.

In the production of CLIMAPLUS, the impact due to glass production is more than 80%. Additional impacts are due to the production of additional resources required for the assembly. To produce glass, the main impacts are related to the energy consumed in the furnace and on the impacts generated in the production of one of the main raw materials, the soda ash.

GWP(A1-A3) (kg/m<sup>2</sup>) + weight (roughly assessed based on the weight of glass multiplied by 1,03).

1. 31,1
2. 42,4
3. 51,2
4. 36,8
5. 58,2
6. 51

Densities: glass 2500, aluminium 2700 and plastic 0,9 – 1,3 kg/m<sup>3</sup>.

| # | GWP<br>(kg/m <sup>2</sup> ) | Weight | GWP<br>(kg/kg) |
|---|-----------------------------|--------|----------------|
| 1 | 31,1                        | 20,6   | 1,51           |
| 2 | 42,4                        | 25,75  | 1,65           |
| 3 | 51,2                        | 30,9   | 1,66           |
| 4 | 36,8                        | 25,75  | 1,43           |
| 5 | 58,2                        | 30,9   | 1,88           |
| 6 | 51                          | 30,9   | 1,65           |

In table, the average of values is 1,63 kg/kg.

Average without IGUs with safety glasses (5 and 6) is 1,56 kg/kg.

## Source

[https://www.okalux.com/fileadmin/user\\_upload/aktuell/Downloads/Zertifikate/EPD\\_Zertifikat\\_Mehrscheibenisoliertes\\_OKALUX%40\\_EN.pdf](https://www.okalux.com/fileadmin/user_upload/aktuell/Downloads/Zertifikate/EPD_Zertifikat_Mehrscheibenisoliertes_OKALUX%40_EN.pdf)

|                                                        |      |
|--------------------------------------------------------|------|
| GWP fossil (A1 – A3)                                   | 1,42 |
| Carbon handprint (D)<br>Carbon storage                 | 0    |
| The content of renewable rawmaterials                  | 0    |
| The content of secondary materials                     |      |
| Substances of Very High Concern                        | 0    |
| End-of life-scenario<br>Recycling and energy recovery. |      |

### INSULATING GLASS UNIT (IGU)

Triple and double

OKALUX

The configuration of the insulating glass units presented in this EPD is as follows: - Double insulating glass units 4/12/4 - made of flat glass - Triple insulating glass units 4/12/4/12/4 - made of flat glass.

Glass: The pre-product is soda lime silicate glass (float glass). The main components are the naturally occurring raw materials sand (silicon carbonate, 58%), soda (sodium carbonate, 18%), dolomite (15%), lime (calcium carbonate, 5%) and sulphate (1%). Spacers: conventional or thermally optimised spacers. Sealing: polyurethane, polysulfide, butyl, silicone, polyisobutylene Desiccant: zeolithes. Inert gases: generally, argon, (or rarely krypton) is used for filling the cavity.

The product contains no substances from the REACH candidate list.

According to prEN 17074, Insulating glass units are collected up to 30%, shipped to central collection points and recycled, for example to produce container glass, glass wool or foam glass.

Per weight calculated assuming that glass is responsible for 97% of weight.

| # | GWP<br>(kg/m <sup>2</sup> ) | Weight | GWP<br>(kg/kg) |
|---|-----------------------------|--------|----------------|
| 1 | 31,64                       | 20,6   | 1,54           |
| 2 | 40,36                       | 30,9   | 1,31           |

In table, the average of values is 1,42 kg/kg.

### EPD Clear Float Glass Trakya Cam Sanayii A.Ş. (Şişecam Flat Glass)

Published by IBU

EPD-TCS-20170105-CAD1-EN

|                      |       |
|----------------------|-------|
| GWP fossil (A1 – A3) | 1,178 |
|----------------------|-------|

|                                                        |                                                               |
|--------------------------------------------------------|---------------------------------------------------------------|
| Carbon handprint (D)<br>Carbon storage                 | 0                                                             |
| The content of renewable rawmaterials                  | 0                                                             |
| The content of secondary materials                     | Sisecam Flat Glass<br>plants utilize broken<br>glass (cullet) |
| Substances of Very High Concern                        | <0,1%                                                         |
| End-of life-scenario<br>Recycling and energy recovery. |                                                               |

## FLOAT GLASS

Manufacturing in Bulgaria and Turkey.

Use purpose: Şişecam Clear Float Glass, as a basic product for all glazing purposes, offers solutions for various sectors including construction.

Composition:

Float glass is primarily made of raw materials like silica sand, soda ash, dolomite, feldspar, limestone and additional raw materials.

• Silica Sand 52-57% • Soda Ash 15-17% • Dolomite 14-16% • Limestone 2-3% • Feldspar 0-3% • Cullet 8-14% • Others

Declared unit 1 m2

Conversation factor to 1 kg 0.09242

## **EPD Clear Laminated Glass Trakya Cam Sanayii A.Ş. (Şişecam Flat Glass)**

Published by IBU

EPD-TCS-20170106-CAD1-EN

<https://ibu-epd.com/en/published-epds/>

|                                        |                                                               |
|----------------------------------------|---------------------------------------------------------------|
| GWP fossil (A1 – A3)                   | 1,144                                                         |
| Carbon handprint (D)<br>Carbon storage | 0                                                             |
| The content of renewable rawmaterials  | 0                                                             |
| The content of secondary materials     | Sisecam Flat Glass<br>plants utilize broken<br>glass (cullet) |
| Substances of Very High Concern        | <0,1%                                                         |

|                                                        |  |
|--------------------------------------------------------|--|
| End-of life-scenario<br>Recycling and energy recovery. |  |
|--------------------------------------------------------|--|

## LAMINATED GLASS

Manufacturing in Bulgaria and Turkey.

Use purposes: Laminated Glass is used in various window types such as curtain walls, ribbon windows, store fronts, punched or architectural windows, overhead glazing, handrails & floors.

Laminated glass is used in many applications such as: •Curtain walling • Windows • Overhead glazing • Internal partitions • Balustrades • Doors • Interior fittings • Shower and bath enclosures • Areas of high pedestrian traffic, museums & art galleries where UV protection is necessary • Areas where improved acoustic performance is a requirement • Passageways with busy pedestrian traffic • Store fronts • Canopies • Banks • Hospitals • Schools and kindergartens • Facilities and sport centers.

Şişecam Laminated Glass is produced by combining two or more panes of float glass with special binding agency Polyvinyl Butyral (PVB) interlayers.

Composition: • Float glass approx. >98% • PVB approx. <2%

Declared unit 1 m2.

conversion factor to 1 kg 0.04329.

## **EPD Offline Coated Glass Trakya Cam Sanayii A.Ş. (Şişecam Flat Glass)**

published by IBU

EPD-TCS-20170109-CAD1-EN

|                                                        |                                                         |
|--------------------------------------------------------|---------------------------------------------------------|
| GWP fossil (A1 – A3)                                   | 1,257                                                   |
| Carbon handprint (D)<br>Carbon storage                 | 0                                                       |
| The content of renewable rawmaterials                  | 0                                                       |
| The content of secondary materials                     | Sisecam Flat Glass plants utilize broken glass (cullet) |
| Substances of Very High Concern                        |                                                         |
| End-of life-scenario<br>Recycling and energy recovery. |                                                         |

## COATED GLASS

Clear offline coated glass produced in the manufacturing plants located in Bulgaria and Turkey.

Offline Coated Glass is manufactured by depositing multi-layered metal/metal oxides on clear float glass through magnetically enhanced vacuum sputtering technology. The coating provides heat and solar control properties at the same time.

Several kinds of soft coating with low emissivity such as Low-E, Solar Low-E, Temperable Low-E and Temperable Solar Low-E.

The product s is widely used in façade glazing and window double glazing in different kinds of buildings.

Contents: 99,98% float glass, 0,02% coating materials.

Declared unit 1 m2

Conversion factor to 1 kg 0.09099

## EPD

<https://gryphon4.environdec.com/system/data/files/6/16194/S-P-01114%20EPD%20Float%20glass.pdf>

Programme operator: EPD International AB Stockholm, Sweden

|                                                        |      |
|--------------------------------------------------------|------|
| GWP fossil (A1 – A3)                                   | 1,29 |
| Carbon handprint (D)<br>Carbon storage                 | 0    |
| The content of renewable rawmaterials                  | 0    |
| The content of secondary materials                     |      |
| Substances of Very High Concern                        |      |
| End-of life-scenario<br>Recycling and energy recovery. |      |

## FLOAT GLASS

ASAHI INDIA GLASS LTD.(AIS)

Asahi India Glass Ltd. (AIS) is India's leading integrated glass solutions company and a dominant player both in the automotive glass and architectural glass segments.

Declared unit 1 m2, 3mm

## EPD

<https://gryphon4.environdec.com/system/data/files/6/16196/S-P-01411%20EPD%20Processed%20Glass.pdf>

Programme operator: EPD International AB Stockholm, Sweden

|                                       |      |
|---------------------------------------|------|
| GWP fossil (A1 – A3), LAMINATED GLASS | 6,24 |
|---------------------------------------|------|

|                                                        |          |
|--------------------------------------------------------|----------|
| GWP fossil (A1 – A3), THERMALLY TREATED GLASS          | 2,98     |
| GWP fossil (A1 – A3), IGU GLASS (LOW-E)                | 3,51     |
| Carbon handprint (D)<br>Carbon storage                 | <u>0</u> |
| The content of renewable rawmaterials                  |          |
| The content of secondary materials                     |          |
| Substances of Very High Concern                        |          |
| End-of life-scenario<br>Recycling and energy recovery. |          |

The EPD is declared for four variants of Processed Glass i.e., Heat Tempered, Laminated, IGU and *Printed glass* manufactured at Taloja unit of AIS.

ASAHI INDIA GLASS LTD.(AIS)

Asahi India Glass Ltd. (AIS) is India's leading integrated glass solutions company and a dominant player both in the automotive glass and architectural glass segments.

Declared unit 1 m2, 6 mm

For laminated:

"Global Warming Potential is 93.6 kg CO2-Equiv., of which 24% contribution is from the production of float glass, 61% from the electricity consumption and 13.6% from PVB".

For thermally treated glass:

" Global Warming Potential is 44.7 kg CO2-Equiv., of which 46% contribution is from the production of float glass and 49% from the electricity consumption in coating and tempering process."

For IGU glass:

"Global Warming Potential is 52.7 kg CO2-Equiv., of which 41% contribution is from the production of float glass, 45% from the electricity consumption and 7% from silicon sealing compound."

### **EPD Tinted Online Coated Glass Trakya Cam Sanayii A.Ş. (Şişecam Flat Glass)**

Published by IBU

EPD-TCS-20170110-CAD1-EN

|                              |       |
|------------------------------|-------|
| GWP fossil (A1 – A3) (kg/kg) | 1,308 |
|------------------------------|-------|

|                                                        |                                                    |
|--------------------------------------------------------|----------------------------------------------------|
| Carbon handprint (D)<br>Carbon storage                 | 0                                                  |
| The content of renewable rawmaterials                  | 0                                                  |
| The content of secondary materials                     | Şişecam Flat Glass utilizes broken glass (cullet). |
| Substances of Very High Concern                        | <0,1%                                              |
| End-of life-scenario<br>Recycling and energy recovery. |                                                    |

## COLOURED FLOAT GLASS

Manufactured in Turkey

Use purposes:

Şişecam Tentesol and Tentesol Titanium are intended primarily for facades and/or windows of commercial buildings, balcony glazing; and providing solutions to interior architecture in terms of partition walls and decorative applications. They can be toughened, laminated, heat strengthened and bent.

Composition:

Coloured Float Glass: >99.5% Coating Materials: approx.<0.5%.

Declared unit 1 m<sup>2</sup>

Conversion factor to 1 kg 0.07082

## EPD by SCHOTT Technical Glass Solutions GmbH

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|                                                        |      |
|--------------------------------------------------------|------|
| GWP fossil (A1 – A3) (kg/kg)                           | 6,91 |
| Carbon handprint (D)<br>Carbon storage                 |      |
| The content of renewable rawmaterials                  |      |
| The content of secondary materials                     |      |
| Substances of Very High Concern                        |      |
| End-of life-scenario<br>Recycling and energy recovery. |      |

## FIRE-RESISTANT GLASS

Die Deklaration bezieht sich auf 1 m<sup>2</sup> thermisch vorgespanntes Borosilicat-Einscheibensicherheitsglas PYRAN® S der SCHOTT Technical Glass Solutions GmbH.

PYRAN® S eignet sich aufgrund seiner hohen optischen Transparenz hervorragend für Architekturverglasungen und wird wegen seiner ausgesprochen hohen Temperaturbelastbarkeit und seiner geringen thermischen Ausdehnung speziell als Glas für Brandschutzverglasungen verwendet.

Borosilicatglas > 99,9 %

Declared unit 1 m2

conversion factor to 1 kg 0,073

## **IVL**

### **FLOAT GLASS**

|                                          |      |
|------------------------------------------|------|
| GWP fossil (A1 – A3) (kg/kg), Planglas   | 1,12 |
| GWP fossil (A1 – A3) (kg/kg), Lamellglas | 1,62 |

## **ICE**

### **FLOAT GLASS**

|                                                |      |
|------------------------------------------------|------|
| GWP fossil (A1 – A3) (kg/kg), Glass, general   | 1,44 |
| GWP fossil (A1 – A3) (kg/kg), Glass, toughened | 1,67 |

## Annex 2. Imports based on toll statistics

Information in following table is collected by Jenni Heikkilä Suomen tasolasiyhdistys ry.

|               |        |                     |       |
|---------------|--------|---------------------|-------|
| Float glass   | 2019   | Laminated glass     | 2019  |
| Country       | tn     | Country             | tn    |
| Venäjä        | 51045  | DE Saksa            | 7964  |
| Saksa         | 48593  | RU Venäjä           | 5764  |
| USA           | 3603   | CN Kiina            | 2896  |
| Puola         | 3311   | EE Viro             | 2653  |
| Belgia        | 3142   | PL Puola            | 2280  |
| Thaimaa       | 1918   | HU Unkari           | 1559  |
| Ranska        | 1655   | BE Belgia           | 666   |
| Kiina         | 746    | CH Sveitsi          | 548   |
| Italia        | 708    | TR Turkki           | 309   |
| Viro          | 543    | GB Iso-Britannia    | 300   |
| Liettua       | 525    | CZ Tsekin tasavalta | 290   |
| Valko-Venäjä  | 168    | SE Ruotsi           | 134   |
| Latvia        | 161    | LT Liettua          | 126   |
| Alankomaat    | 138    | IN Intia            | 123   |
| GB            | 62     | LV Latvia           | 115   |
| Tsekki        | 52     | BY Valko-Venäjä     | 100   |
|               |        | IT Italia           | 76    |
| Total (Above) | 116369 | Total (Above)       | 25902 |
| Total (All)   | 116497 | Total (All)         | 26264 |