

# EPD for Satin Deco

Environmental Product Declaration  
in accordance with DIN EN ISO 14025 and EN 15804

**Acid etched flat glass as addition to the EPD Floatglass, Laminated Safety and Coated Glass (EPD-GFEV-19.0)**

**Company EPD**

**Guardian Europe S.à r.l.**



Declaration Code  
EPD-GSD-GB-19.1

**Note: This EPD is an addition to the EPD Floatglass, Laminated Safety and Coated Glass (EPD-GFEV-19.0)**

# Environmental Product Declaration in accordance with ISO 14025 and EN 15804

## SatinDeco



Detailed version

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<b>Life Cycle Assessment</b>	<b>ift Rosenheim GmbH</b> Theodor-Gietl-Straße 7-9 83026 Rosenheim			
<b>Holder of the declaration</b>	<b>Guardian Europe S.à.r.l.</b> 19, rue du Puits Romain L-8070 Bertrange			 <small>Glass • Automotive • Building Products</small>
<b>Declaration code</b>	EPD-GSD-GB-19.1			
<b>Designation of declared product</b>	SatinDeco - Acid etched Flat glass			
<b>Scope</b>	Surface of chemically attacked (acid) flat glass to be used in buildings and construction works.			
<b>Basis</b>	This EPD was prepared on the basis of EN ISO 14025:2011 and EN 15804:2012. In addition to that, the "Guidance on Preparing Type III Environmental Product Declarations" applies. This Declaration is based on the PCR Document "Flachglas im Bauwesen" (Glass in Building) PCR-FG-1.1 : 2013. The EPD is created as addition to the EPD Floatglass, Laminated Safety and Coated Glass (EPD-GFEV-19.0).			
<b>validity</b>	This verified Environmental Product Declaration applies solely to the specified products and is valid for a period of 5 years from the date of issue. The declaration holder assumes full liability for the underlying data, certificates and verifications.			
	Publication date: 25. June 2015	Latest revision: 21. July 2016	Next revision: 25. June 2020	
<b>LCA Basis</b>	The LCA was prepared in accordance with EN ISO 14040 and EN ISO 14044. The base data include both data collected at various companies and generic data from the "GaBi 6" database. LCA calculations were based on the "cradle to gate" life cycle.			
<b>Notes on publication</b>	The "Conditions and Guidance on the Use of ift Test Documents" apply. The declaration holder assumes full liability for the underlying data, certificates and verifications.			
Prof. Ulrich Sieberath Director of Institute		Patrick Wortner, MBA and Eng., Dipl.-Ing. (FH) Independent, external Verifier		

Product group: glass  
Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
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<b>Additional holder of declaration</b>	<ul style="list-style-type: none"><li>• Guardian Navarra / Spain</li></ul>
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## 1 Product definition

### Product definition

This EPD applies to the product group glass and is valid for:

Surface of acid etched flat glass. The LCA was prepared using the declared unit:

#### **1 m<sup>2</sup> glass surface**

The LCA for the declared unit only includes the production process of the surface. The environmental effects of the glass can be found in the EPD Floatglass, Laminated Safety and Coated Glass (EPD-GFEV-19.0) and is not included in this EPD.

The declared unit relates to the product stage of 1 m<sup>2</sup> surface of acid etched flat glass.

### Product description:

#### **Acid etched flat glass**

Acid etched flat glass is the result of an acid application on high quality float glass. This deposition is done on an acid-etch process line. After application, the acid dissolves part of the glass generating hollows on the surface that disperse the light producing the typical etched glass translucent effect.

The product is used in the widest range of indoor applications i.e. furniture, partitions, as well as for outdoor applications like windows, roofing or walls, etc. Acid etched flat glass is applied on large sheets of glass and cut to size for cost effective fabrication.

The EPD is created as addition to the EPD Floatglass, Laminated Safety and Coated Glass (EPD-GFEV-19.0). It can be used as an extension to following products:

- "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.

### Product standards:

- Flat glass: EN 572

For detailed product descriptions and performance specifications please refer to the manufacturer specifications at [www.guardianglass.com](http://www.guardianglass.com) or product descriptions for the respective product.

Product group: glass  
Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
Next revision: 25. June 2020

**Application** SatinDeco is used as indoor and outdoor applications in buildings

**Additional information** For information and content of the EPD Floatglass, Laminated Safety and Coated Glass (EPD-GFEV-19.0) visit [www.ift-service.de](http://www.ift-service.de)

## 2 Materials used

### 2.1 Primary products

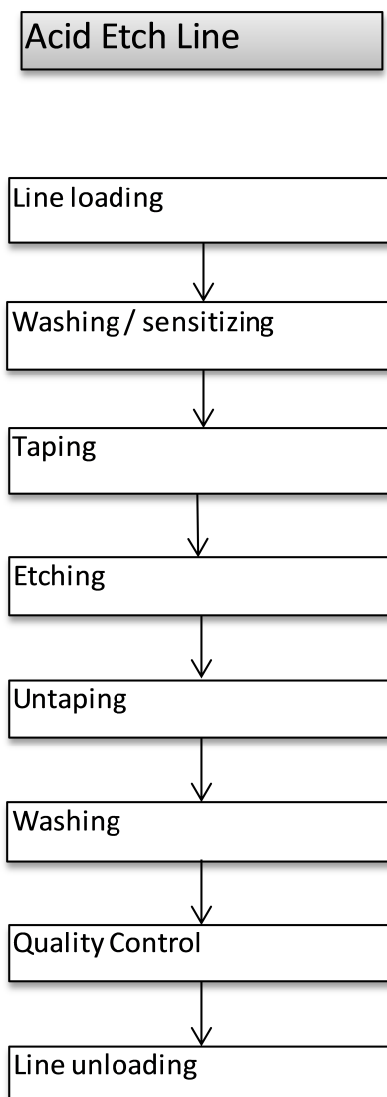
**Primary products** The main components of float glass, which consists of the naturally occurring raw materials sand (silicon carbonate, 59%), soda (sodium carbonate, 18%), dolomite (15%), lime (calcium carbonate, 4%), nepheline (3%), and sulphate (1%). There are no other primary products applied in the process of Acid etching. The impacts depend on the size of the surface, not on the thickness of the glass.  
For the process of Acid etching primary products as in 7.2 described are used.

### 2.2 Declarable substances

**Declarable substances** In accordance with the REACH candidate list, no substances of very high concern are contained (Declaration from May 2012)

### 3 Product stage

#### Product manufacture



### 4 Construction stage

#### Processing recommendations, installation

SatinDeco can be cut, beveled, heat-treated, drilled, polished, painted, laminated or assembled in double glazings. We recommend immediate cleansing after machining. Processing and installation guidelines must be applied.

### 5 Use stages

#### Emissions to the environment

No emissions to indoor air, water and soil known

#### B1 - B7

The use stage is not considered in this declaration

Product group: glass  
 Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
 Next revision: 25. June 2020

## 6 End-of-life stage (not declared)

**Possible end-of-life stages** Acid etched glass is not specifically designed for reuse, although reuse is by all means possible.

The End-of-life stage of acid etched glass can only be considered in combination with Flat glass. The End-of-life stage was not part of the LCA.  
 All production waste generated during manufacture is internally recycled.

## 7 Life Cycle Assessment (LCA)

Environmental product declarations are based on life cycle analyses (LCAs) which use material and energy flows for the calculation and subsequent representation of environmental impacts.

As the basis for this, an LCA was prepared for acid etched glass. The LCA was developed in accordance with EN 15804 and the requirements set out by the international standards EN ISO 14040, EN ISO 14044, ISO 21930 and EN ISO 14025.

The LCA is representative of the products presented in the Declaration and the specified reference period.

### 7.1 Definition of goal and scope

**Goal** The goal of the LCA is to demonstrate the environmental impacts of FG and TSG with a SatinDeco surface. As set out by EN 15804 the environmental impacts covered by the Environmental Product Declaration for the product stage on a cradle to gate approach. The LCA is calculated for an EPD as addition to the EPD Floatglass, Laminated Safety and Coated Glass (EPD-GFEV-19.0).

**Data quality and data availability, also geographical and time-related system boundaries** The production-specific data for the process acid etch of flat glass originate from data collected at the production plant. The average values determined are based on the volumes produced by the plants.

The base data for the coating consist of data collected in 2013 for the geographical area of Europe and is corresponding to current production. The quantity data for the raw materials, energy and ancillary materials used are annual averages. Data were additionally collected by the **ift** Rosenheim in 2014 in order to verify representativeness. Therefore data was collected from the production site in Tudela Navarra (ESP).

The life cycle of the coating was modelled using the sustainability software tool "GaBi 6" for the development of Life Cycle Assessments. All relevant background datasets for the production of acid etched glass are taken from the database of the software tool "GaBi 6".

The databases were last updated in 2015. Data before this date also originate from this database and are not more than 4 years old. No other generic data were used for the calculation.

To cover all European Union members, for all life cycle phases were used preferably generic data records for Europe (e.g. "power mix EU-27"). If no

Product group: glass  
 Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
 Next revision: 25. June 2020

European records were existed, German or global records were used.  
 Data gaps were either filled with comparable data or conservative assumptions, or the data were cut off in compliance with the 1% rule.

**Scope and system boundaries**

The system boundaries refer to all process steps for the manufacturing plants, from the extraction of the raw materials to the dispatch of the product, ready for shipment, from the production gate.

Due to the wide range of possible applications and designs, the use stage and the End-of-life stage are not included in the calculation.

**Cut-off criteria**

All operating data collected, i.e. all raw materials used by composition, the electrical energy consumed, internal consumption of ancillary materials, all production waste which can be directly attributed to the product, and all available emissions data from the plants, were included in the LCA.

Building sections/parts of facilities that are not relevant to the manufacture of the product were excluded.

The average weighted transport distances of the primary products/pre-products to the various manufacturing plants were not taken into account.

It can be assumed that the total of negligible processes per life cycle stage does not exceed 5 percent. The life cycle calculation also includes material and energy flows that account for less than 1 percent.

## 7.2 Inventory analysis

**Goal**

All material and energy flows are described below. The processes covered are presented as input and output parameters and refer to the declared/functional units.

The models of the unit processes used for the LCA have been documented in a transparent manner.

**Life cycle stages**

Product stage A1, A3.

**Benefits**

No benefits are taken into account.

**Allocation procedures  
 Allocation of co-products**

In the product stage of acid etched glass two Co-products occur. Like in the PCR Document "Flachglas im Bauwesen" (Glass in Building) PCR-FG-1.1 : 2013, resources are allocated through physical quantities.

**Allocations for reuse, recovery and recycling**

There is no allocation for reuse, recovery and recycling declared

**Allocations based on life cycle boundaries**

It is not possible to quantify that a certain amount of secondary material is used in the product stage. Since the End-of-life stage is not taken into account, a credit in D can't be awarded.

Product group: glass  
 Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
 Next revision: 25. June 2020

## Inputs

The LCA includes the following production-relevant inputs:

### Energy

The electricity mix is based on "European electricity mix".  
 Gas is based on "EU-27: Thermal Energy from natural gas".

### Water

No water is consumed during the individual production steps for the manufacture of roller shutters and roller grilles, sectional doors  
 The consumption of fresh water specified in Section 7.3 originates (among others) from the upstream processes of the primary products/pre-products.

### Raw material/primary products/pre-products:

There are no raw materials/pre-products used, because only the production process of the surface is considered

### Ancillary materials and consumables:

0.1437 kg ancillary materials and consumables are required for 1 m<sup>2</sup> of acid etched glass. Share in % is given below:

**Figure 3: Ancillary materials for acid etched surface**

No.	Material	Mass in %
1	Calcium Dihydroxy	55,7 %
2	Ammonium Biflururo	20,9 %
3	Hydrofluoric acid	10,5 %
4	Others	12,9 %

## Outputs

The LCA includes the production-relevant outputs per 1 m<sup>2</sup> of acid etching given below:

### Waste

Secondary raw materials were included in the benefits.  
 See Section 7.3 - Impact assessment

### Waste water

153 cm<sup>3</sup> waste water is produced for the manufacture of 1 m<sup>2</sup> of acid etched glass

## 7.3 Impact assesment

### Goal

Impact assessment covers inputs and outputs. The impact categories applied are set out below:



Product group: glass  
Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
Next revision: 25. June 2020

**Impact categories**

The characterisation factors of the ELCD (European Reference Life Cycle Database) were used. The characterisation factors for the consumption of abiotic resources were taken from CML (Institute of Environmental Sciences, Faculty of Science, Leiden University, Netherlands).

- Abiotic depletion - fossil resources (ADP - fossil fuels.)
- Abiotic depletion - non-fossil resources (ADP - elements);
- Acidification of soil and water;
- Ozone depletion;
- Global warming;
- Eutrophication;
- Photochemical ozone creation.

**Wastes**

The waste generated during the production of 1 m<sup>2</sup> of acid etched glass is evaluated and shown separately for each of the three main fractions, namely trade wastes, special wastes and radioactive wastes. Since waste handling is modelled within the system boundaries, the amounts shown refer to the deposited wastes.

A portion of the waste indicated is generated during the manufacture of the primary products/pre-products. Radioactive waste results from the generation of electricity. The wastes presented are generated throughout the entire product life cycle.

Product group: glass  
 Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
 Next revision: 25. June 2020

<b>Results per m<sup>2</sup> acid etched surface</b>		
<b>Environmental impacts</b>	<b>Unit</b>	<b>A1, A3</b>
Global warming potential (GWP 100)	kg CO <sub>2</sub> equiv.	0,68
Ozone depletion potential (ODP)	kg R11-equiv.	1,21E-09
Acidification potential of soil and water (AP)	kg SO <sub>2</sub> equiv.	3,55E-03
Eutrophication potential (EP)	kg PO <sub>4</sub> <sup>3-</sup> equiv.	3,01E-04
Photochemical ozone creation potential (POCP)	kg C <sub>2</sub> H <sub>4</sub> equiv.	2,37E-04
Abiotic depletion potential - non-fossil resources (ADP - elements)	kg Sb- equiv.	7,85E-07
Abiotic depletion potential - fossil resources (ADP – fossil fuels)	MJ and Hz.	6,62
<b>Use of resources</b>	<b>Unit</b>	
Use of renewable primary energy - excluding renewable primary energy resources used as raw materials	MJ	0,82
Use of renewable primary energy resources used as raw materials (material use)	MJ	0
Total use of renewable primary energy resources (primary energy and renewable primary energy resources used as raw materials) (energy + material use)	MJ	0,82
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials.	MJ	7,93
Use of non-renewable primary energy resources used as raw materials (material use)	MJ	0
Total use of non-renewable primary energy resources (primary energy and non-renewable primary energy resources used as raw materials) (energy + material use)	MJ	7,93
Use of secondary materials	kg	0
Use of renewable secondary fuels	MJ	0
Use of non-renewable secondary fuels	MJ	0
Use of net fresh water	m <sup>3</sup>	7,57E-03

Values that cannot be shown or are inexistent or marginal are expressed as [-]. Non-relevant modules are described in the Annex.

Product group: glass  
 Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
 Next revision: 25. June 2020

Waste categories	Unit	A1, A3
Hazardous waste disposed	kg	2,28E-06
Non-hazardous waste disposed (municipal waste)	kg	0,12
Radioactive waste	kg	5,20E-04
Output material flows	Unit	A1, A3
Components for re-use	kg	-
Materials for recycling	kg	-
Materials for energy recovery	kg	-
Exported energy	MJ	-

Values that cannot be shown or are inexistent or marginal are expressed as [-]. Non-relevant modules are described in the Annex.

## 7.4 Interpretation, LCA presentation and critical verification

### Interpretation

All relevant and necessary items as per EN ISO 14040 and EN ISO 14044 were included in the LCA. It can therefore be assumed that the LCA is suitable, without restriction, for use in the Environmental Product Declaration for SatinDeco surface.

**The environmental impacts shown are suitable for the certification of buildings.**

### Report

The LCA report was prepared in accordance with the requirements of EN ISO 14040, EN ISO 14044, EN 15804 and ISO 14025.

The results of the study are not designed to be used for comparative statements intended for publication.

The results and conclusions reported to the target group are complete, correct, without bias and transparent.

The report is not addressed to third parties due to confidential information contained in the report.

### Critical verification

The LCA was critically verified by the independent and external verifier Patrick Wortner, MBA and Eng., Dipl.-Ing. (FH).

Product group: glass  
 Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
 Next revision: 25. June 2020

## 8 General information regarding the EPD

### Comparability

This EPD was prepared in accordance with EN 15804 and is therefore only comparable to those EPDs that also comply with EN 15804. Any comparison must be based on reference to the building context and the fact that the same boundary conditions were considered in the various life cycle stages. For a comparison of EPDs for construction products the rules as per EN 15804 (Clause 5.3) apply.

### Communication

The communications format of this EPD meets the requirements of EN 15942:2011 and is therefore the basis for B2B communication. Only the nomenclature has been changed according to EN 15804.

### Verification

Verification of the Environmental Product Declaration is documented in accordance with the **ift** Guideline "Guidance on Preparing Type III Environmental Product Declarations" in accordance with the requirements set out in ISO 14025.

The European standard EN 15804 serves as the core PCR <sup>a</sup> .
Independent verification of the declaration according to EN ISO 14025:2010 <input type="checkbox"/> internal <input checked="" type="checkbox"/> external
Independent third party verifier Patrick Wortner
<sup>a</sup> Product category rules <sup>b</sup> Voluntary for the exchange of information within trade, obligatory for the exchange of information between trade and consumer (see ISO 14025:2010, 9.4)

### Revisions of this document

No.	Date	Status note	Creator	Verifier
1	25.06.2015	First internal verification and approval	F. Stich	F. Stöhr
2	21.07.2016	Adaption based on EPD-GFEV-19.0 and external verification	F. Stich	P. Wortner
3				
4				
5				

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Product group: glass  
Declaration code: EPD-GSD-GB-19.1

Publication date: 25. June 2015  
Next revision: 25. June 2020

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ift Rosenheim, 2011

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### **notes**

This EPD is mainly based on the work and findings of the Institut für Fenstertechnik e.V., Rosenheim (**ift** Rosenheim) and specifically on the **ift**-Guideline NA.01/1 – Guidance on the Preparation of Type III Environmental Product Declarations.

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### **Layout**

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