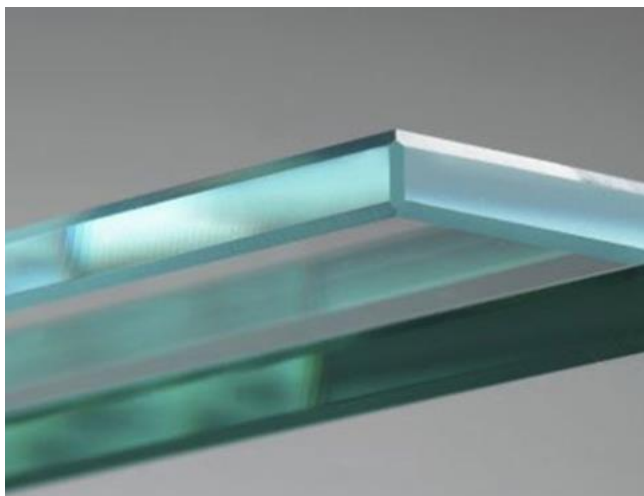


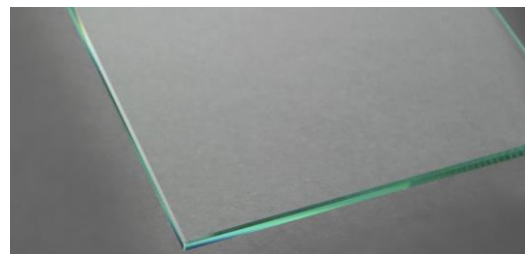
EUROFLOAT® flat glass produced by EUROGLAS in Ujazd POLAND



Issuance date: 01.02.2016
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EPD program operator:

Building Research Institute (ITB), 00-611 Warsaw, Filtrowa 1
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ITB is the member of The European Platform for EPD program operators. www.eco-platform.org



Manufacturer

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Telephone number: +48 44 719 40 00
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E-mail address: ujazd@euroglas.com



Basic information

This declaration is the type III Environmental Product Declaration (EPD) based on EN 15804 and verified according to ISO 14025 by external auditor. It contains the information on the impacts of declared construction materials on environment and their aspects verified by the independent Advisory Body according to ISO 14025. Basically, a comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804 (see point 5.3 of the standard).

Life cycle: A1-A3 modules in accordance with EN 15804 (Cradle to Gate)

The year of preparing the characteristic: 2015

Declared durability: Under normal conditions, Euroglas products are expected to last the service life of a building (60 years)

PCR: ITB PCR A (PCR based on EN 15804)

Declared unit: 1 m² with 4 mm thickness of flat glass.

Reasons for performing LCA: B2B

Representativeness: Polish product

Manufacturer and Product Information

Clear float glass.

EUROFLOAT® is the base material for all glass products. Characteristic for float glass is the light green colour. You can see it clearly at the glass edge. A standard panel is available in a maximum size of 3210 mm width x 6000 length. Larger dimensions are available on request.

EUROFLOAT, made in Ujazd float glass factory, is the most commonly used glass type. The float glass process facilitates the efficient production of clear, transparent glass with flat surfaces.

Attributes

- Highest quality and optimised intrinsic colour
- Undistorted vision
- Homogeneous, smooth surface
- High chemical resistance
- No colour changes
- Resistant to weathering
- Acid and alkali resistant.
- Neither absorbs nor emits odours
- Available in sizes up to 3210 x 6000 mm (larger sizes available on request).

EUROFLOAT float glass is processed to make:

- EUROGLAS ESG Flat single pane safety glass
- EUROLAMEX Laminated safety glass
- SILVERSTAR Insulating glass for thermal insulation and sun protection
- SWISSFORM Curved glass
- FIRESWISS Fire-resistant glass

The subject of this EPD is based on the actual technical documents for factory Ujazd of Euroglas Sp. z o.o. All actual technical documents are always available on website www.euroglas.com

Set of products for Euroglas under this EPD covers transparent flat glass with the technical data shown in Table 1

Table 1. Product description and range (data are shown for 4mm thickness glass)

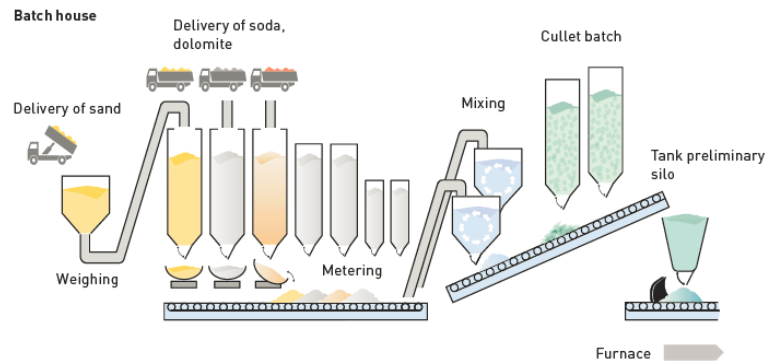
PRODUCT	TYPE	THICKNESS	STANDARD
transparent flat glass - 4x3210x6000	EUROFLOAT	3÷12 mm	EN 572, EN 1096, EN 12543, EN 12150, EN 1863, EN 14179
Heat transfer coefficient U_g in [W/(m ² K)]			5,8
Total energy transmittance-g value [%]			87
Light transmittance [%]			90
Weight of 1m ² 4 mm thickness glass panel [kg]			9,5

A1 and A2 Modules: Raw materials supply and transport

Raw materials for flat glass production come from local (Polish) suppliers from Poland, Data on transport of the different products to the manufacturing plant are collected and modelled for Ujazd plant by ITB. Means of transport include truck, train and ship, and Polish and European fuel averages are applied.

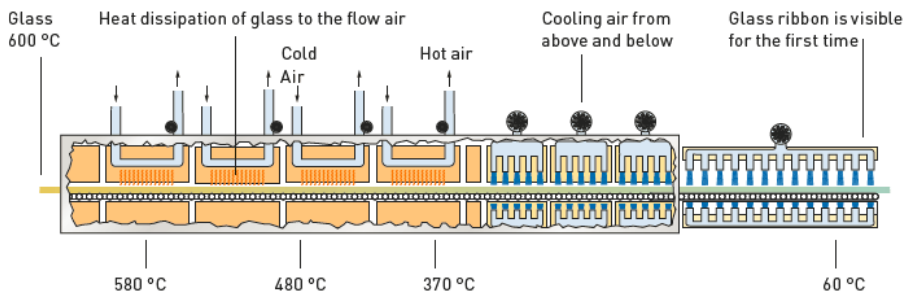
A3: Production

The most important base material in the manufacture of float glass is quartz sand, a material that is in plentiful supply in nature and will also be available to future generations in sufficient quantity. It also needs soda, dolomite, lime and other raw materials in smaller quantities. Approximately 20 % clean cullet is added to the mixture to improve the melting process. These raw materials enter the melting furnace as a batch, where they

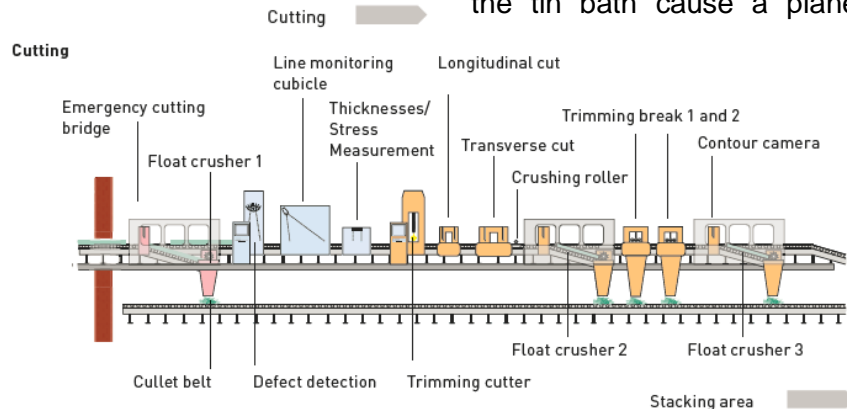


are melted at a temperature of approx. 1550 °C and refined with minimal bubbles. The liquid glass is then fed to the float bath, which contains a tin melt in a protective inert-gas atmosphere. The glass mass "floats" on the molten tin in the form of an endless ribbon. The surface tension of the glass and the flat surface of the tin bath cause a plane-

Annealing lehr



parallel and distortion-free glass ribbon of high optical quality to form. In the cooling tunnel and on the subsequent open roller conveyor, the glass ribbon is continuously cooled down from 600 to 60 °C, monitored by camera technology for defects, and then cut into glass sheets of predominantly 3210 x 6000 mm in size.



Manufacture covers all processes linked to production, which comprises various related operations besides on-site activities, including float glass production process, finishing, packaging and internal transportation. The manufacturing process also yields data on the combustion of refinery products, such as diesel and gasoline, related to the production process. Use of electricity, fuels and auxiliary materials in the production of float glass is taken into account using national data. The environmental profile of these energy carriers is modelled by ITB for average Polish conditions. Packaging-related flows in the production process and all upstream packaging are included in the manufacturing module. Apart from production of packaging material, the supply and transport of packaging material are also considered in the LCA model. In accordance with EN 15804, they are reported and allocated to the modules where the packaging is applied in EPD-ITB no1 and no2. Data on packaging waste created during this step are then generated. It is assumed that packaging waste generated in the course of production and up-stream processes is 100% collected and incinerated based on a multi-input and multi-output process specific to the elementary composition of the waste. Energy (e.g. electricity) are credited using national production averages.

Allocation

The allocation rules used for this EPD are based on ITB-PCR A. The flat glass system production is a single line process without co-products. All impacts from raw materials extraction are allocated in A1 module of EPD. 100% of impacts from line production were inventoried and allocated to flat glass, which generates 60% of all factory impacts in module A3. Municipal waste and waste water of whole factory were allocated to module A3. Electricity was inventoried for whole production process. Emissions are measured separately as well and presented in A3 module.

System limits

The life cycle analysis of the examined products covers "Product Stage", A1-A3 modules (Cradle to Gate) in accordance with EN 15804+A1 and ITB-PCR A. Details on systems limits are provided in product specific ITB-EPDs. For example for EUROGLAS flat glass system includes extraction of raw materials outside of factory in Ujazd (upstream process), transport to the factory and production stage in Ujazd. All materials and energy consumption inventoried in factory were included in calculation. Office impacts were also taken into consideration. In the assessment, all significant parameters from gathered production data are considered, i.e. all material used per formulation, utilised thermal energy, internal fuel and electric power consumption, direct production waste, and all available emission measurements. This study also takes into account some material flows of less than 1% and energy flows with a proportion of less than 1 energy-%. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804, machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees.

Data collection period

The data for manufacture of the examined products (flat glass) refer to the year 2015. The life cycle assessments were prepared for Poland as the reference area.

Data quality

The values determined to calculate the LCIA originate from verified LCI EUROGLAS Ujazd inventory data. This data was verified by ISO auditor and was presented for external auditor.

Assumptions and estimates

Impacts for each product and factory process were inventoried and calculated separately. All raw material consumption, emission water used were specific and presented in specific EPD. Emission into air from energy carriers was estimated using formal conversion factors for carriers.

Databases

The data for LCA are calculated or comes from specific EPD for flat glass, PGE (Electricity). Specific data quality analysis was a part of external ISO audit. Characterization factors are CML ver. 4.2 based on EN 15804:2013+A1 version. (PN EN 15804+A1:2014-04)

Calculation rules

LCA was done in accordance to PCR A document.

Power Mix

Selection of the power mix for 2012-2014 in accordance with formal National Mix published by annual GUS report. Specific data for power production impact - PGE

Note

Specific information on application and other actions with these system products are described in detail in the technical data sheet available on the producers website.

Environmental characteristics (LCA)

Table 2. Environmental characteristic for EUROFLOAT flat glass (1 m², 4 mm thickness)

Environmental assessment information (MNA – Module not assessed, MD – Module Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction 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
MD	MD	MD	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA	MNA

Environmental impacts: (1 m², 4 mm thickness)

Indicator	Unit	A1	A2	A3	A1-A3
Global warming potential	[kg CO ₂ eq.] (100 years)	1,90	5,48	3,00	10,38
Depletion potential of the stratospheric ozone layer	[kg CFC 11 eq.]	3,41E-08	3,90E-07	8,52E-09	4,33E-07
Acidification potential of soil and water	[kg SO ₂ eq.]	2,61E-02	6,71E-02	7,28E-03	1,01E-01
Eutrophication potential	[kg (PO ₄) ³⁻ eq.]	1,74E-03	3,47E-03	5,23E-03	1,04E-02
Formation potential of tropospheric ozone	[kg Ethene eq.]	4,33E-03	1,16E-02	3,41E-06	1,59E-02
Abiotic depletion potential (ADP-elements) for non-fossil resources	[kg Sb eq.]	9,58E-05	0,00	3,99E-05	1,36E-04
Abiotic depletion potential (ADP-fossil fuels) for fossil resources	[MJ]	21,88	0,94	55,13	77,95

Environmental aspects on resource use: (1 m², 4 mm thickness)

Indicator	Unit	A1	A2	A3	A1-A3
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	[MJ]	1,00E-01	0,0	5,01E-04	1,01E-01
Use of renewable primary energy resources used as raw materials	[MJ]	1,92E-01	4,00E-02	2,06	2,30
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	2,92E-01	4,00E-02	2,06	2,40
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	[MJ]	21,41	2,90	82,01	106,32
Use of non-renewable primary energy resources used as raw materials	[MJ]	0,0	0,0	1,50E-03	1,50E-03
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	[MJ]	21,41	2,90	82,01	106,32
Use of secondary material	[kg]	0,0	0,0	4,41	4,41
Use of renewable secondary fuels	[MJ]	0,0	0,0	0,0	0,0
Use of non-renewable secondary fuels	[MJ]	0,0	0,0	0,0	0,0
Net use of fresh water	[dm ³]	3,6	0,01	1,61	5,21

Other environmental information describing waste categories: (1 m², 4 mm thickness)

Indicator	Unit	A1	A2	A3	A1-A3
Hazardous waste disposed	[kg]	8,29E-06	0,0	2,15E-04	2,24E-04
Non-hazardous waste disposed	[kg]	1,74E-02	0,0	4,19E-01	4,36E-01
Radioactive waste disposed	[kg]	0,0	0,0	1,92E-03	1,92E-03
Components for re-use	[kg]	0,0	0,0	5,78E-03	5,78E-03
Materials for recycling	[kg]	0,0	0,0	7,89E-04	7,89E-04
Materials for energy recovery	[kg]	0,0	0,0	1,47E-04	1,47E-04
Exported energy	[MJ]	0,0	0,0	0,0	0,0

Verification

The process of verification of this EPD is in accordance with EN ISO 14025, clause 8 and ISO 21930, clause 9. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years, if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 and ITB PCR A
Independent verification corresponding to ISO 14025 & 8.3.1. <input checked="" type="checkbox"/> external <input type="checkbox"/> internal
External verification of EPD: PhD. Eng. Halina Prejzner LCA, LCI audit and input data verification: M.Sc. Eng. Dominik Bekierski, d.bekierski@itb.pl Verification of LCA: PhD Eng. Michał Piasecki, m.piasecki@itb.pl

Normative references

- ITB PCR A- General Product Category Rules for Construction Products
- ISO 14025:2006, Environmental management – Type III environmental declarations – Principles and procedure
- ISO 21930:2007, Sustainability in building and construction – Environmental declaration of building products
- ISO 14044:2006, Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2000, Buildings and constructed assets — Service life planning — Part 1: General principles
- ISO 15686-8:2008, Buildings and constructed assets – Service life planning – Part 8: Reference service life
- EN 15804:2012+A1:2013, Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.
- EN15942:2011, Sustainability of construction- Environmental product declarations. Communication format business-to-business



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02-888 Warszawa, ul. Kaszewów 21

ŚWIADECTWO nr 049/2016
DEKLARACJI ŚRODOWISKOWEJ III TYPU

Wyroby:

Szkoło bazowe EUROFLOAT

Wnioskodawca:

Euroglas Polska Sp. z o.o.

97-225 Ujazd, Osiedle Niewiadów 65

potwierdza się poprawność ustalenia danych uwzględnionych przy opracowaniu
Deklaracji Środowiskowej III typu oraz zgodność z wymaganiami normy

PN-EN 15804+A1:2014-04

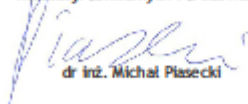
Zrównoważoność obiektów budowlanych.

Deklaracje środowiskowe wyrobów.

Podstawowe zasady kategoryzacji wyrobów budowlanych.

Niniejsze świadectwo, wydane po raz pierwszy 1 lutego 2016 r. jest ważne 5 lat,
lub do czasu zmiany wymienionej Deklaracji Środowiskowej

Kierownik
Zakładu Fizyki Ciepłej,
Instalacji Sanitarnych i Środowiska



dr inż. Michał Piasecki



Zastępca Dyrektora
ds. Badań i Innowacji



dr inż. Krzysztof Kuczyński

Warszawa, luty 2016 r.