ENVIRONMENTAL PRODUCT DECLARATION

IN ACCORDANCE WITH EN 15804+A2 & ISO 14025

Owner of declaration	PAL-Klaas AS
Program operator	Rakennustieto EPD
Declaration number	RTS_399_25
Publishing date	24.6.2025
EPD valid until	24.6.2030

SAFETY GLASS - TEMPERED, LAMINATED, TEMPERED-LAMINATED, COLORED

PAL-KLAAS

GENERAL INFORMATION

The EPD owner has the sole ownership, liability, and responsibility for the EPD. Construction products EPDs may not be comparable if they do not comply with EN 15804 and if they are not compared in a building context.

EPDs within the same product category but from different programs may not be comparable.

EPD program operator

Rakennustieto EPD

Rakennustietosäätiö RTS sr, Malminkatu 16 A, 00100 Helsinki, Finland

https://ymparisto.rakennustieto.fi/en/rakennustieto-epds

Publishing date

24.6.2025

Valid until

24.6.2030

Product category rules

The CEN standard EN 15804 serves as the core PCR. In addition, the RTS PCR (English version, 11.12.2024) is used and EN 17074:2019 Glass in building.

EPD author

Hannes Soosaar, Kirke Maria Lepik
LCA Support - Rangi Maja OÜ
www.lcasupport.com

EPD verifier

Sigita Židonienė
Vesta Consulting UAB
www.vestaconsulting.lt

Verification date

21.03.2025

Independent verification of this EPD and data, according to ISO 14025:2010:

☐ Internal ☑ External

Manufacturer

PAL-Klaas AS

Address

Lähtru tee 25, Palivere, Läänemaa 90802, Estonia

Contact details

PAL-Klaas AS
Lähtru tee 25, Palivere, Läänemaa 90802, Estonia
info@pal-klaas.ee

Website

www.pal-klaas.ee

Place of production

Palivere, Estonia

Declared unit

1 m^2 of 1 mm thick glass

Mass of declared unit

2.5 kg tempered glass
2.608 kg laminated glass
2.608 kg tempered-laminated glass
2.514 kg colored glass

Data period

2023

Jukka Seppänen
RTS EPD Committee Secretary

Laura Apilo
Managing Director

PRODUCT INFORMATION

Product name	Tempered glass Tempered-laminated glass Laminated glass Colored glass
Place of production	Lähtru tee 25, Palivere, Läänemaa 90802, Estonia

PRODUCT DESCRIPTION AND APPLICATION

PAL-Klaas produces various types of safety glass products from float glass including but not limited to - tempered and laminated glasses, soft and hard coated glasses and have painted and silk printed glasses in our portfolio.

Our safety glass has many applications in the construction industry, both in exterior and interior areas of use.

A safety glass is available in various thicknesses and configurations for this reason; to get the result for your product the impact must be multiplied by the thickness and of the safely glass purchased. A conversion table has been provided in the annex.

TECHNICAL SPECIFICATIONS AND PRODUCT STANDARDS

Heat soaked thermally toughened soda lime silicate safety glass for use in buildings. PVB laminated safety glass for use in buildings.

That comply with

- EN 14179-1
- EN 12150-2
- EN 12543-3

PHYSICAL PROPERTIES OF THE PRODUCT

Tempered glass is available from 4 mm thickness to 20 mm.
Laminated glass is available with up to two 10 mm thick glasses.
Tempered-laminated glass is available with up to two 10 mm thick glasses.
Colored glass is available from 4 mm to 20 mm.

Additional information can be found on http://www.pal-klaas.ee

PRODUCT RAW MATERIAL COMPOSITION PER DECLARED UNIT

Product components	Tempered Amount, mass%*	Laminated Amount, mass%*	Tempered-laminated Amount, mass%*	Colored Amount, mass%*	Material origin
Glass	100%	96%	96%	100%	Europe
PVB	0%	4%	4%	0%	Europe
Total	**100%**	**100%**	**100%**	**100%**	
Raw Material Category	**Tempered** Amount, mass%*	**Laminated** Amount, mass%*	**Tempered-laminated** Amount, mass%*	**Colored** Amount, mass%*	**Material origin**
Mineral	100%	96%	96%	100%	Europe
Fossil materials	0%	4%	4%	0%	Europe
Total	**100%**	**100%**	**100%**	**100%**	

* Order of magnitude, not exact composition. All values are rounded.

PACKAGING RAW MATERIAL COMPOSITION PER DECLARED UNIT

Packaging components	Tempered Amount, mass%*	Laminated Amount, mass%*	Tempered-laminated Amount, mass%*	Colored Amount, mass%*	Material origin
Wood	99%	99%	99%	99%	Europe
Plastic film	1%	1%	1%	1%	Europe
Total	**100%**	**100%**	**100%**	**100%**	
Raw Material Category	**Tempered** Amount, mass%*	**Laminated** Amount, mass%*	**Tempered-laminated** Amount, mass%*	**Colored** Amount, mass%*	**Material origin**
Bio-based materials	99%	99%	99%	99%	Europe
Fossil materials	1%	1%	1%	1%	Europe
Total	**100%**	**100%**	**100%**	**100%**	

* Order of magnitude, not exact composition. All values are rounded.

BIOGENIC CARBON CONTENT

Biogenic carbon content in product	0 kg
Biogenic carbon content in packaging	0.093 kg tempered glass 0.112 kg laminated glass 0.112 kg tempered-laminated glass 0.130 kg colored glass

Note. 1 kg biogenic carbon is equivalent to 44/12 kg of biogenic CO_2.

SUBSTANCES, REACH - VERY HIGH CONCERN

The product does not contain any REACH SVHC substances in amounts greater than 0.1 % (1000 ppm).

MANUFACTURING PROCESS

PAL-Klaas uses float-glass as the main raw material for production.
All input materials arrive on lorries at the manufacturing site where it is stored in the warehouse.
As each piece of glass is made to a specific order. The large glass slabs are cut into desired sizes

After cutting the glass additional processing is done. Based on the specific type of safety glass that is ordered there the workflows must complete at least on addition process either tempering or laminating before the product is ready for packing and shipping out to the client via lorry.

Based on the steps needed to complete the manufacture of safety glass the product has been grouped into groups and the impacts are given separately as tempered, laminated, tempered-laminated or colored.

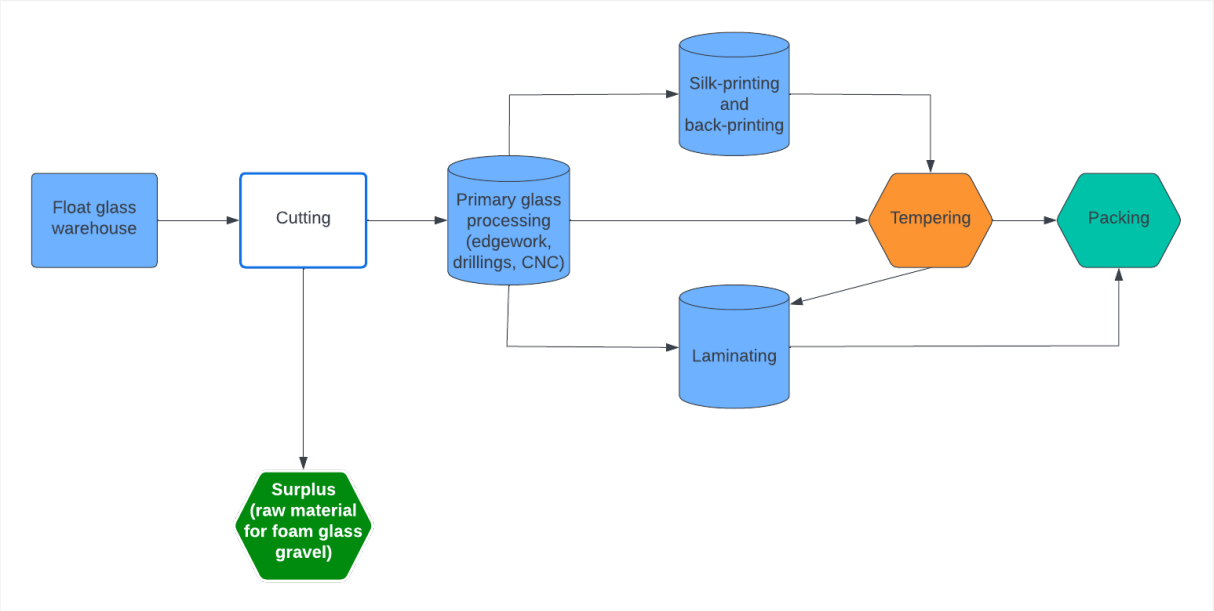

Figure 1 Manufacturing production process flow diagram.

PRODUCT LIFE-CYCLE AND LIFE-CYCLE ASSESSMENT

Period for data	2023
Declared unit	1 m^2
Mass per declared unit	2.5 kg tempered glass 2.608 kg laminated glass 2.608 kg tempered-laminated glass 2.514 kg colored glass

The study does not exclude any modules or processes which are stated mandatory in the EN 15804:2012+A2:2019 and the applied PCR. The study does not exclude any hazardous materials or substances.

The study includes all major raw material and energy consumption. All inputs and outputs of the unit processes, for which data is available for, are included in the calculation. There is no neglected unit process that is more than 1% of total mass or energy flows. The module specific total neglected input and output flows also do not exceed 5% of energy usage or mass.

Co-product allocation has not been used.

The data sources for the study are Ecoinvent 3.10.1 (2024), One Click LCA databases and supplier EPDs. The tools used for the study were One Click LCA and Open LCA. The EN 15804 reference package used is based on EF 3.1.

SYSTEM BOUNDARY

The scope of the EPD is cradle to gate with options (A1-A4), modules C1–C4 and module D.

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries		
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	D	D
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	x	x	x
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/ demolition	Transport	Waste processing	Disposal	Reuse	Recovery	Recycling

Modules not declared = MND. Modules not relevant = MNR.

MANUFACTURING AND PACKAGING (A1-A3)

The environmental impacts considered for the product stage cover the manufacturing of raw materials used in the production as well as packaging materials and other ancillary materials.

Vehicle capacity utilization volume factor is assumed to be 1, which means full load. It may vary but as the role of transportation emission in total results is small and so the variety in load is assumed to be negligible. Empty returns are not taken into account as it is assumed that return trips are used by transportation companies to serve the needs of other clients.

The heating of the production facility is covered by excess energy from production machinery. In rare cases if additional heating is needed diesel generators are used to generate additional heating. The impact of burning diesel is accounted for the same as diesel consumed by lifting equipment.

Fuels used by machines, and handling of waste formed in the production processes at the manufacturing facilities are included in this stage. All fuel and energy use were allocated based on production volume. The electricity used in the plant is grid energy in Estonian. The study also considers the material losses occurring during the manufacturing processes as well as losses during electricity transmission.

Table 1. Production Facility Energy Usage.

Electricity data source and quality	Electricity, medium voltage, residual mix (Reference product: electricity, medium voltage) Source: Ecoinvent 3.10.1, Unit: kWh
Specific emissions (GWP-fossil, CO2e/kWh)	0.64 kg CO2e/kWh
Heating data source and quality	Diesel, burned in building machine (Reference product: diesel, burned in building machine), Source: Ecoinvent 3.10.1, Unit: MJ
Specific emissions (GWP-fossil, CO2e/kWh)	0.1 kg CO2e/MJ

TRANSPORT AND INSTALLATION (A4-A5)

Transportation impacts occurred from final products delivery to construction site (A4) cover fuel direct exhaust emissions, environmental impacts of fuel production, as well as related infrastructure emissions.

The transportation distance is defined according to RTS PCR - from the place of manufacture to Helsinki, Finland. According to the manufacturer, transportation doesn't cause losses as products are packaged properly. The final product is transported 176 km (101 km by lorry and 75 km ferry). Vehicle capacity utilization volume factor is assumed to be 1.

Bulk density has been calculated based on the assumption that any package will contain about 44% of product and that the rest of the package space will have the density of 181 kg/m^3. Results are rounded.

Table 2 Transport related data.

Vehicle type used for transport and distance	176 km (101 km by lorry and 75 km ferry)
Specific transport emissions (GWP-fossil, CO2e/kWh)	0.10 kg CO2 per tkm
Capacity utilization (including empty returns)	100%
Volume capacity utilization factor	1
Product density (kg/m³)	2500 kg/m³ tempered glass 2608 kg/m³ laminated glass 2608 kg/m³ tempered-laminated glass 2514 kg/m³ colored glass
Bulk density (kg/m³)	1626 kg/m³ tempered glass 1635 kg/m³ laminated glass 1635 kg/m³ tempered-laminated glass 1692 kg/m³ colored glass

A5 has not been declared.

PRODUCT USE AND MAINTENANCE (B1-B7)

This EPD does not cover the use phase. Air, soil, and water impacts during the use phase have not been studied.

PRODUCT END OF LIFE (C1-C4, D)

It is estimated that there is no mass loss during the use of the product, therefore the end-of-life product is assumed to have the same weight as the declared product. All the end-of-life products are assumed to be sent to the closest facilities such as recycling or landfill. Transportation distance to the closest disposal area is estimated as 100 km and the transportation method is assumed as lorry which is the most common option.

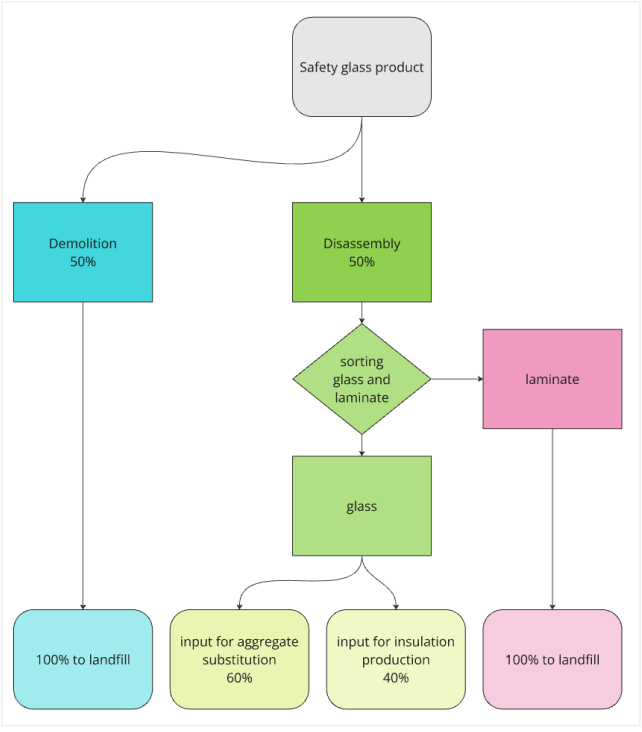

Figure 2. EOL scenarios.

It is assumed that 50% of products are disassembled and 50% of the waste is demolished along with the building. Demolition is assumed to take 0.01 kWh/kg (Bozdağ, Ö & Seçer, M (2007) and the Level(s) project). It is assumed that 100% of the waste is collected. Only flat glass is assumed to go recycling, the fit based paint is included in the glass as it is fused and cannot be separated. The PVB film will be disposed of as demolished product.

The demolished product will be disposed of at a landfill, this includes 100% of the PVB film.

The disassembled product is assumed recycling. 40% of the recycled waste flat glass is used to produce glass wool and 60% is used as aggregates for construction. The PVB film extracted is considered with the PVB film extracted during demolition.

Materials destined for recycling have been considered in module D. Only net benefits are considered. The recycling efficiency is assumed as 100% as there is no degradation of the raw material.

Table 3. End of life material allocation.

EOL mass of product		1 m^2
Collection	**Collected separately**	1.250 kg tempered 1.304 kg laminated 1.304 kg tempered-laminated 1.257 kg colored
	Collected with mixed waste	1.250 kg tempered 1.304 kg laminated 1.304 kg tempered-laminated 1.257 kg colored
Recovery	**Re-use**	0 kg
	Recycling	1.250 kg tempered 1.250 kg laminated 1.250 kg tempered-laminated 1.257 kg colored
	Incineration with energy recovery	0 kg
Disposal	**Incineration without energy recovery**	0 kg
	Landfill	1.25 kg tempered 1.358 kg laminated 1.358 kg tempered-laminated 1.257 kg colored
Total		2.250 kg tempered 2.608 kg laminated 2.608 kg tempered-laminated 2.514 kg colored kg
Scenario assumptions, e.g. transportation		End-of-life product is transported 100 km with an average lorry

Note. All values in the table are rounded.

PAL-KLAAS

BIBLIOGRAPHY

ISO 14025:2010 Environmental labels and declarations – Type III environmental declarations. Principles and procedures.

ISO 14040:2006 Environmental management. Life cycle assessment. Principles and frameworks.

ISO 14044:2006 Environmental management. Life cycle assessment. Requirements and guidelines.

Ecoinvent database v3.10.1 (2024) and One Click LCA database.

Raw material producer EPD.

EN 15804:2012+A2:2019 Sustainability in construction works – Environmental product declarations – Core rules for the product category of construction products.

EN 17074:2019 Glass in building - Environmental product declaration - Product category rules for flat glass products

RTS PCR in line with EN 15804+A2. Published by the Building Information Foundation RTS 26.8.2020.

Mathieu Hestin, Sarah de Veron & Stephanie Burgos. (2016). Economic study on recycling of building glass in Europe. [http://www.glassforeurope.com/wp-content/uploads/2018/04/Economic-study-on-recycling-of-building-glass-in-Europe-Deloitte.pdf]

Bozdağ, Ö & Seçer, M. 2007. Energy consumption of RC buildings during their life cycle.

TEMPERED SAFETY GLASS (1 M^2 OF 1 MM THICK GLASS)

All results are presented per declared unit, except for 'Key information per kg (RTS)' where results are presented per kg of product.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2. PEF VP-029-C

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO2e	4.87E+00	5.41E-02	9.01E-03	2.95E-02	2.24E-02	2.47E-02	-1.84E-02
Global warming potential – fossil	kg CO2e	4.86E+00	5.40E-02	9.01E-03	2.94E-02	2.23E-02	2.47E-02	-1.84E-02
Global warming potential – biogenic	kg CO2e	3.65E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Global warming potential – LULUC	kg CO2e	2.24E-03	2.31E-05	9.23E-07	1.32E-05	5.82E-05	5.88E-05	-1.17E-05
Ozone depletion potential	kg CFC-11e	1.01E-07	9.48E-10	1.38E-10	4.35E-10	4.66E-10	5.40E-10	-2.43E-10
Acidification potential	mol H+e	3.14E-02	8.21E-04	8.13E-05	1.00E-04	1.22E-04	1.48E-04	-1.07E-04
Eutrophication potential - freshwater	kg Pe	7.94E-04	2.70E-06	2.60E-07	2.29E-06	1.83E-06	5.78E-06	-3.12E-06
Eutrophication potential - marine	kg Ne	5.85E-03	2.16E-04	3.77E-05	3.30E-05	4.64E-05	5.29E-05	-3.27E-05
Eutrophication potential - terrestrial	mol Ne	6.73E-02	2.39E-03	4.13E-04	3.59E-04	5.02E-04	5.72E-04	-3.71E-04
Photochemical ozone formation ("smog")	kg NMVOCe	1.89E-02	7.05E-04	1.23E-04	1.48E-04	1.76E-04	2.02E-04	-1.18E-04
Abiotic depletion potential - minerals & metals	kg Sbe	3.99E-01	1.03E-07	3.23E-09	8.21E-08	5.94E-08	6.40E-08	-8.02E-08
Abiotic depletion potential - fossil resources	MJ	5.74E+01	7.28E-01	1.18E-01	4.27E-01	3.99E-01	4.54E-01	-2.42E-01
Water use	m3e depr.	9.65E-01	2.97E-03	2.94E-04	2.11E-03	1.60E-03	1.93E-03	-1.18E-02

EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	7.78E+00	9.05E-03	7.47E-04	5.85E-03	4.95E-03	6.10E-03	-1.06E-02
Renewable primary energy resources as material	MJ	2.02E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ	7.98E+00	9.05E-03	7.47E-04	5.85E-03	4.95E-03	6.10E-03	-1.06E-02
Non-renewable primary energy resources as energy	MJ	5.76E+01	7.28E-01	1.18E-01	4.27E-01	3.99E-01	4.54E-01	-2.42E-01
Non-renewable primary energy resources as material	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of non-renewable primary energy resources	MJ	5.76E+01	7.28E-01	1.18E-01	4.27E-01	3.99E-01	4.54E-01	-2.42E-01
Secondary materials	kg	4.47E-02	3.16E-04	4.90E-05	1.82E-04	1.41E-04	1.59E-04	1.25E+00
Renewable secondary fuels	MJ	2.97E-03	2.63E-06	1.28E-07	2.31E-06	2.17E-06	2.50E-06	-1.50E-06
Non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m3	3.39E-02	8.23E-05	7.79E-06	6.32E-05	2.31E-04	-4.30E-04	-2.83E-04

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	3.26E-01	9.84E-04	1.31E-04	7.24E-04	5.90E-04	6.82E-04	-9.79E-04
Non-hazardous waste	kg	1.08E+01	1.73E-02	1.79E-03	1.34E-02	1.18E-02	8.52E-01	-1.76E-02
Radioactive waste	kg	1.89E-04	1.57E-07	1.28E-08	9.11E-08	7.35E-08	9.14E-08	-1.85E-07

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.02E-04	0.00E+00	0.00E+00	0.00E+00	1.25E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

KEY INFORMATION PER KG (RTS)

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO2e	1.95E+00	2.16E-02	3.60E-03	1.18E-02	8.96E-03	9.88E-03	-7.36E-03
Global warming potential – fossil	kg CO2e	1.94E+00	2.16E-02	3.60E-03	1.18E-02	8.92E-03	9.88E-03	-7.36E-03
Global warming potential – biogenic	kg CO2e	1.46E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic depletion potential - minerals & metals	kg Sbe	1.60E-01	4.12E-08	1.29E-09	3.28E-08	2.38E-08	2.56E-08	-3.21E-08
Abiotic depletion potential - fossil	MJ	2.30E+01	2.91E-01	4.72E-02	1.71E-01	1.60E-01	1.82E-01	-9.68E-02
Water use	m3e depr.	3.86E-01	1.19E-03	1.18E-04	8.44E-04	6.40E-04	7.72E-04	-4.72E-03
Secondary materials	kg	1.79E-02	1.26E-04	1.96E-05	7.28E-05	5.64E-05	6.36E-05	5.00E-01
Biogenic carbon in product (A3)	kg C	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	3.72E-02	N/A	N/A	N/A	N/A	N/A	N/A

LAMINATED SAFETY GLASS (1 M^2 OF 1 MM THICK GLASS)

All results are presented per declared unit, except for 'Key information per kg (RTS)' where results are presented per kg of product.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2. PEF VP-029-C

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO2e	4.98E+00	5.71E-02	9.37E-03	2.81E-02	2.24E-02	1.53E-01	-1.84E-02
Global warming potential – fossil	kg CO2e	4.98E+00	5.71E-02	9.37E-03	2.81E-02	2.23E-02	1.53E-01	-1.84E-02
Global warming potential – biogenic	kg CO2e	3.68E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Global warming potential – LULUC	kg CO2e	2.40E-03	2.44E-05	9.60E-07	1.26E-05	5.82E-05	7.43E-05	-1.17E-05
Ozone depletion potential	kg CFC-11e	1.00E-07	1.00E-09	1.44E-10	4.14E-10	4.66E-10	1.07E-09	-2.43E-10
Acidification potential	mol H+e	3.07E-02	8.68E-04	8.46E-05	9.57E-05	1.22E-04	2.24E-04	-1.07E-04
Eutrophication potential - freshwater	kg Pe	6.71E-04	2.85E-06	2.71E-07	2.19E-06	1.83E-06	7.59E-06	-3.12E-06
Eutrophication potential - marine	kg Ne	5.80E-03	2.28E-04	3.92E-05	3.14E-05	4.64E-05	9.52E-05	-3.27E-05
Eutrophication potential - terrestrial	mol Ne	6.70E-02	2.52E-03	4.30E-04	3.42E-04	5.02E-04	7.99E-04	-3.71E-04
Photochemical ozone formation ("smog")	kg NMVOCe	1.90E-02	7.45E-04	1.28E-04	1.41E-04	1.76E-04	2.79E-04	-1.18E-04
Abiotic depletion potential - minerals & metals	kg Sbe	3.99E-01	1.09E-07	3.36E-09	7.83E-08	5.94E-08	2.10E-07	-8.02E-08
Abiotic depletion potential - fossil resources	MJ	6.37E+01	7.69E-01	1.23E-01	4.07E-01	3.99E-01	6.23E-01	-2.42E-01
Water use	m3e depr.	8.31E-01	3.14E-03	3.06E-04	2.01E-03	1.60E-03	1.55E-01	-1.18E-02

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USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	1.05E+01	9.56E-03	7.76E-04	5.58E-03	4.95E-03	2.41E-02	-1.06E-02
Renewable primary energy resources as material	MJ	6.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.84E-01	0.00E+00
Total use of renewable primary energy resources	MJ	1.12E+01	9.56E-03	7.76E-04	5.58E-03	4.95E-03	-4.59E-01	-1.06E-02
Non-renewable primary energy resources as energy	MJ	5.99E+01	7.69E-01	1.23E-01	4.07E-01	3.99E-01	-1.70E+00	-2.42E-01
Non-renewable primary energy resources as material	MJ	3.60E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.60E+00	0.00E+00
Total use of non-renewable primary energy resources	MJ	6.35E+01	7.69E-01	1.23E-01	4.07E-01	3.99E-01	-5.30E+00	-2.42E-01
Secondary materials	kg	4.15E-02	3.34E-04	5.09E-05	1.73E-04	1.41E-04	2.23E-04	1.25E+00
Renewable secondary fuels	MJ	2.98E-03	2.78E-06	1.33E-07	2.20E-06	2.17E-06	2.16E-05	-1.50E-06
Non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m3	3.24E-02	8.70E-05	8.10E-06	6.02E-05	2.31E-04	3.68E-03	-2.83E-04

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	2.88E-01	1.04E-03	1.36E-04	6.90E-04	5.90E-04	3.64E-02	-9.79E-04
Non-hazardous waste	kg	1.03E+01	1.83E-02	1.86E-03	1.28E-02	1.18E-02	3.22E-01	-1.76E-02
Radioactive waste	kg	2.83E-04	1.66E-07	1.33E-08	8.68E-08	7.35E-08	2.79E-07	-1.85E-07

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.02E-04	0.00E+00	0.00E+00	0.00E+00	1.25E+00	1.08E-01	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

KEY INFORMATION PER KG (RTS)

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO2e	1.91E+00	2.19E-02	3.59E-03	1.08E-02	8.59E-03	5.87E-02	-7.06E-03
Global warming potential – fossil	kg CO2e	1.91E+00	2.19E-02	3.59E-03	1.08E-02	8.55E-03	5.87E-02	-7.06E-03
Global warming potential – biogenic	kg CO2e	1.41E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic depletion potential - minerals & metals	kg Sbe	1.53E-01	4.18E-08	1.29E-09	3.00E-08	2.28E-08	8.05E-08	-3.08E-08
Abiotic depletion potential - fossil	MJ	2.44E+01	2.95E-01	4.72E-02	1.56E-01	1.53E-01	2.39E-01	-9.28E-02
Water use	m3e depr.	3.19E-01	1.20E-03	1.17E-04	7.71E-04	6.13E-04	5.94E-02	-4.52E-03
Secondary materials	kg	1.59E-02	1.28E-04	1.95E-05	6.63E-05	5.41E-05	8.55E-05	4.79E-01
Biogenic carbon in product (A3)	kg C	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	4.29E-02	N/A	N/A	N/A	N/A	N/A	N/A

TEMPERED-LAMINATED SAFETY GLASS (1 M^2 OF 1 MM THICK GLASS)

All results are presented per declared unit, except for 'Key information per kg (RTS)' where results are presented per kg of product.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2. PEF VP-029-C

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO2e	6.49E+00	5.72E-02	9.37E-03	2.81E-02	2.24E-02	1.53E-01	-1.84E-02
Global warming potential – fossil	kg CO2e	6.49E+00	5.71E-02	9.37E-03	2.81E-02	2.23E-02	1.53E-01	-1.84E-02
Global warming potential – biogenic	kg CO2e	3.75E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Global warming potential – LULUC	kg CO2e	2.56E-03	2.44E-05	9.60E-07	1.26E-05	5.82E-05	7.43E-05	-1.17E-05
Ozone depletion potential	kg CFC-11e	1.15E-07	1.00E-09	1.44E-10	4.14E-10	4.66E-10	1.07E-09	-2.43E-10
Acidification potential	mol H+e	3.56E-02	8.69E-04	8.46E-05	9.57E-05	1.22E-04	2.24E-04	-1.07E-04
Eutrophication potential - freshwater	kg Pe	1.11E-03	2.85E-06	2.71E-07	2.19E-06	1.83E-06	7.59E-06	-3.12E-06
Eutrophication potential - marine	kg Ne	6.86E-03	2.28E-04	3.92E-05	3.14E-05	4.64E-05	9.52E-05	-3.27E-05
Eutrophication potential - terrestrial	mol Ne	7.79E-02	2.53E-03	4.30E-04	3.42E-04	5.02E-04	7.99E-04	-3.71E-04
Photochemical ozone formation ("smog")	kg NMVOCe	2.22E-02	7.45E-04	1.28E-04	1.41E-04	1.76E-04	2.79E-04	-1.18E-04
Abiotic depletion potential - minerals & metals	kg Sbe	3.99E-01	1.09E-07	3.36E-09	7.83E-08	5.94E-08	2.10E-07	-8.02E-08
Abiotic depletion potential - fossil resources	MJ	8.24E+01	7.70E-01	1.23E-01	4.07E-01	3.99E-01	6.23E-01	-2.42E-01
Water use	m3e depr.	9.71E-01	3.14E-03	3.06E-04	2.01E-03	1.60E-03	1.55E-01	-1.18E-02

EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation, human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	1.12E+01	9.57E-03	7.76E-04	5.58E-03	4.95E-03	2.41E-02	-1.06E-02
Renewable primary energy resources as material	MJ	6.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-4.84E-01	0.00E+00
Total use of renewable primary energy resources	MJ	1.18E+01	9.57E-03	7.76E-04	5.58E-03	4.95E-03	-4.59E-01	-1.06E-02
Non-renewable primary energy resources as energy	MJ	7.87E+01	7.70E-01	1.23E-01	4.07E-01	3.99E-01	-1.70E+00	-2.42E-01
Non-renewable primary energy resources as material	MJ	3.60E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-3.60E+00	0.00E+00
Total use of non-renewable primary energy resources	MJ	8.23E+01	7.70E-01	1.23E-01	4.07E-01	3.99E-01	-5.30E+00	-2.42E-01
Secondary materials	kg	5.32E-02	3.34E-04	5.09E-05	1.73E-04	1.41E-04	2.23E-04	1.25E+00
Renewable secondary fuels	MJ	2.99E-03	2.78E-06	1.33E-07	2.20E-06	2.17E-06	2.16E-05	-1.50E-06
Non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m3	4.55E-02	8.70E-05	8.10E-06	6.02E-05	2.31E-04	3.68E-03	-2.83E-04

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	4.20E-01	1.04E-03	1.36E-04	6.90E-04	5.90E-04	3.64E-02	-9.79E-04
Non-hazardous waste	kg	1.28E+01	1.83E-02	1.86E-03	1.28E-02	1.18E-02	3.22E-01	-1.76E-02
Radioactive waste	kg	3.31E-04	1.66E-07	1.33E-08	8.68E-08	7.35E-08	2.79E-07	-1.85E-07

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.02E-04	0.00E+00	0.00E+00	0.00E+00	1.25E+00	1.08E-01	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

KEY INFORMATION PER KG (RTS)

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO2e	2.49E+00	2.19E-02	3.59E-03	1.08E-02	8.59E-03	5.87E-02	-7.06E-03
Global warming potential – fossil	kg CO2e	2.49E+00	2.19E-02	3.59E-03	1.08E-02	8.55E-03	5.87E-02	-7.06E-03
Global warming potential – biogenic	kg CO2e	1.44E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic depletion potential - minerals & metals	kg Sbe	1.53E-01	4.18E-08	1.29E-09	3.00E-08	2.28E-08	8.05E-08	-3.08E-08
Abiotic depletion potential - fossil	MJ	3.16E+01	2.95E-01	4.72E-02	1.56E-01	1.53E-01	2.39E-01	-9.28E-02
Water use	m3e depr.	3.72E-01	1.20E-03	1.17E-04	7.71E-04	6.13E-04	5.94E-02	-4.52E-03
Secondary materials	kg	2.04E-02	1.28E-04	1.95E-05	6.63E-05	5.41E-05	8.55E-05	4.79E-01
Biogenic carbon in product (A3)	kg C	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	4.29E-02	N/A	N/A	N/A	N/A	N/A	N/A

COLORED SAFETY GLASS (1 M^2 OF 1 MM THICK GLASS)

All results are presented per declared unit, except for 'Key information per kg (RTS)' where results are presented per kg of product.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2. PEF VP-029-C

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO_2e	4.94E+00	5.62E-02	9.01E-03	4.05E-02	3.25E-02	2.25E-02	-1.89E-02
Global warming potential – fossil	kg CO_2e	4.94E+00	5.62E-02	9.01E-03	4.05E-02	3.25E-02	2.25E-02	-1.89E-02
Global warming potential – biogenic	kg CO_2e	3.15E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Global warming potential – LULUC	kg CO_2e	2.50E-03	2.40E-05	9.23E-07	1.72E-05	6.60E-05	5.85E-05	-1.20E-05
Ozone depletion potential	kg CFC_{-11}e	1.04E-07	9.85E-10	1.38E-10	6.70E-10	6.91E-10	4.69E-10	-2.50E-10
Acidification potential	mol H^+e	3.18E-02	8.54E-04	8.13E-05	1.36E-04	1.85E-04	1.23E-04	-1.10E-04
Eutrophication potential - freshwater	kg Pe	8.26E-04	2.80E-06	2.60E-07	3.01E-06	7.37E-06	1.84E-06	-3.21E-06
Eutrophication potential - marine	kg Ne	5.93E-03	2.24E-04	3.77E-05	4.51E-05	6.59E-05	4.67E-05	-3.36E-05
Eutrophication potential - terrestrial	mol Ne	6.83E-02	2.48E-03	4.13E-04	4.91E-04	7.11E-04	5.05E-04	-3.81E-04
Photochemical ozone formation ("smog")	kg NMVOCe	1.93E-02	7.33E-04	1.23E-04	2.07E-04	2.51E-04	1.77E-04	-1.21E-04
Abiotic depletion potential - minerals & metals	kg Sbe	3.99E-01	1.07E-07	3.23E-09	1.13E-07	1.04E-07	5.97E-08	-8.24E-08
Abiotic depletion potential - fossil resources	MJ	5.84E+01	7.57E-01	1.18E-01	5.88E-01	5.77E-01	4.01E-01	-2.48E-01
Water use	m^3e depr.	9.93E-01	3.09E-03	2.94E-04	2.94E-03	3.33E-03	1.60E-03	-1.21E-02

EN 15804+A2 disclaimer for Abiotic depletion and Water use and optional indicators except Particulate matter and Ionizing radiation. human health. The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.

USE OF NATURAL RESOURCES

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Renewable primary energy resources as energy	MJ	1.05E+01	9.40E-03	7.47E-04	8.56E-03	1.73E-02	4.98E-03	-1.09E-02
Renewable primary energy resources as material	MJ	2.02E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total use of renewable primary energy resources	MJ	1.07E+01	9.40E-03	7.47E-04	8.56E-03	1.73E-02	4.98E-03	-1.09E-02
Non-renewable primary energy resources as energy	MJ	5.85E+01	7.57E-01	1.18E-01	5.88E-01	5.77E-01	4.02E-01	-2.48E-01
Non-renewable primary energy resources as material	MJ	1.51E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	-1.51E-01	0.00E+00
Total use of non-renewable primary energy resources	MJ	5.87E+01	7.57E-01	1.18E-01	5.88E-01	5.77E-01	2.50E-01	-2.48E-01
Secondary materials	kg	4.70E-02	3.29E-04	4.90E-05	2.52E-04	2.09E-04	1.42E-04	1.26E+00
Renewable secondary fuels	MJ	2.96E-03	2.73E-06	1.28E-07	3.19E-06	3.02E-06	2.19E-06	-1.54E-06
Non-renewable secondary fuels	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water	m^3	3.48E-02	8.55E-05	7.79E-06	8.69E-05	-3.40E-04	2.32E-04	-2.91E-04

END OF LIFE – WASTE

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Hazardous waste	kg	3.33E-01	1.02E-03	1.31E-04	9.48E-04	9.08E-04	5.93E-04	-1.01E-03
Non-hazardous waste	kg	1.07E+01	1.80E-02	1.79E-03	1.80E-02	8.04E-01	1.19E-02	-1.82E-02
Radioactive waste	kg	1.91E-04	1.64E-07	1.28E-08	1.42E-07	3.71E-07	7.40E-08	-1.91E-07

END OF LIFE – OUTPUT FLOWS

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Components for re-use	kg	3.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	3.02E-04	0.00E+00	0.00E+00	0.00E+00	2.51E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

KEY INFORMATION PER KG (RTS)

Impact category	Unit	A1-A3	A4	C1	C2	C3	C4	D
Global warming potential – total	kg CO2e	1.96E+00	2.24E-02	3.58E-03	1.61E-02	1.29E-02	8.95E-03	-7.52E-03
Global warming potential – fossil	kg CO2e	1.96E+00	2.24E-02	3.58E-03	1.61E-02	1.29E-02	8.95E-03	-7.52E-03
Global warming potential – biogenic	kg CO2e	1.25E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic depletion potential - minerals & metals	kg Sbe	1.25E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic depletion potential - fossil	MJ	2.32E+01	3.01E-01	4.69E-02	2.34E-01	2.30E-01	1.60E-01	-9.86E-02
Water use	m3e depr.	3.95E-01	1.23E-03	1.17E-04	1.17E-03	1.32E-03	6.36E-04	-4.81E-03
Secondary materials	kg	1.87E-02	1.31E-04	1.95E-05	1.00E-04	8.31E-05	5.65E-05	5.00E-01
Biogenic carbon in product (A3)	kg C	0.00E+00	N/A	N/A	N/A	N/A	N/A	N/A
Biogenic carbon in packaging (A3)	kg C	5.17E-02	N/A	N/A	N/A	N/A	N/A	N/A

ANNEX 1. TEMPERED SAFETY GLASS CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF. IMPACTS OF 1 M2 OF GLASS BY THICKNESS.

To calculate the impact for any of the categories please multiply the result by the thickness of the glass.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Global warming potential – total (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	4.87E+00	5.41E-02	9.01E-03	2.95E-02	2.24E-02	2.47E-02	-1.84E-02
2	9.74E+00	1.08E-01	1.80E-02	5.90E-02	4.48E-02	4.94E-02	-3.68E-02
3	1.46E+01	1.62E-01	2.70E-02	8.85E-02	6.72E-02	7.41E-02	-5.52E-02
4	1.95E+01	2.16E-01	3.60E-02	1.18E-01	8.96E-02	9.88E-02	-7.36E-02
5	2.44E+01	2.71E-01	4.51E-02	1.48E-01	1.12E-01	1.24E-01	-9.20E-02
6	2.92E+01	3.25E-01	5.41E-02	1.77E-01	1.34E-01	1.48E-01	-1.10E-01
7	3.41E+01	3.79E-01	6.31E-02	2.07E-01	1.57E-01	1.73E-01	-1.29E-01
8	3.90E+01	4.33E-01	7.21E-02	2.36E-01	1.79E-01	1.98E-01	-1.47E-01
9	4.38E+01	4.87E-01	8.11E-02	2.66E-01	2.02E-01	2.22E-01	-1.66E-01
10	4.87E+01	5.41E-01	9.01E-02	2.95E-01	2.24E-01	2.47E-01	-1.84E-01
11	5.36E+01	5.95E-01	9.91E-02	3.25E-01	2.46E-01	2.72E-01	-2.02E-01
12	5.84E+01	6.49E-01	1.08E-01	3.54E-01	2.69E-01	2.96E-01	-2.21E-01
13	6.33E+01	7.03E-01	1.17E-01	3.84E-01	2.91E-01	3.21E-01	-2.39E-01
14	6.82E+01	7.57E-01	1.26E-01	4.13E-01	3.14E-01	3.46E-01	-2.58E-01
15	7.31E+01	8.12E-01	1.35E-01	4.43E-01	3.36E-01	3.71E-01	-2.76E-01
16	7.79E+01	8.66E-01	1.44E-01	4.72E-01	3.58E-01	3.95E-01	-2.94E-01
17	8.28E+01	9.20E-01	1.53E-01	5.02E-01	3.81E-01	4.20E-01	-3.13E-01
18	8.77E+01	9.74E-01	1.62E-01	5.31E-01	4.03E-01	4.45E-01	-3.31E-01
19	9.25E+01	1.03E+00	1.71E-01	5.61E-01	4.26E-01	4.69E-01	-3.50E-01
20	9.74E+01	1.08E+00	1.80E-01	5.90E-01	4.48E-01	4.94E-01	-3.68E-01

Global warming potential – fossil (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	4.86E+00	5.40E-02	9.01E-03	2.94E-02	2.23E-02	2.47E-02	-1.84E-02
2	9.72E+00	1.08E-01	1.80E-02	5.88E-02	4.46E-02	4.94E-02	-3.68E-02
3	1.46E+01	1.62E-01	2.70E-02	8.82E-02	6.69E-02	7.41E-02	-5.52E-02
4	1.94E+01	2.16E-01	3.60E-02	1.18E-01	8.92E-02	9.88E-02	-7.36E-02
5	2.43E+01	2.70E-01	4.51E-02	1.47E-01	1.12E-01	1.24E-01	-9.20E-02
6	2.92E+01	3.24E-01	5.41E-02	1.76E-01	1.34E-01	1.48E-01	-1.10E-01
7	3.40E+01	3.78E-01	6.31E-02	2.06E-01	1.56E-01	1.73E-01	-1.29E-01
8	3.89E+01	4.32E-01	7.21E-02	2.35E-01	1.78E-01	1.98E-01	-1.47E-01
9	4.37E+01	4.86E-01	8.11E-02	2.65E-01	2.01E-01	2.22E-01	-1.66E-01
10	4.86E+01	5.40E-01	9.01E-02	2.94E-01	2.23E-01	2.47E-01	-1.84E-01
11	5.35E+01	5.94E-01	9.91E-02	3.23E-01	2.45E-01	2.72E-01	-2.02E-01
12	5.83E+01	6.48E-01	1.08E-01	3.53E-01	2.68E-01	2.96E-01	-2.21E-01
13	6.32E+01	7.02E-01	1.17E-01	3.82E-01	2.90E-01	3.21E-01	-2.39E-01
14	6.80E+01	7.56E-01	1.26E-01	4.12E-01	3.12E-01	3.46E-01	-2.58E-01
15	7.29E+01	8.10E-01	1.35E-01	4.41E-01	3.35E-01	3.71E-01	-2.76E-01
16	7.78E+01	8.64E-01	1.44E-01	4.70E-01	3.57E-01	3.95E-01	-2.94E-01
17	8.26E+01	9.18E-01	1.53E-01	5.00E-01	3.79E-01	4.20E-01	-3.13E-01
18	8.75E+01	9.72E-01	1.62E-01	5.29E-01	4.01E-01	4.45E-01	-3.31E-01
19	9.23E+01	1.03E+00	1.71E-01	5.59E-01	4.24E-01	4.69E-01	-3.50E-01
20	9.72E+01	1.08E+00	1.80E-01	5.88E-01	4.46E-01	4.94E-01	-3.68E-01

Global warming potential – biogenic (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	3.65E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	7.30E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	1.10E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.46E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.83E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	2.56E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	2.92E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	3.29E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	3.65E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	4.02E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	4.38E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	4.75E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	5.11E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	5.48E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	5.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
17	6.21E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	6.57E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19	6.94E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
20	7.30E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ANNEX 2. LAMINATED SAFETY GLASS CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF. IMPACTS OF 1 M2 OF GLASS BY THICKNESS.

To calculate the impact for any of the categories please multiply the result by the thickness of the glass.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Global warming potential - total (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	4.98E+00	5.71E-02	9.37E-03	2.81E-02	2.24E-02	1.53E-01	-1.84E-02
2	9.96E+00	1.14E-01	1.87E-02	5.62E-02	4.48E-02	3.06E-01	-3.68E-02
3	1.49E+01	1.71E-01	2.81E-02	8.43E-02	6.72E-02	4.59E-01	-5.52E-02
4	1.99E+01	2.28E-01	3.75E-02	1.12E-01	8.96E-02	6.12E-01	-7.36E-02
5	2.49E+01	2.86E-01	4.69E-02	1.41E-01	1.12E-01	7.65E-01	-9.20E-02
6	2.99E+01	3.43E-01	5.62E-02	1.69E-01	1.34E-01	9.18E-01	-1.10E-01
7	3.49E+01	4.00E-01	6.56E-02	1.97E-01	1.57E-01	1.07E+00	-1.29E-01
8	3.98E+01	4.57E-01	7.50E-02	2.25E-01	1.79E-01	1.22E+00	-1.47E-01
9	4.48E+01	5.14E-01	8.43E-02	2.53E-01	2.02E-01	1.38E+00	-1.66E-01
10	4.98E+01	5.71E-01	9.37E-02	2.81E-01	2.24E-01	1.53E+00	-1.84E-01
11	5.48E+01	6.28E-01	1.03E-01	3.09E-01	2.46E-01	1.68E+00	-2.02E-01
12	5.98E+01	6.85E-01	1.12E-01	3.37E-01	2.69E-01	1.84E+00	-2.21E-01
13	6.47E+01	7.42E-01	1.22E-01	3.65E-01	2.91E-01	1.99E+00	-2.39E-01
14	6.97E+01	7.99E-01	1.31E-01	3.93E-01	3.14E-01	2.14E+00	-2.58E-01
15	7.47E+01	8.57E-01	1.41E-01	4.22E-01	3.36E-01	2.30E+00	-2.76E-01
16	7.97E+01	9.14E-01	1.50E-01	4.50E-01	3.58E-01	2.45E+00	-2.94E-01
17	8.47E+01	9.71E-01	1.59E-01	4.78E-01	3.81E-01	2.60E+00	-3.13E-01
18	8.96E+01	1.03E+00	1.69E-01	5.06E-01	4.03E-01	2.75E+00	-3.31E-01
19	9.46E+01	1.08E+00	1.78E-01	5.34E-01	4.26E-01	2.91E+00	-3.50E-01
20	9.96E+01	1.14E+00	1.87E-01	5.62E-01	4.48E-01	3.06E+00	-3.68E-01

Global warming potential - fossil (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	4.98E+00	5.71E-02	9.37E-03	2.81E-02	2.23E-02	1.53E-01	-1.84E-02
2	9.96E+00	1.14E-01	1.87E-02	5.62E-02	4.46E-02	3.06E-01	-3.68E-02
3	1.49E+01	1.71E-01	2.81E-02	8.43E-02	6.69E-02	4.59E-01	-5.52E-02
4	1.99E+01	2.28E-01	3.75E-02	1.12E-01	8.92E-02	6.12E-01	-7.36E-02
5	2.49E+01	2.86E-01	4.69E-02	1.41E-01	1.12E-01	7.65E-01	-9.20E-02
6	2.99E+01	3.43E-01	5.62E-02	1.69E-01	1.34E-01	9.18E-01	-1.10E-01
7	3.49E+01	4.00E-01	6.56E-02	1.97E-01	1.56E-01	1.07E+00	-1.29E-01
8	3.98E+01	4.57E-01	7.50E-02	2.25E-01	1.78E-01	1.22E+00	-1.47E-01
9	4.48E+01	5.14E-01	8.43E-02	2.53E-01	2.01E-01	1.38E+00	-1.66E-01
10	4.98E+01	5.71E-01	9.37E-02	2.81E-01	2.23E-01	1.53E+00	-1.84E-01
11	5.48E+01	6.28E-01	1.03E-01	3.09E-01	2.45E-01	1.68E+00	-2.02E-01
12	5.98E+01	6.85E-01	1.12E-01	3.37E-01	2.68E-01	1.84E+00	-2.21E-01
13	6.47E+01	7.42E-01	1.22E-01	3.65E-01	2.90E-01	1.99E+00	-2.39E-01
14	6.97E+01	7.99E-01	1.31E-01	3.93E-01	3.12E-01	2.14E+00	-2.58E-01
15	7.47E+01	8.57E-01	1.41E-01	4.22E-01	3.35E-01	2.30E+00	-2.76E-01
16	7.97E+01	9.14E-01	1.50E-01	4.50E-01	3.57E-01	2.45E+00	-2.94E-01
17	8.47E+01	9.71E-01	1.59E-01	4.78E-01	3.79E-01	2.60E+00	-3.13E-01
18	8.96E+01	1.03E+00	1.69E-01	5.06E-01	4.01E-01	2.75E+00	-3.31E-01
19	9.46E+01	1.08E+00	1.78E-01	5.34E-01	4.24E-01	2.91E+00	-3.50E-01
20	9.96E+01	1.14E+00	1.87E-01	5.62E-01	4.46E-01	3.06E+00	-3.68E-01

Global warming potential - biogenic (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	3.68E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	7.36E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	1.10E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.47E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.21E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	2.58E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	2.94E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	3.31E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	3.68E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	4.05E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	4.42E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	4.78E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	5.15E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	5.52E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	5.89E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
17	6.26E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	6.62E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19	6.99E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
20	7.36E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ANNEX 3. TEMPERED-LAMINATED SAFETY GLASS CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF. IMPACTS OF 1 M2 OF GLASS BY THICKNESS.

To calculate the impact for any of the categories please multiply the result by the thickness of the glass.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Global warming potential – total (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	6.49E+00	5.72E-02	9.37E-03	2.81E-02	2.24E-02	1.53E-01	-1.84E-02
2	1.30E+01	1.14E-01	1.87E-02	5.62E-02	4.48E-02	3.06E-01	-3.68E-02
3	1.95E+01	1.72E-01	2.81E-02	8.43E-02	6.72E-02	4.59E-01	-5.52E-02
4	2.60E+01	2.29E-01	3.75E-02	1.12E-01	8.96E-02	6.12E-01	-7.36E-02
5	3.25E+01	2.86E-01	4.69E-02	1.41E-01	1.12E-01	7.65E-01	-9.20E-02
6	3.89E+01	3.43E-01	5.62E-02	1.69E-01	1.34E-01	9.18E-01	-1.10E-01
7	4.54E+01	4.00E-01	6.56E-02	1.97E-01	1.57E-01	1.07E+00	-1.29E-01
8	5.19E+01	4.58E-01	7.50E-02	2.25E-01	1.79E-01	1.22E+00	-1.47E-01
9	5.84E+01	5.15E-01	8.43E-02	2.53E-01	2.02E-01	1.38E+00	-1.66E-01
10	6.49E+01	5.72E-01	9.37E-02	2.81E-01	2.24E-01	1.53E+00	-1.84E-01
11	7.14E+01	6.29E-01	1.03E-01	3.09E-01	2.46E-01	1.68E+00	-2.02E-01
12	7.79E+01	6.86E-01	1.12E-01	3.37E-01	2.69E-01	1.84E+00	-2.21E-01
13	8.44E+01	7.44E-01	1.22E-01	3.65E-01	2.91E-01	1.99E+00	-2.39E-01
14	9.09E+01	8.01E-01	1.31E-01	3.93E-01	3.14E-01	2.14E+00	-2.58E-01
15	9.74E+01	8.58E-01	1.41E-01	4.22E-01	3.36E-01	2.30E+00	-2.76E-01
16	1.04E+02	9.15E-01	1.50E-01	4.50E-01	3.58E-01	2.45E+00	-2.94E-01
17	1.10E+02	9.72E-01	1.59E-01	4.78E-01	3.81E-01	2.60E+00	-3.13E-01
18	1.17E+02	1.03E+00	1.69E-01	5.06E-01	4.03E-01	2.75E+00	-3.31E-01
19	1.23E+02	1.09E+00	1.78E-01	5.34E-01	4.26E-01	2.91E+00	-3.50E-01
20	1.30E+02	1.14E+00	1.87E-01	5.62E-01	4.48E-01	3.06E+00	-3.68E-01

Global warming potential – fossil (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	6.49E+00	5.71E-02	9.37E-03	2.81E-02	2.23E-02	1.53E-01	-1.84E-02
2	1.30E+01	1.14E-01	1.87E-02	5.62E-02	4.46E-02	3.06E-01	-3.68E-02
3	1.95E+01	1.71E-01	2.81E-02	8.43E-02	6.69E-02	4.59E-01	-5.52E-02
4	2.60E+01	2.28E-01	3.75E-02	1.12E-01	8.92E-02	6.12E-01	-7.36E-02
5	3.25E+01	2.86E-01	4.69E-02	1.41E-01	1.12E-01	7.65E-01	-9.20E-02
6	3.89E+01	3.43E-01	5.62E-02	1.69E-01	1.34E-01	9.18E-01	-1.10E-01
7	4.54E+01	4.00E-01	6.56E-02	1.97E-01	1.56E-01	1.07E+00	-1.29E-01
8	5.19E+01	4.57E-01	7.50E-02	2.25E-01	1.78E-01	1.22E+00	-1.47E-01
9	5.84E+01	5.14E-01	8.43E-02	2.53E-01	2.01E-01	1.38E+00	-1.66E-01
10	6.49E+01	5.71E-01	9.37E-02	2.81E-01	2.23E-01	1.53E+00	-1.84E-01
11	7.14E+01	6.28E-01	1.03E-01	3.09E-01	2.45E-01	1.68E+00	-2.02E-01
12	7.79E+01	6.85E-01	1.12E-01	3.37E-01	2.68E-01	1.84E+00	-2.21E-01
13	8.44E+01	7.42E-01	1.22E-01	3.65E-01	2.90E-01	1.99E+00	-2.39E-01
14	9.09E+01	7.99E-01	1.31E-01	3.93E-01	3.12E-01	2.14E+00	-2.58E-01
15	9.74E+01	8.57E-01	1.41E-01	4.22E-01	3.35E-01	2.30E+00	-2.76E-01
16	1.04E+02	9.14E-01	1.50E-01	4.50E-01	3.57E-01	2.45E+00	-2.94E-01
17	1.10E+02	9.71E-01	1.59E-01	4.78E-01	3.79E-01	2.60E+00	-3.13E-01
18	1.17E+02	1.03E+00	1.69E-01	5.06E-01	4.01E-01	2.75E+00	-3.31E-01
19	1.23E+02	1.08E+00	1.78E-01	5.34E-01	4.24E-01	2.91E+00	-3.50E-01
20	1.30E+02	1.14E+00	1.87E-01	5.62E-01	4.46E-01	3.06E+00	-3.68E-01

Global warming potential – biogenic (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	3.75E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	7.50E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	1.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	2.25E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	2.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	3.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	3.38E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	3.75E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	4.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	4.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	4.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	5.25E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	5.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	6.00E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
17	6.38E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	6.75E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19	7.13E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
20	7.50E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

ANNEX 4. COLORED SAFETY GLASS CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF. IMPACTS OF 1 M2 OF GLASS BY THICKNESS.

To calculate the impact for any of the categories please multiply the result by the thickness of the glass.

CORE ENVIRONMENTAL IMPACT INDICATORS – EN 15804+A2, PEF

Global warming potential – total (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	4.94E+00	5.62E-02	9.01E-03	4.05E-02	3.25E-02	2.25E-02	-1.89E-02
2	9.88E+00	1.12E-01	1.80E-02	8.10E-02	6.50E-02	4.50E-02	-3.78E-02
3	1.48E+01	1.69E-01	2.70E-02	1.22E-01	9.75E-02	6.75E-02	-5.67E-02
4	1.98E+01	2.25E-01	3.60E-02	1.62E-01	1.30E-01	9.00E-02	-7.56E-02
5	2.47E+01	2.81E-01	4.51E-02	2.03E-01	1.63E-01	1.13E-01	-9.45E-02
6	2.96E+01	3.37E-01	5.41E-02	2.43E-01	1.95E-01	1.35E-01	-1.13E-01
7	3.46E+01	3.93E-01	6.31E-02	2.84E-01	2.28E-01	1.58E-01	-1.32E-01
8	3.95E+01	4.50E-01	7.21E-02	3.24E-01	2.60E-01	1.80E-01	-1.51E-01
9	4.45E+01	5.06E-01	8.11E-02	3.65E-01	2.93E-01	2.03E-01	-1.70E-01
10	4.94E+01	5.62E-01	9.01E-02	4.05E-01	3.25E-01	2.25E-01	-1.89E-01
11	5.43E+01	6.18E-01	9.91E-02	4.46E-01	3.58E-01	2.48E-01	-2.08E-01
12	5.93E+01	6.74E-01	1.08E-01	4.86E-01	3.90E-01	2.70E-01	-2.27E-01
13	6.42E+01	7.31E-01	1.17E-01	5.27E-01	4.23E-01	2.93E-01	-2.46E-01
14	6.92E+01	7.87E-01	1.26E-01	5.67E-01	4.55E-01	3.15E-01	-2.65E-01
15	7.41E+01	8.43E-01	1.35E-01	6.08E-01	4.88E-01	3.38E-01	-2.84E-01
16	7.90E+01	8.99E-01	1.44E-01	6.48E-01	5.20E-01	3.60E-01	-3.02E-01
17	8.40E+01	9.55E-01	1.53E-01	6.89E-01	5.53E-01	3.83E-01	-3.21E-01
18	8.89E+01	1.01E+00	1.62E-01	7.29E-01	5.85E-01	4.05E-01	-3.40E-01
19	9.39E+01	1.07E+00	1.71E-01	7.70E-01	6.18E-01	4.28E-01	-3.59E-01
20	9.88E+01	1.12E+00	1.80E-01	8.10E-01	6.50E-01	4.50E-01	-3.78E-01

Global warming potential – fossil (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	4.94E+00	5.62E-02	9.01E-03	4.05E-02	3.25E-02	2.25E-02	-1.89E-02
2	9.88E+00	1.12E-01	1.80E-02	8.10E-02	6.50E-02	4.50E-02	-3.78E-02
3	1.48E+01	1.69E-01	2.70E-02	1.22E-01	9.75E-02	6.75E-02	-5.67E-02
4	1.98E+01	2.25E-01	3.60E-02	1.62E-01	1.30E-01	9.00E-02	-7.56E-02
5	2.47E+01	2.81E-01	4.51E-02	2.03E-01	1.63E-01	1.13E-01	-9.45E-02
6	2.96E+01	3.37E-01	5.41E-02	2.43E-01	1.95E-01	1.35E-01	-1.13E-01
7	3.46E+01	3.93E-01	6.31E-02	2.84E-01	2.28E-01	1.58E-01	-1.32E-01
8	3.95E+01	4.50E-01	7.21E-02	3.24E-01	2.60E-01	1.80E-01	-1.51E-01
9	4.45E+01	5.06E-01	8.11E-02	3.65E-01	2.93E-01	2.03E-01	-1.70E-01
10	4.94E+01	5.62E-01	9.01E-02	4.05E-01	3.25E-01	2.25E-01	-1.89E-01
11	5.43E+01	6.18E-01	9.91E-02	4.46E-01	3.58E-01	2.48E-01	-2.08E-01
12	5.93E+01	6.74E-01	1.08E-01	4.86E-01	3.90E-01	2.70E-01	-2.27E-01
13	6.42E+01	7.31E-01	1.17E-01	5.27E-01	4.23E-01	2.93E-01	-2.46E-01
14	6.92E+01	7.87E-01	1.26E-01	5.67E-01	4.55E-01	3.15E-01	-2.65E-01
15	7.41E+01	8.43E-01	1.35E-01	6.08E-01	4.88E-01	3.38E-01	-2.84E-01
16	7.90E+01	8.99E-01	1.44E-01	6.48E-01	5.20E-01	3.60E-01	-3.02E-01
17	8.40E+01	9.55E-01	1.53E-01	6.89E-01	5.53E-01	3.83E-01	-3.21E-01
18	8.89E+01	1.01E+00	1.62E-01	7.29E-01	5.85E-01	4.05E-01	-3.40E-01
19	9.39E+01	1.07E+00	1.71E-01	7.70E-01	6.18E-01	4.28E-01	-3.59E-01
20	9.88E+01	1.12E+00	1.80E-01	8.10E-01	6.50E-01	4.50E-01	-3.78E-01

Global warming potential – biogenic (kg CO2e) per 1m2

thickness (mm)	A1-A3	A4	C1	C2	C3	C4	D
1	3.15E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2	6.30E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3	9.45E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	1.26E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5	1.58E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
6	1.89E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7	2.21E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8	2.52E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9	2.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
10	3.15E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
11	3.47E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
12	3.78E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
13	4.10E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
14	4.41E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
15	4.73E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
16	5.04E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
17	5.36E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
18	5.67E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
19	5.99E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
20	6.30E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00