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THE INTERNATIONAL EPD® SYSTEM

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Environmental Product Declaration

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021 for Saflex™ LiteCarbon™ Clear from Solutia Europe, a subsidiary of Eastman Chemical Company

Programme:	The International EPD® System, www.environdec.com
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An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at ***www.environdec.com****.*

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THE INTERNATIONAL EPD® SYSTEM

General information

Programme information

Programme	The International EPD® System
Address	EPD International AB Box 210 60 SE-100 31 Stockholm Sweden
Website	www.environdec.com
Email	info@environdec.com

Accountability for PCR, LCA and independent, third-party verification

Product category rules (PCR)

CEN standard EN 15804 serves as the core PCR.

PCR: Construction products, 2019:14. Version 1.3.4

Multi-purpose films, UN CPC 36330 plastics: plates, sheets, film, foil and strip, of plastics, not self-adhesive, non-cellular and not reinforced, laminated, supported or similarly combined with other materials. Version 1.0.2

PCR review was conducted by the Technical Committee of the International EPD System. See www.environdec.com for a list of members. Review chair: Claudia A. Peña, University of Concepción, Chile. The review panel may be contacted via the Secretariat www.environdec.com/contact.

Life cycle assessment (LCA)

LCA accountability: Bart De Bruycker, Eastman

Third-party verification

Independent, third-party verification of the declaration and data, according to ISO 14025:2006, via:

☒ EPD verification by individual verifier

Third-party verifier: Matthias Schulz, Schulz Sustainability Consulting, matthias@schulz-sustainability-consulting.de

Approved by The International EPD® System

Procedure for follow-up of data during EPD validity involves third-party verifier:

☐ Yes ☒ No

The EPD owner has the sole ownership, liability and responsibility for the EPD.

EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g., identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company information

Owner of the EPD	Solutia Europe bv, a subsidiary of Eastman Chemical Company
Address	Ottergemsesteenweg Zuid 707, 9000 Ghent, Belgium
Contact	Bart De Bruycker bdebruycker@eastman.com

Description of the organisation

Eastman is a global specialty materials company that produces a broad range of products found in items people use every day. Eastman works with customers to deliver innovative products and solutions while maintaining a commitment to safety and sustainability. The company's innovation-driven growth model takes advantage of world-class technology platforms and differentiated application development to grow its leading positions in attractive end markets such as transportation, building and construction, and consumables. As a globally inclusive and diverse company, Eastman employs approximately 14,000 people around the world and serves customers in more than 100 countries. The company is headquartered in Kingsport, Tennessee, USA.

Solutia Europe BV is a subsidiary of Eastman covering the advanced interlayers business and branding name Saflex. Since 1937, glass fabricators and automotive engineers have counted on Saflex polyvinyl butyral (PVB) interlayers for high-quality products, reliable service and expert advice to help deliver world class technology for laminated glass. Eastman glazing products include Saflex PVB interlayers for glass lamination and Vanceva™ color PVB interlayers. Architects and engineers take advantage of our products' structural performance, variety of colors, acoustic sound reduction, and solar UV protection that provides the added benefits of safety, security and weight reduction inherent to the PVB when laminated between two or more pieces of glass.

Product-related or management system-related certifications: ISO 9001, ISO 14001, ISO 50001, IATF

Name and location of production site: Solutia Europe, Ottergemsesteenweg Zuid 707, 9000 Ghent, Belgium

Product information

Product name: Saflex™ LiteCarbon™ Clear

Product identification and application

Saflex interlayers are plasticized polyvinyl butyral (PVB) sheeting produced by Eastman and its affiliates. These interlayers are bonded through a heat and pressure process to two or more pieces of glazing to produce laminates with impact and glass containment properties. Laminated glasses with the properly selected type of Saflex interlayers are capable of being classified as safety glass in accordance with, but not limited to, various regulations such as ANSI Z97.1, AS/NZS 2208, CAN/CGSB 12.1, CNS 1183, CPSC 16 CFR 1201, EN 12600 and ISO 29584. Saflex interlayers were specifically formulated to provide exceptional durability when exposed to natural weathering. A more detailed list of Saflex formulations can be found at saflex-vanceva.eastman.com or by contacting your local Eastman representative.

Saflex interlayers should be stored inside the moisture barrier bag that the roll is shipped in and maintained within the temperatures recommended in the Saflex laminating guide. It is recommended that the interlayer be used within a three-year period from purchase to minimize roll blocking.

Saflex™ LiteCarbon™ Clear PVB interlayer should be processed in the same manner as Saflex Clear. Consult the laminating guide or your Saflex representative for more information.

LCA information

Declared unit	1 square meter [m^2] of Saflex™ LiteCarbon™ Clear
UN CPC code	36330
Geographical scope	Saflex™ LiteCarbon™ Clear PVB interlayer is produced in Ghent, Belgium. The EPD results serve as a global proxy.
Time representativeness	Data collected in 2023
Database(s) and LCA software used	LCA for Experts (LCAfE), formerly known as GaBi, version 10.7.1.28 was used to model the system, and the results presented use the 2023.2 LCA for Experts database produced and maintained by Sphera and EcoInvent.
Cut-off rules	Any inputs less than 0.5% of total input mass or energy or any inputs which are deemed to have less than 1% contribution to relevant impact indicators (per engineering judgment)
Allocation procedure	Pre-consumer recycled content classified according ISO 14021 enters the system boundary through the cut-off approach. This means it enters from a burden-free status. From that point impacts of recycling, transport and processing are added into the LCA.

Conversion to kg

Declared unit	1 m^2
Weight	0.813 kg/m^2
Density	1070 kg/m^3
Thickness	0.00076 m

Construction relevant parameters for Saflex™ LiteCarbon™ Clear PVB

Property	Test method	Unit	Conditions	Saflex value
Thickness	Eastman	mm	0.76 mm	± 0.025 mm
Density	ASTM D792	g/cm^3	23°C	1.07
Thermal conductivity	ASTM D5930	1/K	61°C	0.0002
Refractive index	ASTM D542		23°C	1.479
Visible transmittance	LBNL WINDOW 7.0 NFRC 100	%		89
Specific heat	ASTM E1269	J/Kg-°K	54°C	2107
Solar heat gain coefficient	NFRC 300	SHGC | g value		0.81
Elongation at failure	ISO 527-3	%	50 mm/min 23°C 50% RH	270
Tensile strength	ISO 527-3	MPa	50 mm/min 23°C 50% RH	23

More product performance data are available on request.

Composition/information on ingredients

Components	Concentration (% w/w)
PVB resin	70%–80%
Plasticizer	21%–30%
Additives	< 1%

Saflex ingredients are thoroughly screened based on substance of concern regulations. Saflex is SVHC and REACH compliant. Furthermore, it does not contain any biocides or PFAS. A full list of declarations can be found in the "Additional environmental information" chapter. Concerning the indoor air quality, laminated glass with a Saflex PVB interlayer is an inert material that doesn't release inorganic or organic compounds.

As Saflex interlayers are an intermediate of the final laminated glass application, a reference service life is therefore provided by the glass application.

Product description

This Environmental Product Declaration presents the environmental impact of 1 m^2 Saflex™ LiteCarbon™ Clear. Developed from a holistic approach to sustainability,

Saflex™ LiteCarbon™ Clear is Eastman's first-generation, reduced-carbon-footprint PVB interlayer. Saflex™ LiteCarbon™ Clear is the result of a comprehensive sustainability strategy that uses various approaches, including pre-consumer recycled content (ISO 14021), manufacturing energy efficiency, an optimized supply chain and operational excellence.

Compared to our baseline Saflex LCA performance, Saflex™ LiteCarbon™ Clear enables reduction of laminated glass embodied carbon and supports glass professionals' scope 3 reduction goals.

Using Saflex™ LiteCarbon™ Clear contributes to LEED and BREEAM green building certification credits. The product provides unaltered aesthetics of laminated glass where safety, security, and acoustic attributes identical to conventional laminated Saflex products. Processable and compatible like any standard Saflex PVB interlayer.

Eastman conducted a life cycle assessment (LCA) to evaluate the environmental profile of Saflex™ LiteCarbon™ Clear PVB interlayer. These condensed EPD results are based on a full LCA base report that meets ISO 14040/14044 rules and guidelines and has undergone a successful third-party review.

Content information

Product components	Wt%	Post-consumer material, wt%	Biogenic material, wt% and kg C/kg
Resin/polyvinyl butyral (CAS 63148-65-2)	70%–80%	0%	0%
Plasticizer/TEG-2EH (CAS 94-28-0)	21%–30%	0%	0%
Additives	< 1%	0%	0%
Total	**100%**	**0%**	**0%**
Packaging materials	**Weight, kg/ declared unit**	**Wt% (vs. the product)**	**Weight biogenic carbon, kg C/declared unit**
Wooden crate	1.03E-02	1.26	4.26E-03
Wooden pallet	5.69E-03	0.70	2.36E-03
Metal crate	2.01E-03	0.25	0
Metal pallet	1.22E-04	0.02	0
Plastic pallet	5.03E-05	0.01	0
Polypropylene (core + plug)	3.53E-03	0.43	0
ABS core	5.21E-04	0.06	0
Aluminium bag	4.95E-04	0.06	0
Corrugated cardboard	1.27E-03	0.16	5.14E-04
Total	**2.40E-02 kg**	**2.95%**	**7.14E-03**[1]

[1]*The amount of corresponding CO_2 for packaging is 0.026 kg CO_2 eq/declared unit.*

Description of system boundaries

Cradle-to-gate with options: modules C1–C4, module D and modules A4–A5

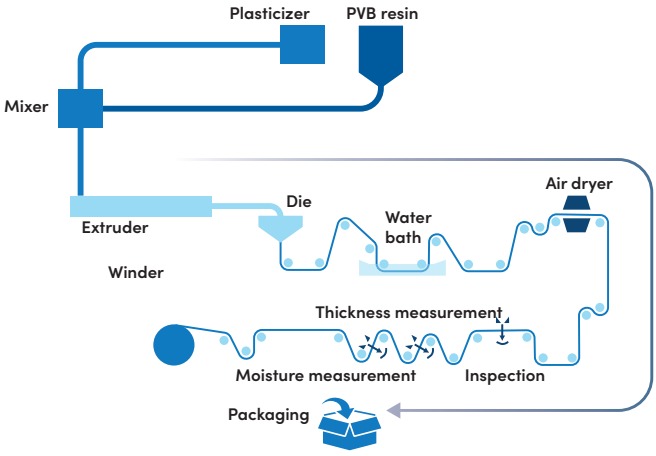
As Saflex PVB interlayer is an intermediate product of a final glazing application, the main data is centred in the cradle-to-gate boundary A1-A3 and A4-A5. The use stage (module B) will be part of the glazing EPD. For compliance with EN 15804, C modules are provided with default scenarios because they are not controlled by Eastman.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results): (X = declared; ND = module not declared)

	Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
Module	**A1**	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
Modules declared	X	X	X	X	X	ND							X	X	X	X	X
Geography	BE			EU		ND							EU				EU
Specific data used	68% GWP-GHG[1]					–	–	–	–	–	–	–	–	–	–	–	–
Variation, products	0%					–	–	–	–	–	–	–	–	–	–	–	–
Variation, sites	0%					–	–	–	–	–	–	–	–	–	–	–	–

[1]The specific data use of 68% is primarily due to the utilization of primary data modelled in LCA for experts. Consequently, generic datasets for polyvinyl alcohol in the resin and TEG in the plasticizer are excluded from this calculation, leading to a specific data use of 68%. Specific data use is not a data quality rating. Data quality rating was performed using the EcoInvent pedigree matrix, which scored an average of 1.7 representing 'meets' the criterion to a high degree, with little significant need for improvement." Correlating with Annex E data quality scoring in EN 15804: 1.7 relates to 'good,' which is the second highest ranking out of five.

Module description and technical information



Cooled storage/ warehousing

Transportation

Installation

End of life

Recovery

A1–A3	A4	A5	C1–C5	D

Included	Excluded
• Raw material production and transportation (A1) • Transport of chemicals/intermediates to resin and plasticizer manufacturing and transport to Ghent site (A2) • Saflex production (A3) • Packaging • Refrigerated storage and transport to central warehouse and/or customer (A4) • Impacts from outbound packaging waste treatment; end of life of wooden and corrugated cardboard (A5) • End-of-life stage (C1–C4) • Resource recovery stage (D)	• Use stage (B1–B7) • Corporate overhead, buildings, employee travel, maintenance of capital goods and infrastructure • Supplier transport of packaging materials • Transport of take-back programs • Warehouse utilities linked to packaging handling • Occasional PE stretch foil and roll stability cushions; pallet straps • Cooled packaging for occasional long-distance transport • End of life for metal and plastic crates/pallets, cores and plugs (going to external mechanical recycling) • Influence of refrigerant/coolant leakage for cooled warehouse/transport (refrigerant type used does not lead to direct GHG emissions and is assumed to be closed loop; influence of transport coolant is also excluded) • Emissions to air during resin and sheet production are determined to be below the cut-off rules • Wastewater treatment during the resin production is excluded and is determined to be below the cut-off rules. • Impacts related to additives are proven to be way below the cut-off rules and are excluded. However, every material is thoroughly checked on its REACH and SVHC compliancy. • PVB product waste treatment during lamination (A5), as it is used as pre-consumer recycled material.

A1–A3: product stage

Production of Saflex™ LiteCarbon™ Clear, including raw material acquisition (virgin: resin and plasticizer; secondary: pre-consumer recycled content according to ISO 14021), operations and waste treatment, energy supply, resource extraction, shipment, and final packaging

The majority of the upstream raw material production is under Eastman's control, ensuring quantitative primary data. Plasticizer and PVB resin are supplied to the sheet production plant. Upstream transportation is modelled into the LCA. Virgin raw materials are unloaded from their silos and follow a gravimetrical path from the top of the production plant. Attribution of pre-consumer recycled content according ISO 14021 is based on physical addition (controlled blending). A high-temperature melt is pushed through the dye tank to form the sheet, which then begins a gradual cool-down process through water baths to control shrinkage. The sheet continues along its path through dryers, with online thickness and moisture measurements, toward the winding process. Here, rolls are wound onto a polypropylene or ABS plastic core from full width into a variety of cuts and lengths. Samples are taken for quality control before the roll is packed.

Energy source behind the electricity used in the manufacturing process (A3) and related climate impact: Belgium Residual grid mix from the Sphera database in LCAfE with reference year 2022: 0.162 kg CO_2eq./kWh according to the GHG-GWP indicator.

A4, transport and warehousing

PVB interlayers are thermoplastics which means they get sticky above 10°–12°C. Therefore, PVB interlayers need to be stored in a cooled warehouse and transported with refrigerated trucks to the customers. Module A4 holds a weighted average refrigerated transport and warehouse model for Saflex LiteCarbon Clear from gate to customer.

A4 information	Unit per clared unit
Fuel type and consumption of vehicle or vehicle type used for transport, e.g., long distance truck, boat, etc.	• Container ship (EN 15804 A4) Sphera • Transport incl. fuel, Euro 0–6 mix, 40 t total weight, 27 t max payload • 0.0373 kWh/m² refrigerated warehouse and transport
Distance	• 1185 km by sea container • 880 km by road transport
Capacity utilisation	72.5%
Bulk density of transported products	1070 kg/m³

A5, installation in the building

Installation/construction and associated waste — specific focus on the packaging waste treatment displayed in module A5, which will be linked to avoided energy generation declared in module D.

A5 information	Unit per declared unit
Output materials (specified by type) as result of waste processing at the building site, e.g., of collection for recycling, for energy recovery, disposal (specified by route)	• Cardboard: 1.27E-03 kg • Wood: 1.6E-02 kg • A PVB product waste rate of 0% is assumed as the impacts related to reuse in Saflex™ LiteCarbon™ Clear are included in modules A1–A3

C1–C4, end of life

This stage includes the next modules:

- C1 – deconstruction, demolition: Currently the most common practice is a manual deconstruction of the laminated glazing unit without environmental impacts.
- C2 – transport to waste processing: a 50 km transportation to the landfill site
- C3 – waste processing for reuse, recovery and/or recycling: 100% landfill so there is no reuse, recovery or recycling considered
- C4 — discopsal considered 100% landfill

C1–C4 information	Unit per declared unit
Collection process specified by type	Assumed collected with mixed construction waste (laminated glass)
Recovery system specified by type	No recovery
Disposal specified by type	0.813 kg
Assumptions for scenario development	50 km transport to landfill site

Disclaimer: it is encouraged to consider the results of the C module when using the results of modules A1–A5.

D, resource recovery stage

In module A5, the thermal and electrical energy generated from the incineration of cardboard and wooden packaging waste has been evaluated. The avoided burdens have been calculated by reversing the electricity grid mix and thermal energy from natural gas using European datasets.

Results of the environmental performance indicators

The EN 15804+A2 reference package LCIA methodology provided by JRC is used. These impact indicators are based on EF3.1. Primary data has been provided for every manufacturing plant. Secondary (generic) data are used from LCAfE software, Sphera and EcoInvent databases. The impact results are only relative statements which do not indicate the end points of the impact categories, exceeding threshold values, safety margins or risks.

Mandatory impact category indicators according to EN 15804

Results per declared unit: 1 m^2 Saflex™ LiteCarbon™ Clear									
Indicator	**Unit**	**A1–A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	2.43E+00	7.13E–02	6.34E–03	0	3.13E–03	0	2.39E–02	-1.07E–02
GWP-biogenic	kg CO_2 eq.	-1.21E–03	0	2.21E–02	0	0	0	0	-8.97E-06
GWP-luluc	kg CO_2 eq.	3.92E–04	9.33E–04	1.46E-07	0	5.29E–05	0	8.80E–05	-1.01–E06
GWP-total	kg CO_2 eq.	2.42E+00	7.17E–02	2.84E-02	0	3.16E–03	0	2.39E-02	-1.07E–02
ODP	kg CFC 11 eq.	1.18E–09	4.86E–13	3.88E-15	0	3.17E–16	0	7.88E-14	-5.15E–14
AP	mol H^+ eq.	4.92E–03	5.26E–04	1.43E-05	0	1.88E–05	0	1.43E-04	-1.38E–05
EP-freshwater	kg P eq.	7.84E-06	2.49E–07	7.83E-10	0	1.34E–08	0	1.37E-05	-2.79–E09
EP-marine	kg N eq.	1.27E-03	2.44E-04	6.58E-06	0	9.20E–06	0	3.08E-05	-3.13E–06
EP-terrestrial	mol N eq.	1.38E-02	2.70E–03	7.80E-05	0	1.02E–04	0	3.38E-04	-3.40E–05
POCP	kg NMVOC eq.	5.42E-03	5.37–E04	1.69E-05	0	1.76E–05	0	9.86E-05	-9.47E–06
ADP-minerals and metals[1]	kg Sb eq.	3.68E-07	6.74E–09	3.85E-11	0	2.68E–10	0	1.59E-09	-3.53E–10
ADP-fossil[1]	MJ	7.01E+01	1.15E+00	8.77E-03	0	4.11E–02	0	4.04E-01	-1.82E–01
WDP[1]	m^3	9.62E-01	1.01E-03	3.13E-03	0	4.69E–05	0	3.09E-03	-2.74E–04
Acronyms	GWP-fossil = global warming potential, fossil fuels; GWP-biogenic = global warming potential, biogenic; GWP-luluc = global warming potential, land use and land use change; ODP = depletion potential of the stratospheric ozone layer; AP = acidification potential, accumulated exceedance; EP-freshwater = eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = eutrophication potential, accumulated exceedance; POCP = formation potential of tropospheric ozone; ADP-minerals and metals = abiotic depletion potential for non-fossil resources; ADP-fossil = abiotic depletion for fossil resources potential; WDP = water (user) deprivation potential, deprivation-weighted water consumption								

[1]*The results of this environmental impact indicator shall be used with care because the uncertainties of these results are high or there is limited experience with the indicator.*

Additional mandatory and voluntary impact category indicators

Results per declared unit: 1 m^2 Saflex™ LiteCarbon™ Clear									
Indicator	**Unit**	**A1–A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG[1]	kg CO_2 eq.	2.43E+00	7.24E-02	6.34E-03	0	3.19E-03	0	2.41E-02	-1.07E-02
PM	Disease incidence	4.25E-08	7.19E-09	4.54E-11	0	1.20E-10	0	1.48E-09	-1.24E-10
IRP[2]	kBq U235 eq.	1.48E-01	5.40E-03	4.62E-05	0	7.42E-06	0	7.81E-04	-1.67E-03
ETP-fw[3]	CTUe	2.41E+01	6.32E-01	2.56E-03	0	3.03E-02	0	8.75E-01	-9.99E-03
HTP-c[3]	CTUh	1.12E-09	1.33E-11	4.10E-13	0	6.08E-13	0	1.30E-11	-1.16E-12
HTP-nc[3]	CTUh	2.09E-08	5.44E-10	2.85E-11	0	2.71E-11	0	2.72E-10	-4.38E-11
SQP[3]	dimensionless	2.95E+00	4.09E-01	2.54E-03	0	2.04E-02	0	6.86E-02	-8.49E-03
Acronyms	GWP-GHG = global warming potential-greenhouse gas; PM = particulate matter emissions; IRP = ionizing radiation, human health; ETP-fw = eco-toxicity – freshwater; HTP-c = human toxicity, cancer effect; HTP-nc = human toxicity, non-cancer effects; SQP = land use related impacts/soil quality								

[1]*This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. The indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero.*
[2]*This impact category deals mainly with the eventual impact of low-dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure or radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some construction materials is also not measured by this indicator.*
[3]*The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.*

Resource use indicators[1]

Results per declared unit: 1 m² Saflex™ LiteCarbon™ Clear									
Indicator	**Unit**	**A1–A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	3.15E+00	1.42E-01	1.83E-03	0	3.48E-03	0	6.10E-02	-1.25E-02
PERM	MJ	2.66E–01	0	-2.66E–01	0	0	0	0	0
PERT	MJ	3.41E+00	1.42E–01	-2.64E–01	0	3.48E–03	0	6.10E–02	-1.25E–02
PENRE	MJ	7.11E+01	1.15E+00	8.77E–03	0	4.11E–02	0	4.04E–01	-1.82E–01
PENRM	MJ	2.54E+01	0	0	0	0	0	0	0
PENRT	MJ	9.65E+01	1.15E+00	8.77E–03	0	4.11E–02	0	4.04E–01	-1.82E–01
SM	kg	2.10E–01	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	3.54E–02	1.23E–04	7.36E–05	0	3.90E–06	0	9.23E–05	-1.77E–05
Acronyms	PERE = use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = use of renewable primary energy resources used as raw materials; PERT = total use of renewable primary energy resources; PENRE = use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = use of non-renewable primary energy resources used as raw materials; PENRT = total use of non-renewable primary energy re-sources; SM = use of secondary material; RSF = use of renewable secondary fuels; NRSF = use of non-renewable secondary fuels; FW = use of net fresh water								

[1]*The primary energy use indicators are calculated through option A according to Annex 3 in PCR2019:14.*

Waste indicators

Results per declared unit: 1 m² Saflex™ LiteCarbon™ Clear									
Indicator	**Unit**	**A1–A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
HWD	kg	3.59E–03	7.72E–11	3.49E–12	0	1.33E–12	0	9.98E–11	-1.40E–11
NHWD	kg	2.15E–02	1.88E–04	2.50E–04	0	6.40–E06	0	8.10E–01	-4.62E–05
RWD	kg	1.31E–03	7.67E–05	4.94E–07	0	5.32–E08	0	5.70E–06	-1.12–E05
Acronyms	HWD = hazardous waste disposed; NHWD = non-hazardous waste disposed; RWD = radioactive waste disposed								

Output flow indicators

Results per declared unit: 1 m² Saflex™ LiteCarbon™ Clear									
Indicator	**Unit**	**A1–A3**	**A4**	**A5**	**C1**	**C2**	**C3**	**C4**	**D**
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	0	0	0	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	3.36E-02	0	0	0	0	0
EET	MJ	0	0	8.61E-02	0	0	0	0	0
Acronyms	HWD = hazardous waste disposed; NHWD = non-hazardous waste disposed; RWD = radioactive waste disposed								

EPD interpretation

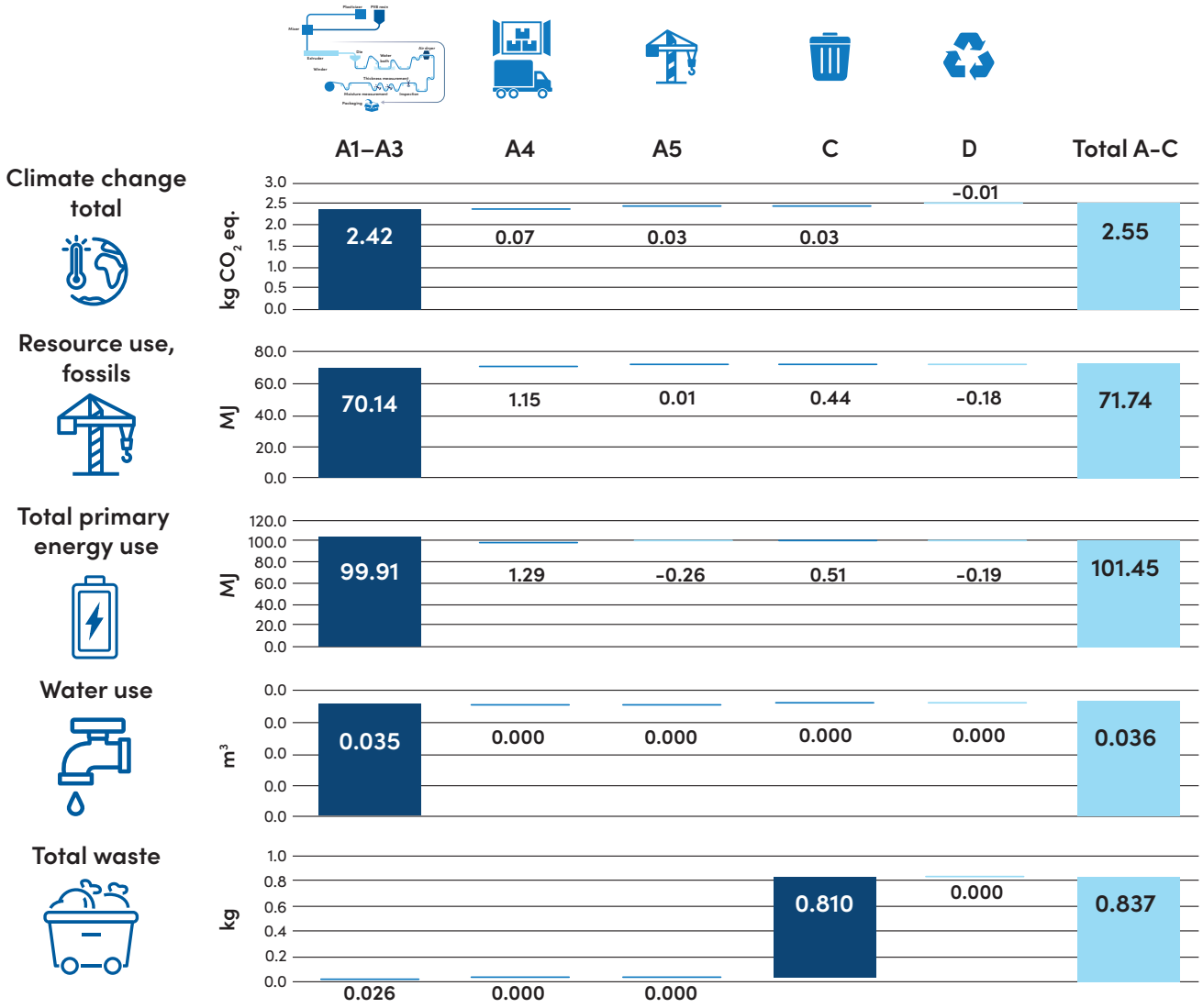


Figure 1: Interpretation and hot spot analysis of the EPD results per square meter Saflex™ LiteCarbon™ Clear. Selection of impact indicators for review contribution along the life cycle modules: resource use, fossils = ADP fossil; total primary energy use = sum of PERT and PENRT; water use = use of net fresh water; total waste = sum of hazardous, non-hazardous and radioactive waste disposed

In alignment with certain glazing EPDs, we emphasize a selection of impact indicators crucial to our downstream value chain (see Figure 1). Particular attention is given to the global warming potential (GWP) total (climate change) impact indicator, which serves as a fundamental requirement for the downstream value chain. This focus allows for the refinement of sustainability road maps and the replacement of generic PVB interlayer LCA data in the glazing EPD with high-quality, verified data.

The selection of impact indicators highlighted in Figure 1 demonstrates that the majority of the environmental impact for Saflex™ LiteCarbon™ Clear occurs in the cradle-to-gate A1–A3 module, accounting for 96% of the GWP. Only 3% of the GWP is attributed to the final sheet production. Additionally, the GWP impact from gate-to-customer transport (A4) and packaging treatment (A5) is relatively low, at 3% and 1% respectively. The landfill scenario in module C also holds a relatively low share.

For the other impact indicators and some aggregated ones, a similar trend is observed. The bulk of the impacts are concentrated in the cradle-to-gate A1–A3 modules. The only exception is the waste impact indicator, which is predominantly associated with module C, as expected.

Additional environmental information

Sustainability is integral to our strategy, driven by innovation and focused always on people. Eastman has the responsibility and opportunity to lead with others to address climate change, mainstream circularity as an economic model, and build a more inclusive and equitable world.

Mitigating climate change — At the moment, this is perhaps the single greatest challenge to the quality of life on our planet. In response, Eastman is committing to carbon neutrality by 2050. Our focus on four sustainable practices — energy efficiency, process transformation, renewable energy and technology breakthroughs — will get us there.

Mainstreaming circularity — Eastman is making circularity a mainstream concept because the future of our planet depends on it. Our growing world needs more sustainable materials that address the plastic waste crisis while lowering carbon footprints. Creating a circular economy will require collaboration across the full value chain, so we're working with our partners to implement circularity on a global scale.

Caring for society — Eastman is more than a materials company. We exist to make people's lives better in meaningful, measurable ways. Through our products, as a corporate citizen and as a global employer, we strive to make a positive social and environmental impact.

Inclusion and diversity — Eastman's inclusion and diversity strategy is centered around four pillars — mitigate unconscious bias, build inclusive teams, foster an inclusive culture and accelerate diversity of leadership — designed to build a high-performing organization and instill in every team member a sense of belonging and empowerment. We are committed to fostering an inclusive and diverse workplace as a foundation to achieve our corporate ambitions while helping enrich society.

Corporate social responsibility — We believe it is critical that our employees are engaged and that we invest in our global communities to have a positive social impact.

Learn more at eastman.com and saflex-vanceva.eastman.com

Regulations and declarations for substances of concern

Subject products are classified under REACH as articles and are governed by the REACH "guidance on requirements of substances in articles." The following statements apply to the subject products: Regulation (EC) No. 1907/2006 on the Registration, Evaluation and Authorisation of Chemicals (REACH) - Substances of Very High Concern	With reference to the SVHC Candidate List, as amended up to and including the 27 June 2024 update, the subject products placed on the market in the European Union are not known to contain any substances listed on the candidate list of Substances of Very High Concern (SVHC) in concentrations greater than or equal to 0.1% or those otherwise established under paragraph 6(b) of Article 56. Therefore, the subject products also would not contain substances included in Annex XIV.
REACH Annex XVII: Registration, Evaluation and Authorisation of Chemicals (REACH) Annex XVII — Substances restricted under REACH	With reference to the list of substances restricted under REACH Annex XVII, this product placed on the market in the European Union is not known to contain any substances listed in Annex XVII.
Directive 2011/65/EU (Restrictions of Hazardous Substances - RoHS), as amended by Commission Delegated Directive (EU) 2015/863	Eastman Chemical Company has not analysed the subject product(s) for the substances restricted by this regulation. However, we do not expect that these substances would be present in this product above the specified limits: cadmium (Cd): 0.01%; mercury (Hg): 0.1%; (Hg); lead (Pb): 0.1%; hexavalent chromium (Cr6+): 0.1%; polybrominated biphenyls (PBB): 0.1 %; polybrominated diphenyl ethers (PBDE): 0.1 %; bis (2-ethylhexyl) phthalate (DEHP): 0.1%; benzyl butyl phthalate (BBP): 0.1%; dibutyl phthalate (DBP): 0.1%; diisobutyl phthalate (DIBP): 0.1%.
Regulation (EU) 2019/1021 on persistent organic pollutants (POPs regulation; previously Regulation (EU) 850/2004)	Eastman has not analyzed the subject product(s) for the presence of the substances listed on this regulation. Based on our knowledge of the raw materials and manufacturing processes, we have no reason to expect any of these substances to be present in the final product or to be formed during manufacturing or under normal handling, storage and use conditions.

Regulations and declarations for substances of concern

Substances of concern — carcinogenic, mutagenic, reprotoxic (CMR) substances	Substances classified as carcinogenic, mutagenic and reprotoxic substances (CMR) class 1 (1A/1B) and class 2 are required to be disclosed on the safety data sheet (SDS) of a chemical substance or mixture if present above the reportable limit. The subject products do not contain any CMR class 1A/1B and 2 substances above the reportable limits. Please review the latest SDS for full details.
Substances of concern (PFAS)	Eastman Chemical Company has not analysed this product for the presence of the substances listed below. Based on our knowledge of the raw materials and manufacturing processes as supplied by Eastman Chemical Company, these substances are not intentionally added to the subject products, and we have no reason to believe these substance(s) to be present. • PFAS (per- and poly-fluoroalkyl) substances, including PFHxS, PFCAs, and PFHxA • PFOS (perfluorooctanesulfonic acid) • PFOA (perfluorooctanoic acid)
Regulation (EU) No. 528/2012 on Biocidal Products (repealed and replaced Directive 98/8/EC)	The subject product(s) does not contain biocide and is therefore not subject to the provisions of this regulation.

Other chemicals and/or compounds of interest

The following substances have not been intentionally added to subject products:

- Alkylphenols
- Asbestos
- Bisphenol A (BPA) (CAS 80-05-7)
- Cadmium (Cd) and Cd compounds
- Chlorinated polyethylene chlorosulfonated polyethylene
- Chlorobenzenes
- Chlorofluorocarbons (CFCs)
- Chromium VI and (Cr+6) compounds
- Chlorinated polyvinyl chloride (CPVC)
- Formaldehyde (added)
- Halogenated flame retardants (HFRs)
- Hydrochlorofluorocarbons (HCFCs)
- Lead (Pb) and Pb compounds
- Mercury (Hg) and Hg compounds
- Ozone-depleting chemicals (ODCs)
- Polycyclic aromatic hydrocarbons (PAHs)
- Polychlorinated biphenyls (PCBs)
- Perfluorinated biphenyls (PCBs)
- Phthalates
- Polyvinyl chloride (PVC)
- Short-chain chlorinated paraffins
- Wood treatments containing creosote, arsenic or pentachlorophenol

It is the responsibility of our customers to determine that their use of our product(s) is safe, lawful, and technically suitable in their intended applications. Because of possible changes in the law and in regulations, as well as possible changes in our products, we cannot guarantee that the status of this product will remain unchanged. We, therefore, recommend that customers continuing to use this product verify its status periodically.

References

General programme instructions of the International EPD® System. Version 4.0 from 2021-03-29

PCR 2019:14. Construction Products. Version 1.3.4

PCR 2021:01. *Multipurpose films, UN CPC 36330 plastics: plates, sheets, film, foil and strip, of plastics, not self-adhesive, non-cellular and not reinforced, laminated, supported or similarly combined with other materials. Version 1.0.2*

Sustainability of construction works — Environmental product declarations — Core rules for the product category of construction products; Dutch version EN 15804:2012+A2:2019 + AC:2021

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ISO 14021, 2016. Environmental labels and declarations — Self-declared environmental claims (Type II environmental labelling). ISO 14021:2016(E).

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ISO Environmental Management, Switzerland.

European Chemical Agency, Candidate List of Substances of Very High Concern for Authorization.

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