

Life Cycle Assessment (LCA) Project Report – Aseptic Prismas

Submission for CAA Bonus A - as of 08/15/2025

This Life Cycle Assessment (LCA) report examines the environmental impacts of Horizon Organic’s Aseptic Prismas packaging from raw material sourcing to end of life. Prepared in line with ISO 14040 and 14044 standards and verified by Planet FWD, it supports Horizon Organic’s submission for CAA Bonus A and reflects the company’s commitment to sustainability.

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I. General Information

PRODUCER DETAILS

Producer Name	Horizon Organic Dairy, LLC
Producer PRO ID (TIN, other) – EIN Code Provided	
Mailing Address	Horizon Organic Dairy, LLC Consumer Connections 12303 Airport Way, Suite 200 Broomfield, CO 80021
Email	legal@horizon.com
Phone	1-888-494.3020
Website	www.horizon.com
Date of report submission	15 th August 2025

STANDARDS AND SCOPE VERIFICATION

Commissioner of the LCA	Horizon Organic
Date of report	
Reference Standard(s)	ISO 14044, 14040
LCA Reference Data	Bill of materials for the product and secondary modelling
Scope of LCA (modules)	Modules A & C
LCA Verification Organization	PlanetFWD
LCA Verifier	Dr. Miranda Gorman

PRODUCT & SKU DETAILS

Product Name	Aseptic Prisma
SKU/Reference Number(s)	Tetra Pak Aseptic Prisma – 1004636
SKU Batch Number	
Date SKU entered OR Market	Prior to Jan 1 2023
Place of Production	
Date of data collection	4 th August 2025

UNIT DATA SUMMARY

Declared functional unit (primary packaging)	The packaging required to transport 1 cubic meter of fluid from the filling site to the customer. Equivalent to 704.47 units of six 8 oz containers.
Declared unit mass (primary)	51.4 kg
Declared unit mass (secondary)	2.1 kg
Declared unit mass (tertiary)	31.6 kg
Declared unit mass (total)	85.1 kg

II. Producer, Product and SKU Details

ABOUT THE PRODUCER

Horizon Organic, founded in 1991, is the largest USDA-certified organic dairy brand in North America, sourcing from over 700 family farms. Now owned by Platinum Equity, it was previously part of Danone and Dean Foods. Certified as a B Corp in 2024, Horizon is known for its sustainable practices and products like grass-fed and Growing Years® milk.

GOAL OF LCA STUDY + *Relevant Bonus*

Horizon Organic submits this LCA study to disclose the environmental impacts of the Aseptic Prismas. They do so as an application for fee reduction as part of Bonus A.

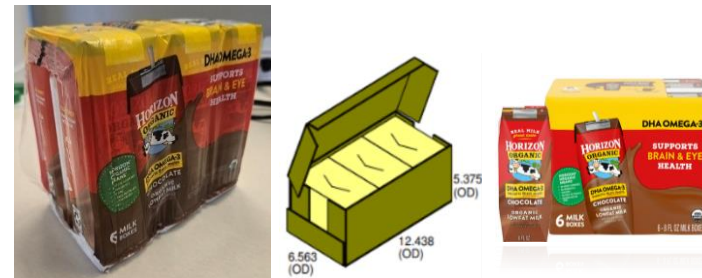
PRODUCT DESCRIPTION

A TetraPak carton container of 8 oz volume. Made of mixed materials polyethylene, aluminum, and paperboard. The carton has a polyethylene pull tab as well as an attached polypropylene straw. The weight of the primary packaging is 0.0122 kg (to 3 d.p.).

A low-density polyethylene wrap is used as secondary packaging. The purpose of this is to hold together six separate 8 oz containers. This has approximate dimensions of 0.167 m X 0.137 m X 0.11 m and weighs 0.00295 kg (to 3 d.p.).

A tertiary container is used to hold three sets of the six pack of Aseptic Prismas. This is a corrugated cardboard box. This has dimensions 0.167 m X 0.137 m X 0.316 m and weighs 0.135 kg (to 3 d.p.).

PRODUCT PHOTOS & DIAGRAMS



TOTAL MATERIAL COMPOSITION

Material Category	Mass %	Material Origin
Plastics		
Paper		
Metals		
Minerals		
Bio-based		
Glass		

FUNCTIONAL UNIT AND SERVICE LIFE

Declared unit (DU)	The amount of packaging required to transport 1 cubic meter of fluid.
Mass per declared unit	85.1 kg – 10% waste/breakage applied to raw material inputs before the DU, resulting in a gross material input of 94.6 kg
Functional unit (FU)	The packaging required to transport 1 cubic meter of fluid from the filling site to the customer. Equivalent to 704.47 units of six 8 oz containers.
Averaging approach (for SKU batches)	N/A

PRIMARY PACKAGING MATERIAL COMPOSITION

Component	Material	Separable?	Component Weight, g	Weight DU, kg	Mass %	PCR Content, %	Material Origin
Tetra Aseptic Brick	paperboard, polyethylene, aluminum	Required processing					
PP Straw	Polypropylene	Yes					
Plastic wrap for straw	Polypropylene	Yes					
Pull tab	Low density polyethylene	Yes					

SECONDARY PACKAGING MATERIAL COMPOSITION

Component	Material	Separable?	Component Weight, g	Weight DU, kg	Mass %	PCR Content, %	Material Origin
LDPE Top Flex Wrap	Low density polyethylene	Yes					
LDPE Bottom Flex Wrap	Low density polyethylene	Yes					

TERTIARY PACKAGING MATERIAL COMPOSITION

Component	Material	Separable?	Component Weight, g	Weight DU, kg	Mass %	PCR Content, %	Material Origin
Corrugate Box	Corrugated cardboard	Yes					

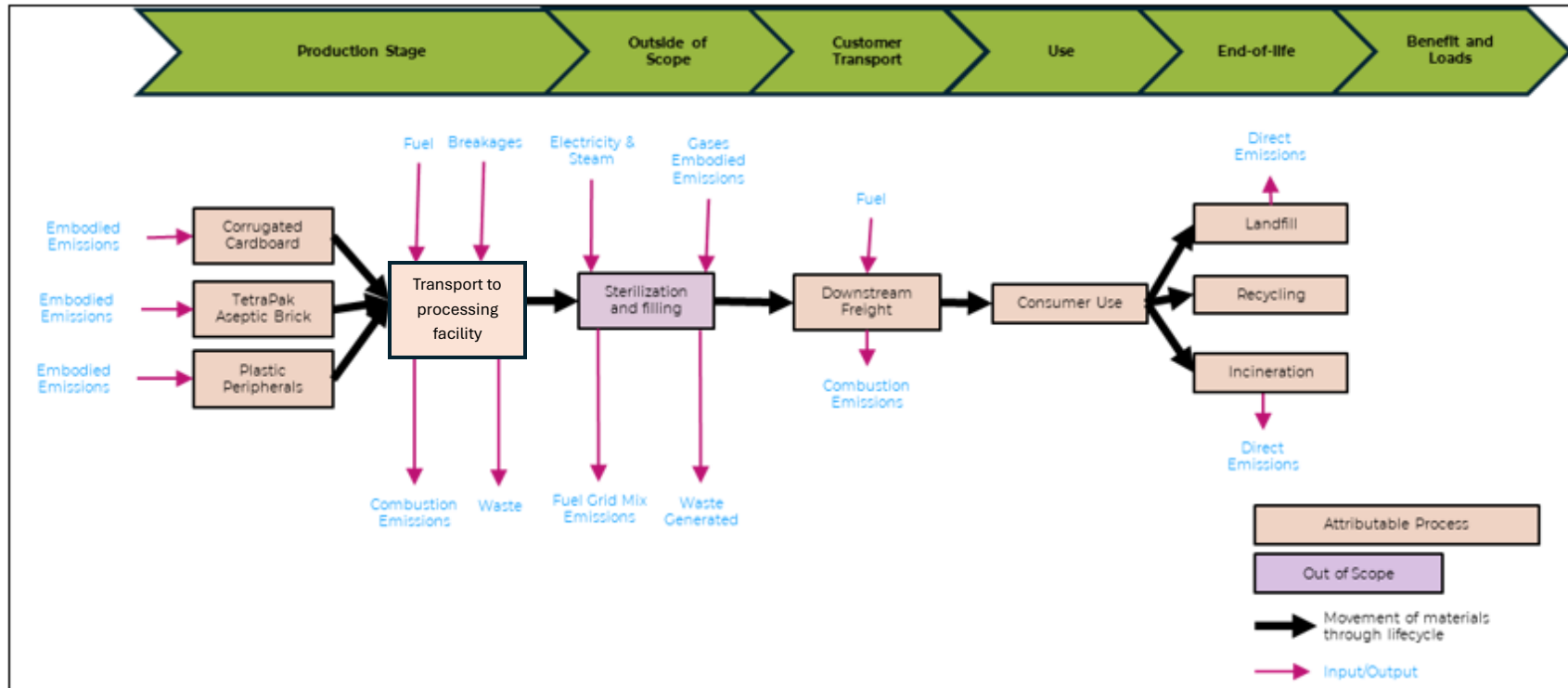
III. Product Life Cycle

SYSTEM BOUNDARY

This report presents the Life Cycle Assessment (LCA) data for the Aseptic Prisma container used by Horizon Organic as a packaging material. The analysis follows the Core Product Category Rules outlined in Chapter 340, as required by the Oregon Authority. It evaluates environmental impacts associated with the product stage (A) and the end-of-life stage (C). Since the carton is not reusable, the use stage is excluded from the assessment. Impact conversion factors were sourced from the Ecoinvent databases and applied using the SimaPro software.

This LCA identifies the raw material composition of the packaging material based on a provided bill of materials alongside secondary data. The transportation routes of this packaging to Horizon are quantified based on the identified location of the supplier and manufacturing site. All manufacturing only considers the manufacturing of the packaging based on secondary data models. The transportation to the customer is packaging weight only to the Oregon purchaser. No use stages are considered as it is a single use packaging product. End of life stages are based on assumptions for end-of-life processing. No benefits and loads are considered within the system boundary. A full system boundary diagram is provided.

Module A				Module B			Module C			Module D				
Production stage				Use Stage			End of life Stage			Beyond System Boundaries				
A1	A2	A3	A4	B1	B2	B3	C2	C3	C4	D				
X	X	X	X	N/A	N/A	N/A	X	X	X	N/A				
Raw Materials	Transport	Manufacturing	Customer Transport	Return Transportation	Washing & sterilization	Redistribution transport	Transport to end-of-life processing	Waste processing of covered materials	Disposal or recovery	Recovery Benefits	Incineration	Landfilling	Composting	Material Substitution



MODULE DESCRIPTIONS

MODULE A (A1-A4)

Raw Materials	Cardboard was sourced from the US and specific US based factors were applied. All other factors for materials utilized global or rest of world factors. The materials are sourced in a mix of North America and South America. Provided by a bill of materials and supplier locations. Upstream transportation of these materials Raw materials include corrugated cardboard, asptic prisma container (paperboard, aluminum, and low-density polyethylene) as well as peripheral plastics (polypropylene and polyethylene) This dataset was provided by Horizon. Assumption on Post Consumer Recycle (PCR) content of zero percent was taken from the Trayak LCA report.
Transport	Specific distances were utilized when available to calculate specific freight (metric tonne.km). When not available a local transportation assumption of 450 km was utilized. Global average EURO 5 >32 metric tonne truck was identified as the assumed vehicle. Two stage transportation routes were provided.

MODULE B (B1-B3) – *for reusable packaging SKUs*

Return Transportation	Not considered as single use packaging.
Washing & sterilization	Not considered as single use packaging.
Redistribution transport	Not considered as single use packaging.
Manufacturing (including ancillaries and co-products)	All manufacturing processes were identified by likely processing and global transformation factors based on tonnage of output.
Customer Transportation to place of purchase	Specific distances were utilized when available to calculate specific freight (metric tonne.km). When not available a local transportation assumption of 450 km was utilized. Global average EURO 5 >32 metric tonne truck was identified as the assumed vehicle. Two stage transportation routes were provided.

MODULE C (C2-C4)

Transport to End-of-Life Processing	End of life freight was estimated at 32 km for local refuse facilities in a EURO 5 >32 metric tonne truck.
Waste processing of covered materials	No waste processing was considered for recycling activities.
Disposal or recovery activities	Landfill and incineration activities impacts were considered based on global average treatment processes.

MODULE D

Any impacts outside of system boundary	No benefits considered.
Incineration	No benefits considered.
Landfilling	No benefits considered.
Composting	No benefits considered.
Material Substitution Credits	No benefits considered.

IV. Life-Cycle Assessment Criteria

CUT-OFF CRITERIA & ASSUMPTIONS

The collected data covered all raw materials, associated transport to manufacturing sites, process energy, direct production wastes, and emissions to air and water. Cut-offs from core processes in the LCA have been permitted up to a maximum of 5% of the total mass of material inputs or 5% of the total energy content of fuels and energy carriers.

ASSUMPTIONS AND ESTIMATES

- 32 km was assumed for transportation activities to waste processing sites as given by the EPA WARM model.
- Means of transportation were assumed as >32 metric tonne lorries.
- Ratio between recycling, landfilling and incinerating materials both during the production stage and end of life stage was adopted from an LCA report produced by Trayak, for a similar gable top carbon product of different dimensions.
- Raw materials within Tetrapak containers were separated based on published LCA's from Tetrapak and a published academic paper. References provided in bibliography.
- Manufacturing of Tetrapak container was assumed as market average for carton board box production with offsetting.

EXCLUDED PROCESSES

Filling and preparation were excluded for this product as this LCA considers packaging only.

Sterilization and preparation were excluded for this product as it is a single use product.

ALLOCATIONS

In this study, no allocation has been completed. Consequently, no tabulated data on allocation is provided.

Allocation is required if some material, energy, and waste data cannot be measured separately for the product under investigation. This is not the case for this assessment.

LCA SOFTWARE AND BIBLIOGRAPHY

The LCA and report have been prepared according to the reference standards and ISO 14040/14044 and PEF from EU 2021.2279 using Simapro software. Calculations utilized the Ecoinvent databases as sources of environmental data.

Sea distances obtained from <https://sea-distances.org/>. Accessed August 2025.

- Land distances were assumed as the central point in the given area by Google maps. With travel taken as the direct route between.
 - International shipping distances were obtained from seadistances.org
 - Material transportation distances were assumed at 450 km when not known based on data in US 2017 Economic Census: Transported published by the US Department of Transportation.
 - EPA SMM indicates that on average corrugated cardboard packaging in the US has a recycling rate of 96.5%, the remaining waste is assumed to be landfilled.
- Karaboyacı, M., Karaboyacı, M., Gizem Elbek, G., Kilic, M., & Sencan, A. (2017). Process Design for the Recycling Of Tetra Pak Components Publication Info. Turkey) EJENS, 2(1), 126–129. <https://www.researchgate.net/publication/325206464>
- Grünwasser, S., Mahami, S., & Wellenreuther, F. (n.d.). Comparative Life Cycle Assessment of Tetra Pak® beverage & liquid food cartons and alternative packaging systems on the North European market Final report. www.ifeu.de
- Supplemental Report for ISO Conformant Life Cycle Assessment Related to Gable Top Cartons and Equivalent Containers for Pactiv Evergreen Inc., Group: 52 oz Premium or Plant Based Milk, prepared by Trayak LLC in March 2023. PactivCarton-Trayak-SupplementReport-2023 FINAL - 52 oz Milk. (n.d.).

V. Life Cycle Inventory Analysis & Hazardous Substance Assessment

Below the full process flow inventory is provided from the lifecycle assessment. This shows all materials and activities quantified into the relevant LCA stages.

Item Description	Unit	ISO Category	Stage	Impact Factor (as apparent in Ecoinvent)
Corrugated cardboard	kg/FU	Raw Materials	A1	1 kg Corrugated board box {US}
Polypropylene	kg/FU	Raw Materials	A1	1 kg Polypropylene, granulate {GLO}
Low density polyethylene	kg/FU	Raw Materials	A1	1 kg Polyethylene, low density, granulate {GLO}
Paperboard	kg/FU	Raw Materials	A1	1 kg Liquid packaging board {RoW}
Low density polyethylene film	kg/FU	Raw Materials	A1	1 kg Packaging film, low density polyethylene {GLO}
Aluminum	kg/FU	Raw Materials	A1	1 kg Aluminium, primary, ingot {RoW}
Average HGV - US	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Container ship	tonne.km/FU	Upstream Transport	A2	1 tkm Transport, freight, sea, container ship {GLO}
Landfill Mass (kg) - Paperboard	kg/FU	Manufacturing	A3	1 kg Waste paperboard {RoW}
Landfill Mass (kg) - Polypropylene	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Landfill Mass (kg) - Low density polyethylene	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Landfill Mass (kg) - Aluminum	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}
Recycling Mass (kg) - Cardboard	kg/FU	Manufacturing	A3	Out of scope
Recycling Mass (kg) - Paperboard	kg/FU	Manufacturing	A3	Out of scope
Recycling Mass (kg) - Polypropylene	kg/FU	Manufacturing	A3	Out of scope
Recycling Mass (kg) - Low density polyethylene	kg/FU	Manufacturing	A3	Out of scope
Recycling Mass (kg) - Aluminum	kg/FU	Manufacturing	A3	Out of scope

Incineration Mass (kg) – Paperboard	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – Polypropylene	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – Low density polyethylene	kg/FU	Manufacturing	A3	1 kg Waste polyethylene {GLO} – Incineration
Average Truck US	tonne.km/FU	Downstream Transport	A4	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Incineration Mass (kg) – Aluminum	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration
Landfill Mass (kg) – Paperboard	kg/FU	Disposal	C4	1 kg Waste paperboard {RoW}
Landfill Mass (kg) – Polypropylene	kg/FU	Disposal	C4	1 kg Inert waste, for final disposal {RoW}
Landfill Mass (kg) – Low density polyethylene	kg/FU	Disposal	C4	1 kg Waste polyethylene {GLO} – Landfill
Landfill Mass (kg) – Aluminum	kg/FU	Disposal	C4	1 kg Inert waste, for final disposal {RoW}
Recycling Mass (kg) – Cardboard	kg/FU	Waste Processing	C3	Out of scope
Recycling Mass (kg) – Paperboard	kg/FU	Waste Processing	C3	Out of scope
Recycling Mass (kg) – Polypropylene	kg/FU	Waste Processing	C3	Out of scope
Recycling Mass (kg) – Low density polyethylene	kg/FU	Waste Processing	C3	Out of scope
Recycling Mass (kg) – Aluminum	kg/FU	Waste Processing	C3	Out of scope
Incineration Mass (kg) – Paperboard	kg/FU	Waste Processing	C3	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – Polypropylene	kg/FU	Waste Processing	C3	1 kg Municipal solid waste {RoW} – Incineration
Total End of Life Freight	tonne.km/FU	Transport	C2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Tetra Aseptic Brick	kg/FU	Manufacturing	A3	1 kg Carton board box production, with offset printing {RoW}
Polypropylene – Extrusion	kg/FU	Manufacturing	A3	1 kg Extrusion, plastic film {RoW}

Low density polyethylene – Injection molding	kg/FU	Manufacturing	A3	1 kg Injection moulding {RoW}
Aluminum – All processes to make aluminum foil	kg/FU	Manufacturing	A3	1 kg Sheet rolling, aluminium {RoW}
Incineration Mass (kg) – Low density polyethylene	kg/FU	Waste Processing	C3	1 kg Waste polyethylene {GLO} – Incineration
Incineration Mass (kg) – Aluminum	kg/FU	Waste Processing	C3	1 kg Municipal solid waste {RoW} – Incineration
Landfill Mass (kg) – Cardboard	kg/FU	Manufacturing	A3	1 kg Waste paperboard {RoW}
Landfill Mass (kg) – Cardboard	kg/FU	Disposal	C4	1 kg Waste paperboard {RoW}
Incineration Mass (kg) – Cardboard	kg/FU	Manufacturing	A3	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – Cardboard	kg/FU	Disposal	C4	1 kg Municipal solid waste {RoW} – Incineration
Incineration Mass (kg) – Polypropylene	kg/FU	Raw Materials	A1	1 kg Corrugated board box {US}
Total End of Life Freight	tonne.km/FU	Raw Materials	A1	1 kg Polypropylene, granulate {GLO}
Tetra Aseptic Brick	kg/FU	Raw Materials	A1	1 kg Polyethylene, low density, granulate {GLO}
Polypropylene – Extrusion	kg/FU	Raw Materials	A1	1 kg Liquid packaging board {RoW}
Low density polyethylene – Injection molding	kg/FU	Raw Materials	A1	1 kg Packaging film, low density polyethylene {GLO}
Aluminum – All processes to make aluminum foil	kg/FU	Raw Materials	A1	1 kg Aluminium, primary, ingot {RoW}
Incineration Mass (kg) – Low density polyethylene	kg/FU	Upstream Transport	A2	1 tkm Transport, freight, lorry >32 metric ton, EURO5 {RoW}
Incineration Mass (kg) – Aluminum	kg/FU	Upstream Transport	A2	1 tkm Transport, freight, sea, container ship {GLO}
Landfill Mass (kg) – Cardboard	kg/FU	Manufacturing	A3	1 kg Waste paperboard {RoW}
Landfill Mass (kg) – Cardboard	kg/FU	Manufacturing	A3	1 kg Inert waste, for final disposal {RoW}

MODULE A – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	32.41	kg C	N/A	N/A
Outputs	Biogenic carbon flows	3.24	kg C	N/A	N/A
	Hazardous waste	-	kg	N/A	N/A
	Non-hazardous waste	9.49	kg	N/A	N/A
	Plastic leakage inventory	0.10	kg	N/A	N/A
	Methane leakage	43.09	kg CO ₂ e CH ₄	N/A	N/A

MODULE B – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
Outputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
	Hazardous waste	N/A	N/A	N/A	N/A
	Non-hazardous waste	N/A	N/A	N/A	N/A
	Plastic leakage inventory	N/A	N/A	N/A	N/A
	Methane leakage	N/A	N/A	N/A	N/A

MODULE C – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	N/A	kg C	N/A	N/A

Type	Flow	Value	Unit	Distance	Mode
Outputs	Biogenic carbon flows	29.17	kg C	N/A	N/A
	Hazardous waste	-	kg	N/A	N/A
	Non-hazardous waste	85.43	kg	N/A	N/A
	Plastic leakage inventory	0.94	kg	N/A	N/A
	Methane leakage	48.11	kg CO ₂ e CH ₄	N/A	N/A

MODULE D – INVENTORY FLOWS

Type	Flow	Value	Unit	Distance	Mode
Inputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
Outputs	Biogenic carbon flows	N/A	N/A	N/A	N/A
	Hazardous waste	N/A	N/A	N/A	N/A
	Non-hazardous waste	N/A	N/A	N/A	N/A
	Plastic leakage inventory	N/A	N/A	N/A	N/A
	Methane leakage	N/A	N/A	N/A	N/A

HAZARDOUS SUBSTANCE ASSESSMENT

The hazardous substances are assessed using the freshwater ecotoxicity indicator. This measures the quantity of environmental emissions resulting in aquatic toxic impacts. These emissions are released throughout the product life cycle. The indicator is reported in Comparative Toxic Units for ecosystems (CTUe). Each CTUe corresponds to the fraction of disappeared species over a cubic metre of freshwater or marine water during one year. The calculation utilizes aquatic toxicity characterization factors from USEtox 2.0. Impact factors are derived from BS EN 15804 + A2. The Ecoinvent database and Simapro software support the calculations.

HUMAN HEALTH IMPACT STATEMENT

The human health impacts are evaluated using the human toxicity midpoint indicator. This calculates the quantity of short-term environmental emissions leading to cancer and toxic non-cancer effects on humans. These emissions occur throughout the life cycle. The indicator is reported in Comparative Toxic Units for humans (CTUh). According to the ILCD Handbook, CTUh reflects the compatibility between midpoint and endpoint recommendations for life cycle impact assessment in the European context. The midpoint indicator, defined in USEtox as Comparative Toxic Units (CTUhuman), corresponds to cases of cancer and non-cancer. The severity factor reflects Disability Adjusted Life Years per case. Impact factors are derived from BS EN 15804 + A2. The Ecoinvent database and Simapro software support the calculations.

VI. Life Cycle Impact Assessment

Impact Category	Unit	A1	A2	A3	A4	B1	B2	B3	C2	C3	C4	D
A Climate Change	kg CO ₂ eq.	9.85E+01	9.82E+00	5.85E+01	3.81E+01	-	-	-	2.87E-01	1.52E+01	6.49E+01	-
B Ozone depletion	kg CFC-11 eq.	4.89E-06	1.51E-07	2.77E-06	5.97E-07	-	-	-	4.50E-09	7.57E-09	7.34E-09	-

C	Human toxicity, cancer	CTUh	2.76E-07	8.49E-09	6.85E-08	3.30E-08	-	-	-	2.48E-10	6.48E-08	7.51E-08	-
D	Human toxicity, non-cancer	CTUh	6.18E-06	1.45E-07	1.07E-06	8.09E-07	-	-	-	6.09E-09	2.58E-07	3.22E-07	-
E	Particulate matter	no. of disease incidents	1.52E-05	6.67E-07	4.71E-06	3.83E-06	-	-	-	2.89E-08	6.51E-07	6.12E-06	-
F	Ionizing radiation, human health	kBq U-235 eq.	1.08E+01	9.75E-02	4.03E+00	5.10E-01	-	-	-	3.84E-03	3.31E-03	3.66E-03	-
G	Photochemical ozone formation, human health	kg NMVOC eq.	8.24E-01	1.27E-01	2.56E-01	1.96E-01	-	-	-	1.48E-03	1.72E-02	3.28E-02	-
H	Acidification	mol H ⁺ eq.	1.09E+00	1.53E-01	2.70E-01	1.38E-01	-	-	-	1.04E-03	6.64E-03	1.17E-02	-
I	Eutrophication, terrestrial	mol N eq.	8.70E-01	3.99E-02	6.49E-02	4.59E-02	-	-	-	3.46E-04	3.20E-03	2.23E-02	-
J	Eutrophication, freshwater	kg P eq.	5.97E-02	5.82E-04	2.53E-02	3.10E-03	-	-	-	2.34E-05	2.44E-04	2.42E-05	-
K	Eutrophication, marine	kg N eq.	2.73E-01	3.99E-02	6.49E-02	4.59E-02	-	-	-	3.46E-04	3.20E-03	2.23E-02	-
L	Ecotoxicity, freshwater	CTUe	1.66E+03	1.38E+02	7.41E+02	5.98E+02	-	-	-	4.51E+00	1.28E+02	2.09E+02	-
M	Land use	pt	9.95E+03	8.24E+01	7.24E+02	5.62E+02	-	-	-	4.23E+00	1.31E+00	9.66E+00	-
N	Water use	m ³ water eq.	-3.14E-01	1.66E-02	5.62E-01	8.70E-02	-	-	-	6.56E-04	6.91E-03	4.25E-03	-
O	Resource use, minerals and metals	kg Sb eq.	5.80E-04	1.87E-05	1.13E-04	1.03E-04	-	-	-	7.76E-07	4.44E-07	4.86E-07	-
P	Resource use, fossils	MJ	3.13E+03	1.33E+02	7.20E+02	5.55E+02	-	-	-	4.18E+00	1.91E+00	3.65E+00	-

VII. Sensitivity Analysis

The purpose of a sensitivity analysis is to check for variability of the results stemming from key data, parameters, or methodological choices in the life cycle evaluation of covered products. This requirement provides additional quantitative information about

the potential variability of the evaluation results. Sensitivity analysis shall disclose the range, minimum and maximum, and variance across all required impact categories and indicators in the project report.

To assess the impact that changes in the supply chain or manufacturing processes sensitivity analysis can be employed. Herein, we calculated the same system whereby recycling was increased to 100% at end of life in addition to an alternative scenario where landfill was increased to 100% at end of life. This makes a “best-case” and “worst-case” scenario to compare the impact of this change. This was the only sensitivity analysis employed, due to limitation in the data primary data on electricity consumption was not available. Instead, market-based production factors were utilized. This meant that electricity sensitivity analysis was not possible. The range of results across all impact categories (where there is a variation) is provided below, where there is no material variation, the cell is left as “–”. Note B and D are not reported as they are not within scope and shall not be affected by sensitivity analysis.

Impact Category		Unit	A1	A2	A3	A4	C2	C3	C4
A	Climate Change	kg CO ₂ eq.	-	-	49.8 - 69.7	-	-	0 - 15.2	0 - 166
B	Ozone depletion	kg CFC-11 eq.	-	-	-	-	-	-	-
C	Human toxicity, cancer	CTUh	-	-	-	-	-	-	-
D	Human toxicity, non-cancer	CTUh	-	-	-	-	-	-	-
E	Particulate matter	no. of disease incidents	-	-	-	-	-	-	-
F	Ionizing radiation, human health	kBq U-235 eq.	-	-	-	-	-	-	-
G	Photochemical ozone formation, human health	kg NMVOC eq.	-	-	-	-	-	-	0 - 0.1
H	Acidification	mol H ⁺ eq.	-	-	-	-	-	-	-
I	Eutrophication, terrestrial	mol N eq.	-	-	-	-	-	-	0 - 0.1
J	Eutrophication, freshwater	kg P eq.	-	-	-	-	-	-	-
K	Eutrophication, marine	kg N eq.	-	-	-	-	-	-	0 - 0.1
L	Ecotoxicity, freshwater	CTUe	-	-	703.6 - 777.4	-	-	0 - 127.9	0 - 538
M	Land use	pt	-	-	722.4 - 724.9	-	-	0 - 1.3	0 - 20.9
N	Water use	m ³ water eq	-	-	-	-	-	-	-
O	Resource use, minerals and metals	kg Sb eq	-	-	-	-	-	-	-
P	Resource use, fossils	MJ	-	-	719.4 - 720.6	-	-	0 - 1.9	0 - 8.1

VIII. Critical Review Report – LCA Third-Party Verification

To be filled in by qualified, independent verifier

CAA GUIDANCE ON LCA REPORT VERIFICATION

We ask that the verifier attest to the following:

- ☐ Are the methods used to carry out the LCA consistent with ISO 14040/14044 international standards?
- ☐ Are the methods used to carry out the LCA scientifically and technically valid?
- ☐ Are the LCA software, data and data sources used appropriate and reasonable in relation to the goal of the study?
- ☐ Do the assumptions and interpretations reflect the limitations identified and the goal of the study?
- ☐ Is the report complete, consistent, and transparent?
- ☐ Does the LCA adhere to section 8.4.1 of Annex I of EU 2021/2279?
- ☐ Are the products within the SKU batch comparable and is it reasonable to assume all products within the SKU batch would have proportional or identical LCA outcomes?
- ☐ Are all steps of the product's life cycle adequately described and are all assumptions or averages sufficiently substantiated within each life cycle stage?
- ☐ Are plastic leakage values in accordance with the Plastic Footprint Network's methodologies for (1) Macroplastics from packaging and (2) Microplastics from tires?
- ☐ Was an adequate sensitivity analysis performed on the grid mixture and recycling methodologies?
- ☐ Is it reasonable to believe all hazardous substances have been accounted for within the hazardous substance assessment?
- ☐ Are all foreseeable human health impacts captured within the human health impact statement?

SELF-DECLARATION OF VERIFIER: *I confirm that I have sufficient knowledge and experience with the specific product category, industry, relevant standards, and geographical area of the LCA to carry out this verification. I confirm my independence in my role as verifier; I have not been involved in the execution of the LCA or in the development of the declaration and have no conflicts of interest regarding this verification.*

THIRD PARTY VERIFICATION STATEMENT

I hereby confirm that, following detailed examination, I have not established any relevant deviations in this LCA project report, in terms of the data collected and used in the LCA calculations, the way the LCA-based calculations have been carried out, the presentation of environmental data in the LCA report, and other additional environmental information, as present with respect to the procedural and methodological requirements in ISO 14040/14044 and reference standards. I confirm that the company-specific data has been examined in regards to its plausibility and consistency; the declaration owner is responsible for its factual integrity and legal compliance.

VERIFIER SCORE (*eligibility – per PEF EU 2021.2279*): 9

VERIFIER SIGNATURE:



DATE OF VERIFICATION: 08/15/2025

Please attach any additional documentation from the LCA or critical review report.