VERSA®
DESIGNED SURFACES

VERIFIED by SCS Global Services
ENVIRONMENTAL PRODUCT DECLARATION
BASED ON LCA

Declaration Owner

Versa Designed Surfaces
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Product

Circon Vinyl Wallcovering
(CSI Code 09 72 16.16; UNSPSC Class Code 72151400)

Declared Unit

The declared unit is one square meter of wallcovering

EPD Number and Period of Validity

SCS-EPD-10243
EPD Valid August 23, 2024 through August 22, 2029
Version Date: May 21, 2025

Product Category Rule

PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022,

UL Part B PCR Guidance for Building-Related Products and Services - Part B: Wall and Door Protection EPD Requirements, UL 10010-10, First Edition, Dated May 22, 2019, expiration date extended to 31-07-2025.

Program Operator

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SCSglobal SERVICES

Declaration Owner:	Versa Designed Surfaces
Address:	2073 McDonald Ave. New Albany, IN 47150
Declaration Number:	SCS-EPD-10243
Declaration Validity Period:	EPD Valid August 23, 2024 through August 22, 2029
Version Date:	May 21, 2025
Program Operator:	SCS Global Services
Declaration URL Link:	https://www.scsglobalservices.com/certified-green-products-guide
LCA Practitioner:	Gerard Mansell, Ph.D., SCS Global Services
LCA Software and LCI database:	OpenLCA v2.4 software and the Ecoinvent v3.11 database
Product RSL:	n/a
Markets of Applicability:	Global (North America, Europe, Asia, Middle East);
EPD Type:	Product-Specific
EPD Scope:	Cradle-to-Gate
LCIA Method and Version:	TRACI 2.1, CML & EN15804 (EF3.1)
Independent critical review of the LCA and data, according to ISO 14044 and ISO 14071	☐ internal ☒ external
LCA Reviewer:	Lindita Bushi, Ph.D., Athena Sustainable Materials Institute
Part A Product Category Rule:	PCR for Building-Related Products and Services - Part A: LCA Calculation Rules and Report Requirements, UL 10010, UL v.4.0, March 2022,
Part A PCR Review conducted by:	Lindita Bushi, PhD (Chair); Hugues Imbeault-Tétreault, ing., M.Sc.A.; Jack Geibig
Part B Product Category Rule:	UL Part B PCR Guidance for Building-Related Products and Services - Part B: Wall and Door Protection EPD Requirements, UL 10010-10, First Edition, Dated May 22, 2019, expiration date extended to 31-07-2025.
Part B PCR Review conducted by:	Lindita Bushi, PhD (Chair); Lise Lauren; Jim Mellentine
Independent verification of the declaration and data, according to ISO 14025 and the PCR	☐ internal ☒ external
EPD Verifier:	Lindita Bushi, Ph.D., Athena Sustainable Materials Institute
Declaration Contents:	

Disclaimers: *This EPD conforms to ISO 14025, 14040, 14044, and 21930.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *Environmental declarations from different programs (ISO 14025) may not be comparable.*

Comparison of the environmental performance of Wall and Door Protection Products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the use phase as instructed under this PCR.

Full conformance with the PCR for Wall and Door Protection Products allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

In accordance with ISO 21930:2017, EPDs are comparable only if they comply with the core PCR, use the same sub-category PCR where applicable, include all relevant information modules and are based on equivalent scenarios with respect to the context of construction works.

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1. Versa Designed Surfaces

Versa Designed Surfaces is one of the world's largest manufacturers of commercial wallcovering and an industry leader in sustainability. Based in New Albany, IN, the company has a strong international presence with a distribution network spanning 70 countries and world-class manufacturing facilities not only in the U.S. but also in China, the Middle East, and The Netherlands.

From its early beginnings in 1955, the company had a vision for technological advancements and meaningful innovations for our partners around the globe. Our collaborative culture is not only committed to making superior products but also to how we can make a positive impact on our customers and the environment. We pride ourselves on our forward-thinking and inspirational sustainable solutions, including closed-loop recycled water-based inks and careful selection of recycled packaging, that take us from our roots to the future of design.

2. Product

2.1 PRODUCT DESCRIPTION

Circon™ is a 20 oz. Type II vinyl wallcovering product (CSI Code 09 72 16.16; UNSPSC Class Code 72151400) comprised of sustainable materials by Versa Designed Surfaces and are manufactured at four of Versa's production facilities located in New Albany, Indiana; Jiangsu Province, China; Dubia, UAE; and Soest, the Netherlands. The products consist primarily of virgin and recycled polyvinyl chloride (PVC), natural fiber fabric, plasticizer, stabilizers, various fillers, additives and pigments. The products are constructed with an extruded vinyl sheet which is subsequently overlaid with a printed natural fiber fabric using adhesive (denoted as print-ready ground substrate) and printed with water-based ink. Although the wallcovering may be fabricated with various patterns and colors, the difference in estimated impacts are not expected to exceed ±10%.

2.2 PRODUCT FLOW DIAGRAM

A flow diagram illustrating the production processes and life cycle phases included in the scope of the EPD is provided below.

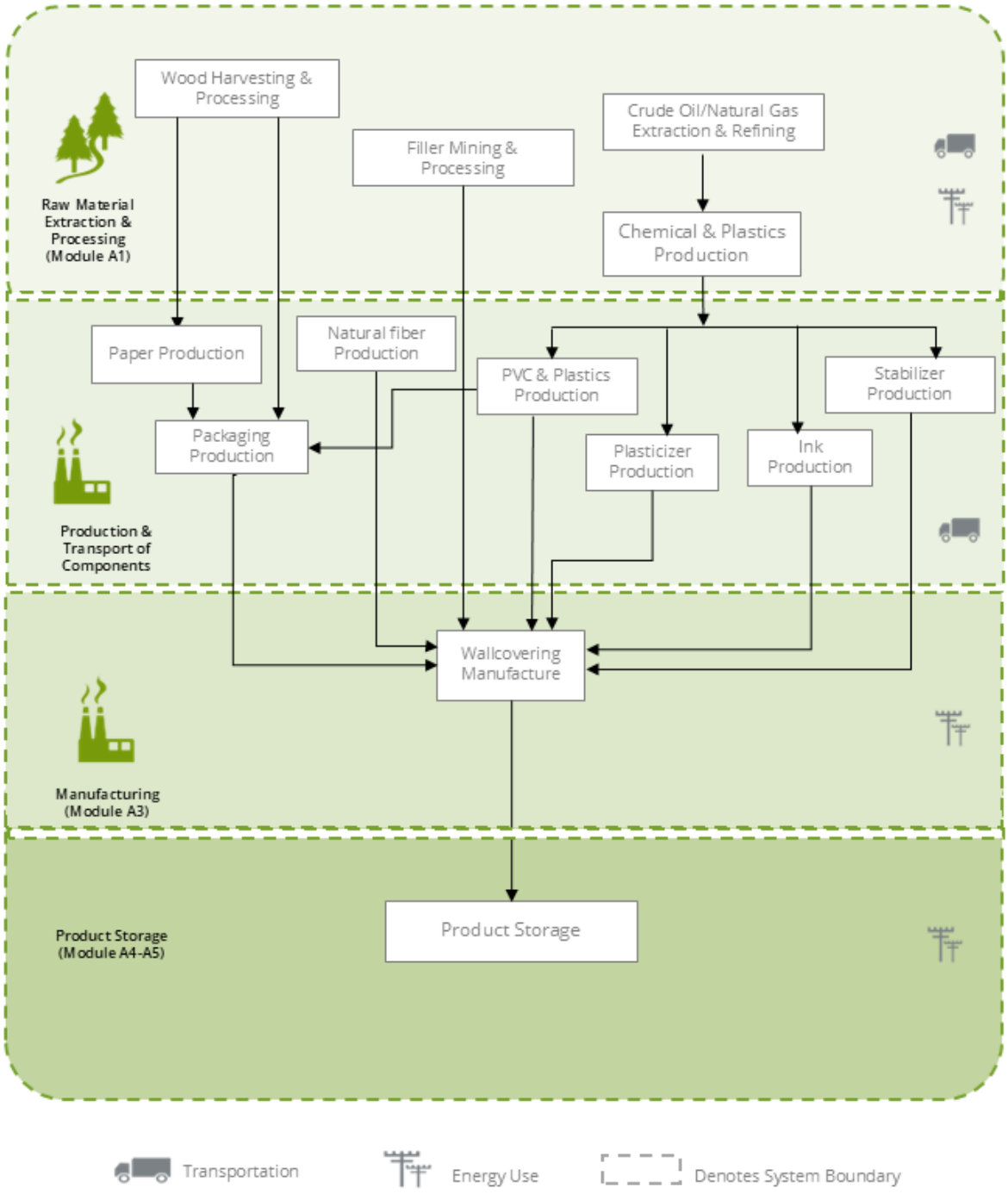

Figure 1. *Flow diagram for the life cycle of the wallcovering products.*

2.3 APPLICATION

The products provide the primary function of wall protection for interior applications. The products are used in various residential and commercial applications including retail, healthcare, education, and hospitality.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

The scope of the EPD is cradle-to-gate with storage, including raw material extraction and processing, transportation, product manufacture, including packaging, and product storage. The life cycle phases included in the product system boundary are shown below. Cut-off and allocation procedures are described below and conform to the PCR and ISO standards. The study is conducted following an attributional LCA approach.

Table 1. *Life cycle phases included in the product system boundary.*

Product			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = included | MND = Module Not Declared

2.5 TECHNICAL DATA

Technical specifications of the wallcovering products are summarized below. Detailed product performance results can be found on the manufacturer's website www.versadesignedsurfaces.com.

Table 2. *Technical specifications for Versa wallcovering products.*

Property	Test Method	Test Results
VOC Emissions	CDPH 01350	Low Emitting
Fire performance	ASTM E84	Class A

2.6 MARKET PLACEMENT/APPLICATION RULES

The products are marketed to consumers in North America and used in various residential and commercial applications.

2.7 PROPERTIES OF DECLARED PRODUCT AS DELIVERED

The wallcovering products are delivered for installation in the form of rolls of various dimensions.

2.8 MATERIAL COMPOSITION

The wallcovering is made primarily of virgin polyvinyl chloride (PVC), natural fiber, plasticizer, stabilizers, various fillers and pigments. Manufacturing scrap is also reground and used in the product. For products manufactured in the UAE and the Netherlands, the extruded vinyl sheet and plain ground substrate is manufactured and supplied by the US and/or China facilities and finished (printed) at the production facility. Table 3 through Table 5 summarize the components by weight and material for the products and product packaging data. Also presented are the material components as a percentage of total mass.

Table 3. *Material component summary for the extruded vinyl sheet by mass in kg/m^2 and as a percentage of total mass. All values in the table have been rounded; masses to three significant figures, percentages to two significant figures.*

Component	Extruded vinyl sheet	
	kg/m2	%
PVC	0.204	56%
Plasticizer	4.75×10^{-2}	13%
Stabilizer	6.43×10^{-3}	1.8%
Filler	0.104	29%
Additive	1.89×10^{-4}	0.052%
Total Product	**0.362**	**100%**

Table 4. *Material component summary for the plain ground substrate by mass in kg/m^2 and as a percentage of total mass. All values in the table have been rounded; masses to three significant figures, percentages to two significant figures.*

Component	Plain ground substrate - US	Plain ground substrate - China
Extruded vinyl sheet	0.362	0.362
	81%	81%
Natural fiber	6.78×10^{-2}	6.78×10^{-2}
	15%	15%
Adhesive	1.94×10^{-2}	1.97×10^{-2}
	4.3%	4.4%
Total Product	**0.449**	**0.449**
	100%	**100%**
Biogenic carbon[1]	2.81×10^{-2}	2.81×10^{-2}

[1] Calculated assuming ~41.4% biogenic carbon in natural fiber.

Table 5. *Material component summary for the Circon wallcovering mass in kg/m^2 and as a percentage of total mass. All values in the table have been rounded; masses to three significant figures, percentages to two significant figures.*

Component	Circon Wallcovering - US	Circon Wallcovering - China	Circon Wallcovering - Dubai	Circon Wallcovering - Netherlands
Plain ground substrate	0.449	0.449	0.452	0.452
	99.3%	99.3%	99%	99%
Pigment	3.16×10^{-3}	3.16×10^{-3}	3.16×10^{-3}	3.16×10^{-3}
	0.7%	0.7%	0.7%	0.7%
Total Product	**0.452**	**0.452**	**0.455**	**0.455**
	100%	**100%**	**100%**	**100%**

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In conformance with the PCR, product materials were reviewed for the presence of any toxic or hazardous chemicals. Based on a review of the product components provided by the manufacturer, no chemicals regulated by the Resource Conservation and Recovery Act (RCRA) were identified in the product or product components. Additionally, there are no releases of such substances associated with the production, use or maintenance of the products.

2.9 MANUFACTURING

The products are manufactured at the Versa production facilities in the United States, China, the Unted Arab Emirates and the Netherlands. The manufacturer provided primary data for their annual production, resource use and electricity consumption and waste generation at each facility. Electricity consumption is modeled using Ecoinvent datasets for the applicable regional electricity grid resource mix. Additionally, no green power sources or CO_2 certificates are included in the present study.

Material-specific scrap rates were provided by the manufacturer and are accounted for within the raw material extraction and processing and upstream transport phases of the assessment. Disposal of manufacturing scrap, via landfilling, is accounted for in the manufacturing stage.

2.10 PACKAGING

The products are packaged for shipment using plastic wrap, corrugated board and wooden pallets.

Table 6. *Material content for the plain ground substrate packaging in kg per square meter of wallcovering.*

Component	Plain ground substrate - US	Plain ground substrate - China
Corrugate	$1.81x10^{-2}$	$4.52x10^{-4}$
	85%	33%
Plastic	$2.49x10^{-3}$	0.00
	12%	0%
Wood	$6.78x10^{-4}$	$9.04x10^{-4}$
	3.2%	67%
Total Packaging	**$2.12x10^{-2}$**	**$1.36x10^{-3}$**
	100%	**100%**

Table 7. *Material content for the product packaging in kg per square meter of wallcovering.*

Component	Circon Wallcovering - US	Circon Wallcovering - China	Circon Wallcovering - Dubai	Circon Wallcovering - Netherlands
Corrugate	$1.81x10^{-2}$	$1.81x10^{-2}$	$2.49x10^{-2}$	$1.81x10^{-2}$
	85%	84%	91%	40%
Plastic	$2.49x10^{-3}$	$2.49x10^{-3}$	$2.49x10^{-3}$	$2.49x10^{-3}$
	12%	12%	9.1%	5.5%
Wood	$6.78x10^{-4}$	$9.04x10^{-4}$	0.00	$2.49x10^{-2}$
	3.2%	4.2%	0%	55%
Total Packaging	**$2.12x10^{-2}$**	**$2.15x10^{-2}$**	**$2.74x10^{-2}$**	**$4.54x10^{-2}$**
	100%	**100%**	**100%**	**100%**

2.11 FURTHER INFORMATION

Further information on the product can be found on the manufacturer's website www.versadesignedsurfaces.com.

3. LCA: Calculation Rules

3.1 DECLARED UNIT

The Versa wallcovering products are suitable for both commercial and residential interiors and provide the primary function of wall protection and decoration. According to ISO 14044, the functional unit is "the quantified performance of a product system, for use as a reference unit." In accordance with the PCR for cradle-to-gate LCAs, a declared unit of one square meter of wallcovering at the factory gate is used in the assessment.

Table 8. *Declared unit and reference flow for the Versa wallcovering products under study.*

Name	Unit	Circon wallcovering - US	Circon wallcovering - China	Circon wallcovering - UAE	Circon wallcovering - Netherlands
Declared Unit	-	1 m^2 of product	1 m^2 of product	1 m^2 of product	1 m^2 of product
Mass	kg	0.452	0.452	0.455	0.455
Thickness to achieve declared unit	mm	0.25	0.25	0.25	0.25
Conversion factor to 1 kg	m^2	2.21	2.21	2.22	2.22

3.2 SYSTEM BOUNDARY

The scope of the EPD is cradle-to-gate with product storage, including raw material extraction and processing, transportation, product manufacture and product storage. The life cycle phases included in the EPD scope are described in Table 9 and illustrated in Figure 1.

Table 9. *The modules and unit processes included in the scope for the Versa Circon wallcovering product system.*

Module	Module Description	Unit Processes Included in Scope
A1	Extraction and processing of raw materials; any reuse of products or materials from previous product systems; processing of secondary materials; generation of electricity from primary energy resources; energy, or other recovery processes from secondary fuels	Extraction and processing of raw materials for the product components.
A2	Transport (to the manufacturer)	Transport of component materials to the manufacturing facilities
A3	Manufacturing, including ancillary material production	Manufacturing of the wallcovering products and packaging (including upstream unit processes*)
A4-A5	Product storage	Storage of products, including heating, cooling, humidity control, etc.

3.3 UNITS

All data and results are presented using SI units.

3.4 ESTIMATES AND ASSUMPTIONS

- Electricity use at the manufacturing facilities was allocated to the products based on the product area as a fraction of the total production.
- The Versa production facilities are located in the US, China, the UAE and the Netherlands. Ecoinvent inventory datasets region-specific electricity grids were used to estimate resource use and emissions from electricity use at the manufacturing facilities.
- Inventory data for some material components were unavailable and modeled using proxy datasets from the Ecoinvent LCI databases.
- Product storage prior to shipment to the installation site was modeled based on information provided by the manufacturer. Electricity and natural gas used at the warehousing facility were allocated to the

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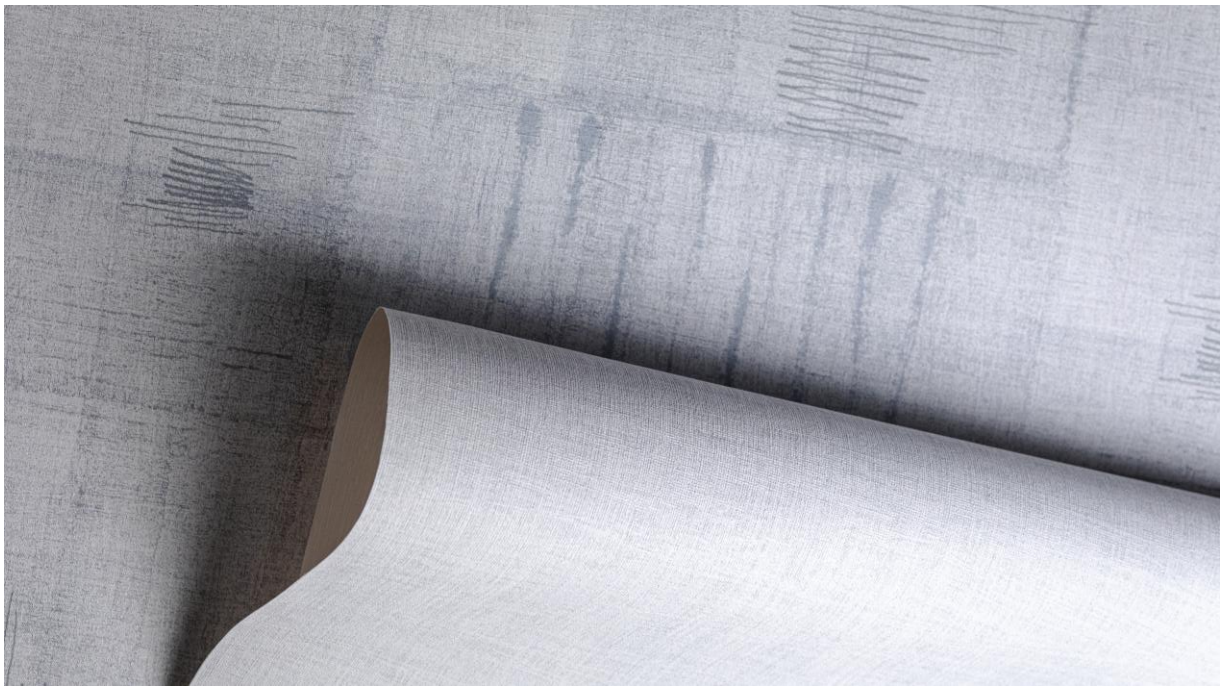
products based on the product area as a fraction of the total facility storage. Only the US-based manufacturer warehouses their product prior to shipment.

The PCR requires the results for several inventory flows related to construction products to be reported including energy and resource use and waste and outflows. These are aggregated inventory flows, and do not characterize any potential impact; results should be interpreted taking into account this limitation.

3.5 CUT-OFF RULES

According to the PCR, processes contributing greater than 1% of the total environmental impact indicator for each impact are included in the inventory. No data gaps were allowed which were expected to significantly affect the outcome of the indicator results. No known flows are deliberately excluded from this EPD.



3.6 DATA SOURCES

Primary data were provided for the manufacturing facility. The sources of secondary LCI data are the Ecoinvent database.

Table 10. *Data sources for the wallcovering products.*

Component	Dataset	Data Source	Publication Date
PRODUCT			
Polyvinyl Chloride	polyvinylchloride production, bulk polymerisation | polyvinylchloride, bulk polymerised | Cutoff, S/RoW;	EI v3.11	2024
Filler	Proprietary	Supplier EPD	2024
PVC Plasticizer	dioctyl terephthalate production | dioctyl terephthalate | Cutoff, S/GLO	EI v3.11	2024
Stabilizer	market for chemical, organic | chemical, organic | Cutoff, S/GLO	EI v3.11	2024
	limestone production, crushed, washed | limestone, crushed, washed | Cutoff, S/RoW	EI v3.11	2024
	market for solvent, organic | solvent, organic | Cutoff, S/GLO	EI v3.11	2024
	market for zinc oxide | zinc oxide | Cutoff, S/GLO	EI v3.11	2024
Natural fiber	market for textile, woven cotton | textile, woven cotton | Cutoff, S/GLO	EI v3.11	2024
Other			
Additives	stearic acid production | stearic acid | Cutoff, S/GLO	EI v3.11	2024
	market for chemical, organic | chemical, organic | Cutoff, S/GLO	EI v3.11	2024
Ink	printing ink production, offset, product in 47.5% solution state | printing ink, offset, without solvent, in 47.5% solution state | Cutoff, S/RoW	EI v3.11	2024
PACKAGING			
Cardboard/Paper	corrugated board box production | corrugated board box | Cutoff, S/RoW; containerboard production, linerboard, testliner | containerboard, linerboard | Cutoff, S/RoW	EI v3.11	2024
Wrapping film	packaging film production, low density polyethylene | packaging film, low density polyethylene | Cutoff, S/RoW	EI v3.11	2024
Wood	EUR-flat pallet production | EUR-flat pallet | Cutoff, S/RoW	EI v3.11	2024
TRANSPORT			
Road transport	market for transport, freight, lorry 16-32 metric ton, EURO4 | transport, freight, lorry 16-32 metric ton, EURO4 | Cutoff, S/RoW	EI v3.11	2024
Rail transport	transport, freight train, diesel | transport, freight train | Cutoff, S/RoW	EI v3.11	2024
Ship transport	transport, freight, sea, container ship | transport, freight, sea, container ship | Cutoff, S/GLO	EI v3.11	2024
RESOURCES			
Grid electricity - US	market for electricity, medium voltage | electricity, medium voltage | Cutoff, U - RFCW/US-RFC	EI v3.11	2024
Grid electricity - China	market group for electricity, medium voltage | electricity, medium voltage | Cutoff, S/CN	EI v3.11	2024
Grid electricity - UAE	market for electricity, medium voltage | electricity, medium voltage | Cutoff, S/AE	EI v3.11	2024
Grid electricity – the Netherlands	market for electricity, medium voltage | electricity, medium voltage | Cutoff, S/NL	EI v3.11	2024
Heat – natural gas	market for heat, central or small-scale, natural gas | heat, central or small-scale, natural gas | Cutoff, S/RoW	EI v3.11	2024
WASTE DISPOSAL			
Landfill	treatment of municipal solid waste, sanitary landfill | municipal solid waste | Cutoff, S/RoW	EI v3.11	2024
Wastewater	treatment of wastewater, average, wastewater treatment | wastewater, average | Cutoff, S/RoW	EI v3.11	2024

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3.7 DATA QUALITY

The data quality assessment addressed the following parameters: time-related coverage, geographical coverage, technological coverage, precision, completeness, representativeness, consistency, reproducibility, sources of data, and uncertainty.

Table 11. *Data quality assessment for the wallcovering product system.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	The most recent available data are used, based on other considerations such as data quality and similarity to the actual operations. Typically, these data are less than 5 years old. All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases. Manufacturer-supplied data (primary data) are based on annual production for 2023.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Electricity use for product manufacture is modeled using representative data for the applicable electricity gird resource mix. Surrogate data used in the assessment are representative of global or European operations. Data representative of European operations is considered sufficiently similar to actual processes.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations. Representative fabrication datasets, specific to the type of material, are used to represent the actual processes, as appropriate.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the products. In some instances, surrogate data used to represent upstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% of the total environmental impact for each indicator are excluded.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent v3.11 data where available. Different portions of the product life cycle are equally considered.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	Data representing energy use at the manufacturing facility represents an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. For secondary LCI data, Ecoinvent v3.11 LCI data are used.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to materials in the products and packaging is low. Actual supplier data for upstream operations were not available and the study relied upon the use of existing representative datasets. These datasets contained relatively recent data (<10 years) but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

3.8 PERIOD UNDER REVIEW

The period of review is calendar year 2023.

3.9 ALLOCATION

Manufacturing resource use was allocated to the products based on surface area of the products. Area-based allocation was deemed most appropriate for the wallcovering products as total facility production was available as total square meters of product produced. Electricity use at the manufacturing facilities was modeled using ecoinvent inventory datasets for the region-specific electrical grids.

The product system includes some recycled materials (regrind), which were allocated using the recycled content allocation method (also known as the 100-0 cut off method). Using the recycled content allocation approach, system inputs with recycled content do not receive any burden from the previous life cycle other than reprocessing of the waste material. At end-of-life, materials which are recycled leave the system boundaries with no additional burden.

Impacts from transportation were attributed to the products based on the mass of material and distance transported.

3.10 COMPARABILITY

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.

4. LCA: Scenarios and Additional Technical Information

Product storage (A4 - A5)

Following manufacture at the US production facility, the products are stored at the manufacturer's warehouse facility prior to shipment to consumers. The manufacturing facility and warehouse are co-located and therefore no additional transportation is required for this stage. Electricity and natural gas used for climate control of the facility are included in this stage of the product life cycle.

5. LCA: Results

Results of the Life Cycle Assessment are presented below. It is noted that LCA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. All LCA results are stated to three significant figures in agreement with the PCR for this product and therefore the sum of the total values may not exactly equal 100%.

category indicators are estimated using the TRACI 2.1 characterization factors for the US, EN15804 for the Netherlands and CML-IA characterization factors for China and the UAE. The impact indicators considered for the assessment include:

- Potential for Global Warming
- Acidification Potential
- Eutrophication Potential
- Smog Formation Potential
- Ozone Depletion Potential

These impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes.

The following inventory parameters, specified by the PCR, are also reported.

Resources	Unit	Waste and Outflows	Unit
Renewable primary resources used as an energy carrier (fuel)	MJ, LHV	Hazardous waste disposed	kg
Renewable primary resources with energy content used as material	MJ, LHV	Non-hazardous waste disposed	kg
Renewable primary resources with energy content used as material	MJ, LHV	High-level radioactive waste, conditioned, to final repository	kg
Non-renewable primary resources with energy content used as material	MJ, LHV	Intermediate- and low-level radioactive waste, conditioned, to final repository	kg
Secondary materials	kg	Components for re-use	kg
Renewable secondary fuels	MJ, LHV	Materials for recycling	kg
Non-renewable secondary fuels	MJ, LHV	Materials for energy recovery	kg
Recovered energy	MJ, LHV	Exported energy	MJ, LHV
Use of net freshwater resources	m^3	-	-

Table 12. *TRACI Life Cycle Impact Assessment results for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(Manufactured in the US)***

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing	Warehousing
Global warming (IPCC 2013)	kg CO_2 eq	1.85	$2.62x10^{-2}$	0.430	$2.44x10^{-2}$
	%	79%	1.1%	18%	1%
Acidification	kg SO_2 eq	$1.11x10^{-2}$	$3.40x10^{-4}$	$8.61x10^{-4}$	$3.19x10^{-5}$
	%	90%	2.8%	7%	0.26%
Eutrophication	kg N eq	$2.36x10^{-2}$	$3.44x10^{-5}$	$5.16x10^{-3}$	$1.53x10^{-4}$
	%	82%	0.12%	18%	0.53%
Smog formation	kg O_3 eq	0.108	$7.69x10^{-3}$	$1.39x10^{-2}$	$4.28x10^{-4}$
	%	83%	5.9%	11%	0.33%
Ozone depletion	kg CFC11 eq	$6.52x10^{-7}$	$4.20x10^{-10}$	$6.39x10^{-9}$	$3.79x10^{-10}$
	%	99%	0.064%	0.97%	0.058%
Abiotic depletion, fossil fuels	MJ, LHV	25.1	0.329	4.06	0.293
	%	84%	1.1%	14%	0.98%

Table 13. *Resource use and waste flows for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. (****Manufactured in the US)***

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing	Warehousing
Resources					
Renewable primary resources used as an energy carrier (fuel)	MJ	4.92	$6.16x10^{-3}$	1.28	$5.49x10^{-3}$
	%	79%	0.099%	21%	0.088%
Renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00	0.00
	%	0%	0%	0%	0%
Non-renewable primary resources used as an energy carrier (fuel),	MJ	27.4	0.335	5.45	0.335
	%	82%	1%	16%	1%
Non-renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00	0.00
	%	0%	0%	0%	0%
Use of secondary materials	MJ	0.00	0.00	0.00	0.00
Use of Renewable secondary fuels	MJ	0.00	0.00	0.00	0.00
Use of Nonrenewable secondary fuels	MJ	0.00	0.00	0.00	0.00
Recovered energy	MJ	0.00	0.00	0.00	0.00
Use of net fresh water	m^3	0.915	$2.90x10^{-4}$	$2.36x10^{-2}$	$5.63x10^{-4}$
	%	97%	0.031%	2.5%	0.06%
Wastes					
Hazardous waste disposed	kg	$1.91x10^{-3}$	$2.00x10^{-6}$	$1.84x10^{-5}$	$1.36x10^{-6}$
	%	99%	0.1%	0.95%	0.07%
Non-hazardous waste disposed	kg	0.221	$6.01x10^{-3}$	0.211	$6.15x10^{-3}$
	%	50%	1.4%	47%	1.4%
High-level radioactive waste	kg	$9.54x10^{-6}$	$2.60x10^{-8}$	$3.95x10^{-6}$	$1.22x10^{-7}$
	%	70%	0.19%	29%	0.89%
Low- and intermediate-level radioactive wastes	kg	$2.76x10^{-5}$	$6.42x10^{-8}$	$1.61x10^{-5}$	$4.89x10^{-7}$
	%	62%	0.15%	36%	1.1%
Components for re-use	kg	0.00	0.00	0.00	0.00
Materials for recycling	kg	0.00	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00	0.00
Exported energy	MJ	0.00	0.00	0.00	0.00

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Table 14. *CML Life Cycle Impact Assessment results for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits.* ***(Manufactured in China)***

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing
Global warming (IPCC 2013)	kg CO_2 eq	1.71	0.151	0.260
	%	81%	7.2%	12%
Acidification	kg SO_2 eq	$9.12x10^{-3}$	$1.69x10^{-3}$	$1.20x10^{-3}$
	%	76%	14%	10%
Eutrophication	kg $(PO_4)^{3-}$ eq	$1.03x10^{-2}$	$2.97x10^{-4}$	$5.94x10^{-4}$
	%	92%	2.6%	5.3%
Photochemical oxidation	kg C_2H_4 eq	$5.04x10^{-4}$	$5.16x10^{-5}$	$4.70x10^{-5}$
	%	84%	8.6%	7.8%
Ozone layer depletion	kg CFC-11 eq	$4.85x10^{-7}$	$1.82x10^{-9}$	$8.50x10^{-10}$
	%	99%	0.37%	0.17%
Abiotic depletion	kg Sb eq	$3.74x10^{-6}$	$2.84x10^{-7}$	$9.53x10^{-8}$
	%	91%	6.9%	2.3%
Abiotic depletion, fossil fuels	MJ, LHV	23.0	1.87	2.65
	%	84%	6.8%	9.6%

Table 15. *Resource use and waste flows for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. (****Manufactured in China)***

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing
Resources				
Renewable primary resources used as an energy carrier (fuel)	MJ	4.59	$4.06x10^{-2}$	0.758
	%	85%	0.75%	14%
Renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00
	%	0%	0%	0%
Non-renewable primary resources used as an energy carrier (fuel),	MJ	25.2	1.91	2.87
	%	84%	6.4%	9.6%
Non-renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00
	%	0%	0%	0%
Use of secondary materials	MJ	0.00	0.00	0.00
Use of Renewable secondary fuels	MJ	0.00	0.00	0.00
Use of Nonrenewable secondary fuels	MJ	0.00	0.00	0.00
Recovered energy	MJ	0.00	0.00	0.00
Use of net fresh water	m^3	0.856	$1.82x10^{-3}$	$1.49x10^{-2}$
	%	98%	0.21%	1.7%
Wastes				
Hazardous waste disposed	kg	$1.75x10^{-3}$	$1.14x10^{-5}$	$9.78x10^{-6}$
	%	99%	0.65%	0.55%
Non-hazardous waste disposed	kg	0.202	$2.65x10^{-2}$	$2.06x10^{-2}$
	%	81%	11%	8.3%
High-level radioactive waste	kg	$8.79x10^{-6}$	$1.68x10^{-7}$	$7.71x10^{-7}$
	%	90%	1.7%	7.9%
Low- and intermediate-level radioactive wastes	kg	$2.53x10^{-5}$	$4.19x10^{-7}$	$2.23x10^{-6}$
	%	91%	1.5%	8%
Components for re-use	kg	0.00	0.00	0.00
Materials for recycling	kg	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00
Exported energy	MJ	0.00	0.00	0.00

Table 16. *CML Life Cycle Impact Assessment results for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. (**Manufactured in the UAE**)*

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing
Global warming (IPCC 2013)	kg CO_2 eq	2.11	$6.83x10^{-2}$	0.954
	%	67%	2.2%	30%
Acidification	kg SO_2 eq	$1.20x10^{-2}$	$1.37x10^{-3}$	$1.07x10^{-3}$
	%	83%	9.5%	7.4%
Eutrophication	kg $(PO_4)^{3-}$ eq	$1.12x10^{-2}$	$1.59x10^{-4}$	$2.69x10^{-3}$
	%	80%	1.1%	19%
Photochemical oxidation	kg C_2H_4 eq	$5.99x10^{-4}$	$3.82x10^{-5}$	$1.19x10^{-4}$
	%	79%	5%	16%
Ozone layer depletion	kg CFC-11 eq	$4.90x10^{-7}$	$8.03x10^{-10}$	$1.40x10^{-8}$
	%	97%	0.16%	2.8%
Abiotic depletion	kg Sb eq	$4.11x10^{-6}$	$6.02x10^{-8}$	$3.39x10^{-7}$
	%	91%	1.3%	7.5%
Abiotic depletion, fossil fuels	MJ, LHV	27.4	0.851	11.9
	%	68%	2.1%	30%

Table 17. *Resource use and waste flows for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. **(Manufactured in the UAE)***

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing
Resources				
Renewable primary resources used as an energy carrier (fuel)	MJ	4.98	$7.28x10^{-3}$	0.651
	%	88%	0.13%	12%
Renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00
	%	0%	0%	0%
Non-renewable primary resources used as an energy carrier (fuel),	MJ	29.8	0.858	13.2
	%	68%	2%	30%
Non-renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00
	%	0%	0%	0%
Use of secondary materials	MJ	0.00	0.00	0.00
Use of Renewable secondary fuels	MJ	0.00	0.00	0.00
Use of Nonrenewable secondary fuels	MJ	0.00	0.00	0.00
Recovered energy	MJ	0.00	0.00	0.00
Use of net fresh water	m^3	0.877	$4.20x10^{-4}$	$7.39x10^{-2}$
	%	92%	0.044%	7.8%
Wastes				
Hazardous waste disposed	kg	$1.77x10^{-3}$	$4.65x10^{-6}$	$6.47x10^{-5}$
	%	96%	0.25%	3.5%
Non-hazardous waste disposed	kg	0.247	$9.17x10^{-3}$	0.323
	%	43%	1.6%	56%
High-level radioactive waste	kg	$9.71x10^{-6}$	$3.26x10^{-8}$	$3.65x10^{-6}$
	%	72%	0.24%	27%
Low- and intermediate-level radioactive wastes	kg	$2.80x10^{-5}$	$7.82x10^{-8}$	$1.31x10^{-5}$
	%	68%	0.19%	32%
Components for re-use	kg	0.00	0.00	0.00
Materials for recycling	kg	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00
Exported energy	MJ	0.00	0.00	0.00

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Table 18. *EN15804 Life Cycle Impact Assessment results for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. (**Manufactured in The Netherlands**)*

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing
GWP - total (IPCC 2021)	kg CO_2 eq.	1.87	0.319	0.280
	%	76%	13%	11%
GWP - fossil fuels (GWP-fossil)	kg CO_2 eq.	2.02	0.318	0.160
	%	81%	13%	6.4%
GWP - biogenic (GWP-biogenic)	kg CO_2 eq.	-0.207	$2.92x10^{-4}$	0.119
	%	240%	-0.33%	-140%
GWP - land use and land use change	kg CO_2 eq.	$5.77x10^{-2}$	$2.40x10^{-4}$	$1.72x10^{-4}$
	%	99%	0.41%	0.3%
GWP – GHG	kg CO_2 eq.	2.13	0.319	0.302
	%	77%	12%	11%
Acidification potential, Accumulated Exceedance	mol H+ eq.	$1.70x10^{-2}$	$2.97x10^{-3}$	$4.76x10^{-4}$
	%	83%	14%	2.3%
Depletion potential of the stratospheric ozone layer	kg CFC-11 eq.	$6.43x10^{-7}$	$4.43x10^{-9}$	$3.02x10^{-9}$
	%	99%	0.68%	0.46%
Eutrophication potential - freshwater	kg P eq.	$8.70x10^{-4}$	$3.95x10^{-5}$	$8.37x10^{-5}$
	%	88%	4%	8.4%
Eutrophication potential - marine	kg N eq.	$1.55x10^{-2}$	$1.29x10^{-3}$	$3.65x10^{-4}$
	%	90%	7.5%	2.1%
Eutrophication potential - terrestrial	mol N eq.	$5.59x10^{-2}$	$1.40x10^{-2}$	$1.46x10^{-3}$
	%	78%	20%	2%
Photochemical Ozone Creation Potential	kg NMVOC eq.	$9.72x10^{-3}$	$4.03x10^{-3}$	$5.08x10^{-4}$
	%	68%	28%	3.6%
Potential incidence of disease due to PM emissions	Disease Incidence	$1.36x10^{-7}$	$3.06x10^{-8}$	$4.82x10^{-9}$
	%	79%	18%	2.8%
Potential Soil quality index	Dimensionless	31.6	2.36	8.40
	%	75%	5.6%	20%
Water (user) deprivation potential	m^3 World eq.	16.9	$3.22x10^{-2}$	$4.42x10^{-2}$
	%	100%	0.19%	0.26%

Table 19. *Resource use and waste flows for the vinyl wallcovering products from cradle-to-gate and product storage. Results reported in MJ are calculated using lower heating values. All values are rounded to three significant digits. (**Manufactured in The Netherlands**)*

Impact Category	Unit	Raw Materials	Upstream Transport	Manufacturing
Resources				
Renewable primary resources used as an energy carrier (fuel)	MJ	4.98	0.112	1.62
	%	74%	1.7%	24%
Renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00
	%	0%	0%	0%
Non-renewable primary resources used as an energy carrier (fuel),	MJ	29.8	4.00	2.25
	%	83%	11%	6.2%
Non-renewable primary resources with energy content used as material	MJ	0.00	0.00	0.00
	%	0%	0%	0%
Use of secondary materials	MJ	0.00	0.00	0.00
Use of Renewable secondary fuels	MJ	0.00	0.00	0.00
Use of Nonrenewable secondary fuels	MJ	0.00	0.00	0.00
Recovered energy	MJ	0.00	0.00	0.00
Use of net fresh water	m^3	0.877	$4.77x10^{-3}$	$1.25x10^{-2}$
	%	98%	0.53%	1.4%
Wastes				
Hazardous waste disposed	kg	$1.77x10^{-3}$	$2.50x10^{-5}$	$1.40x10^{-5}$
	%	98%	1.4%	0.77%
Non-hazardous waste disposed	kg	0.247	$6.03x10^{-2}$	0.268
	%	43%	10%	47%
High-level radioactive waste	kg	$9.71x10^{-6}$	$4.56x10^{-7}$	$9.96x10^{-7}$
	%	87%	4.1%	8.9%
Low- and intermediate-level radioactive wastes	kg	$2.80x10^{-5}$	$1.14x10^{-6}$	$3.53x10^{-6}$
	%	86%	3.5%	11%
Components for re-use	kg	0.00	0.00	0.00
Materials for recycling	kg	0.00	0.00	0.00
Materials for energy recovery	kg	0.00	0.00	0.00
Exported energy	MJ	0.00	0.00	0.00

6. LCA: Interpretation

The contributions to total impact indicator results are dominated by the raw material extraction and processing (A1) followed by the product manufacturing (A3) phase. Impact contributions from the upstream transport phase (A2) range from less than 1% to 32%, depending on the specific product and indicator, while impacts from product storage (A4/A5) are minimal.

7. Additional Environmental Information

The PVC resin portion of this product is comprised of bio-attributed PVC resin produced under a mass balance program certified by ISCC+ and RSB.

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